MACROECONOMIC AND INSTITUTIONAL DETERMINANTS OF STOCK MARKET DEVELOPMENT: THE CASE OF MALAWI STOCK EXCHANGE

Master of Arts (Economics) Thesis

By

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DECLARATION

I the undersigned hereby declare that this thesis is my original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used acknowledgments have been made.

Chimwemwe Chijere

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Signature

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Date

CERTIFICATE OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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DEDICATION

To my loving mom and dad, Sophia and Daniel Chijere.

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My sincere thanks go to Dr Ronald Mangani my supervisor, who constructively critiqued and guided me on this work.

I must thank my parents, brothers and my fiancée Mercy Muhaniwa for their moral support.

ABSTRACT

This study was undertaken to find out if the macroeconomic variables and institutions can account for stock market development and volatility on the Malawi Stock Exchange. The study employs a GARCH (1, 1) model with quarterly data from 1996q4 to 2012q1. The empirical results indicate that macroeconomic variables and institutional factors have significant impact on stock market development and volatility.

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LIST OF ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey-Fuller
APT	Arbitrage Pricing Theory
ARCH	Auto Regressive Conditional Heteroskedasticity
ASEA	African Securities Exchanges Association
BHL	Blantyre Hotels Limited
CAPM	Capital Asset Pricing Model
FMB	First Merchant Bank
GARCH	Generalised Auto Conditional Heteroskedasticity
GDP	Gross Domestic Product
JSE	Johannesburg Stock Exchange
LM	Langrage Multiplier
MPICO	Malawi Properties Investment Company
MSE	Malawi Stock Exchange
NBM	National Bank of Malawi
NBS	New Building Society Bank
NITL	National Investment Trust Limited
OML	Old Mutual plc
PCL	Press Corporation Limited
RER	Real Exchange Rate
SADC	Southern Africa Development Community
SAPs	Structural Adjustment Programs

SE	Stock Exchange
STD.ERR	Standard Error
TNM	Telekom Networks Malawi
VT	Value Traded

CHAPTER ONE

INTRODUCTION

1.1 Background

Stock market development is a multi-dimensional concept. It is usually measured by stock market size, liquidity, volatility, concentration, integration with the world capital markets and institutional development (Levine and Zervos (1996); Demigue-Kunt and Levine 1996b). It is recognised that a well functioning financial system is very important in economic growth. As part of the financial system, the stock markets play an important role in economic growth.

Literature shows that there is a reciprocal relationship between financial development and economic growth. Economic growth makes the development of financial intermediation system profitable, and the establishment of an efficient financial system permits faster economic growth. By specializing in fund pooling, risk diversification, liquidity management, project evaluation and monitoring, the financial system improves the efficiency of capital allocation and increases the productive capacity of the real sector. At the same time, the technological efficiency of the financial sector increases with its size, because economies of scale and learning-by-doing effects are present in financial intermediation activities. As a result, the real sector can exert a positive externality on the financial sector through the volume of savings. Therefore, financial development and economic growth positively influence each other in the process of development (Garcia V.F and Liu L. 1999). Thus this

paper examines the macroeconomic and institutional determinants of stock market development, taking the Malawi stock exchange as a case study.

1.2 Statement of the Problem

Theoretical and empirical literature shows that establishing the determinants of stock market development remains wanting. There is no sufficiently rigorous understanding of the emergence, development and economic implications of different financial structures. Financial structures, be it the mix of financial contracts, markets, and institutions tend to vary across countries and changes as countries develop (Boyd and Smith 1996; Levine 1996). As this might be, we do not have adequate studies to show what determines the emergence and subsequent development of stock markets.

There has been a significant development in the African capital markets since the early 1990s. Prior to 1989, there were just five stock markets in sub-Saharan Africa and three in North Africa (Yarty C.A and Adjasi C.K 2007). To date, there are about 19 stock exchanges in Africa. With the exception of South Africa, most African stock markets doubled their market capitalisation between 1992 and 2002. Total market capitalisation for African markets increased from US$ 113,423 million to US$ 244,672 million between 1992 and 2002 (Yarty C.A and Adjasi C.K 2007).

Table 1: Comparative Statistics of SEs

Exchanges	Value Traded (USD)	Volume Traded	Market Cap (USD)	Turnover Ratio (%)	Number of Listed Companies
Uganda SE	16,372,900	46,139,325	4,031,000,000	0.41%	14
Dar Es Salaam SE	32,854,400	133,403,198	7,389,640,000	0.44%	17
Rwanda Stock Exchange	35,274,460	118,134,400	1,589,300,000	2.20%	4
Malawi SE	53,346,700	1,590,006,071	1,384,213,000	3.15%	14
Lusaka SE	149,102,000	1,148,269,144	9,409,000,000	1.59%	21
BRVM	150,713,600	19,799,503	7,670,831,000	0.00%	67
Botswana SE	193,450,500	667,891,882	58,888,770,000	3.30%	37
Ghana SE	269,010,000	252,870,000	28,522,430,000	0.01%	34
Zimbabwe SE	477,524,000	4,610,008,413	3,690,000,000	12.95%	77
SE of Mauritius	559,140,500	347,394,601	7,681,570,000	7.28%	87
Namibian SE	560,735,700	344,765,582	137,857,900,000	0.00%	32
Bourse de Tunis	1,130,428,000	254,869,295	9,641,350,000	12.00%	57
Nigerian SE	4,181,930,000	89,576,608,901	67,681,100,000	8.36%	198
Nairobi SE	6,268,647,000	5,721,831,529	10	8.87%	58
Casablanca SE	12,051,500,000	33,752,357	60,185,400,000	9.57%	76
JSE Ltd.	407,370,000,000	71,463,833,873	856,242,000,000	0.00%	406

Source: ASEA 2011 Data.

The above trend does not mean that these stock markets are fully grown. In most of the markets, trading occurs in only few stocks which account for a considerable part of the total market capitalisation. In the Malawian case, as evidenced by the indicators of stock market development in Table 1 above, the Malawi Stock Exchange is small with only 14 listed companies as compared to the average of 75 companies in the African Securities Exchange Association (ASEA). The market capitalisation for Malawi Stock Exchange (MSE) is as low as US$1,384,213,000 compared to the average of US$ 27,041,500,267 (excluding JSE

which is an outlier). Taking all these into account, the question which remains is: what determines the development of the Malawi Stock Exchange?

1.3 Significance of the Study

Studies by Demirgue-Kunt and Levine (1996); Demirgue-Kunt and Maksimore 1998; Gracia and Liu (1999); Yartey (2007b); and Maksimore (1998) suggests that sound macroeconomic environment, well developed banking sector, transparent and accountable regulatory framework and shareholder protection are necessary preconditions for the efficient functioning of stock markets. Stability of the macroeconomic environment is very important for the development of the stock market as its volatility worsens the problem of information asymmetries and becomes a source of vulnerability to the financial system. Gracia and Liu (1999) further show that sound macroeconomic environment and sufficiently high income levels are important determinants of stock market development in emerging markets. Institutions, defined as the rules of the game may bring confidence in equity investment. Yartey (2007a) finds that good quality institutions such as law and order, democratic accountability, and bureaucratic quality are important determinants of stock market development in Africa because they reduce risk and enhance the viability of external finance.

Notwithstanding the vast empirical work on the subject, less has been done to establish the determinants of the development of the Malawi stock exchange in terms of market capitalisation and total value traded. A close work is by Govati (2009) who investigated on the relationship between stock prices on the Malawi stock exchange and macroeconomic variables – exchange rate, interest rate, money supply and

industrial production. This work needs to be buttressed by looking at other indicators of stock market development including other variables that might better explain stock market development.

This study therefore seeks to find out what determines the development of the Malawi Stock Exchange. It aims at ascertaining whether macroeconomic variables, namely interest rate, exchange rate and inflation rate; in addition to institutional development-measured by tax burden, affects stock market capitalisation and market liquidity on the Malawi Stock Exchange.

1.4 Study Objectives

1.4.1 General Objective

The overall objective of this study is to find out the macroeconomic and institutional determinants of Malawi Stock Exchange development. The stock market development is being measured by market capitalisation as a percentage of GDP, and total value traded. The macroeconomic variables that have been identified are: interest rate, exchange rate, gross domestic product and inflation rate. The institutional development is measured by tax burden.

1.4.2 SPECIFIC OBJECTIVES

More specifically, the study seeks to achieve the following:

a) Find out if the interest rate has an impact on market capitalisation and its volatility.

b) Find out if the exchange rate has an impact on market capitalisation and its volatility.

c) Find out if GDP has an impact on market capitalisation and its volatility.

d) Find out if the inflation rate has an impact on market capitalisation and its volatility.

e) Establish if tax burden has an impact on market capitalisation and its volatility.

f) Analyse if interest rate determines total value traded and its volatility.

g) Find out if exchange rate determines total value traded and its volatility.

h) Find out if inflation rate has an impact on total value traded and its volatility.

i)Find out if GDP has an impact on total value traded and its volatility.

j)Establish if tax burden determines total value traded and its volatility.

1.5 Research Hypothesis

With regard to the objectives of this study, the following null hypotheses will be tested:

a) The interest rate has no impact on market capitalisation and its volatility.

b) The exchange rate has no impact on market capitalisation and its volatility.

c) GDP has no impact on market capitalisation and its volatility.

d) The inflation rate has no impact on market capitalisation and its volatility.

e) The tax burden has no impact on market capitalisation and its volatility.

f) The interest rate does not determine total value traded and its volatility.

g) The exchange rate does not determine total value traded and its volatility.

h) The inflation rate has no impact on total value traded and its volatility.

i) GDP has no impact on total value traded and its volatility.

j) The tax burden does not determine total value traded and its volatility.

1.6 Organisation of the Study

This paper is structured into six chapters. The remainder of this thesis will progress as follows: Chapter two provides an overview of the Malawi Stock Exchange (MSE). Chapter three involves the theoretical and empirical review of the literature; Chapter four sets out the study methodology. Then, Chapter five discuses the estimation results; Chapter six gives the conclusions, the policy implications and areas of further research.

CHAPTER TWO

THE MALAWI STOCK EXCHANGE

2.1 Introduction

This chapter gives the background of the Malawi Stock Exchange in terms of market development. It further discuses the market size and depth of the MSE.

2.2 The Background and Market Development

The Malawi Stock Exchange (MSE) started in 1996; registered under the Capital Market Development Act of 1990. The MSE was part of the initiatives in the Structural Adjustment Programs (SAPs), which necessitated reforms in the financial market. The establishment of the stock exchange was seen as a means through which state owned enterprises could be listed and then the shares offered to the general public.

The market started with the listing of treasury bills. On 11 November 1996, National Insurance Company Limited (now Nico Holdings Company Limited) got listed. Thereafter, a number of companies got listed, as indicated in Table 2 below, the latest being Telekom Networks Malawi Limited in 2008. Late 2011, Packaging Industries (Malawi) limited got delisted from the market. As of June 2012, there were 14 listed counters on the Malawi Stock Exchange and these counters diversify in Banking, Insurance, financial services, tourism and hotel industries and manufacturing.

Table 2: Listed companies on the MSE

COUNTER NAME	MSE CODE	DATE LISTED
Blantyre Hotels Limited	BHL	25 March,1997
First Merchant Bank	FMB	19 June,2006
Illovo Sugar Malawi Limited	ILLOVO	10November,1997
Malawi Properties Investment Company Limited	MPICO	12November,2007
National Bank of Malawi	NBM	21 August,2000
NBS Bank	NBS	27 June,2007
NICO Holdings Limited	NICO	11November,1996
National Investment Trust Limited	NITL	21 March,2005
Press Corporation Limited	PCL	9 September,1998
Standard Bank Limited	STANDARDBANK	29 June,1998
Sunbird Tourism Limited	SUNBIRD	8 December,2002
Old Mutual plc	OML	12 July,1999
Real Insurance Company	REAL	29September,2008
Telekom Networks Malawi	TNM	3 November,2008

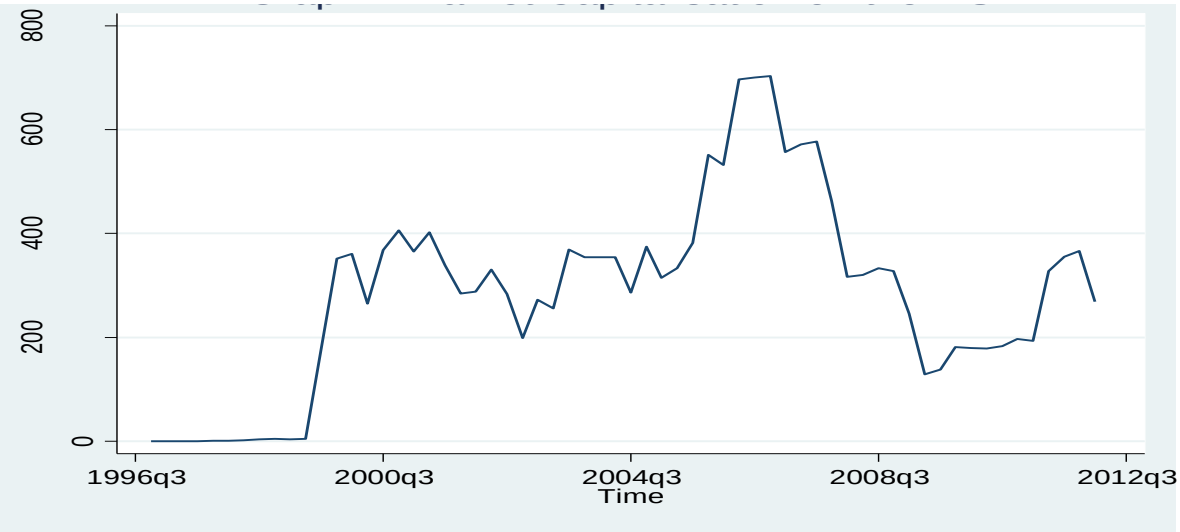
Source: www.mse.com

The principal object of the Exchange is to operate a Stock Exchange in Malawi with due regard to the public interest, and to maintain a fair and efficient dealing in securities for the protection of investors and to regulate the affairs of its members (www.mse.com).

2.3 The Market Size

The market size of the Malawi Stock Exchange is measured by the capitalisation ratio, which is the value of domestic equities traded on the stock exchange relative to the Gross Domestic Product (GDP). It is a measure of the relative size of the stock market to the economy. The market capitalisation for the period under study is depicted in Figure 1 below.

Figure 1: Market Capitalisation on the MSE

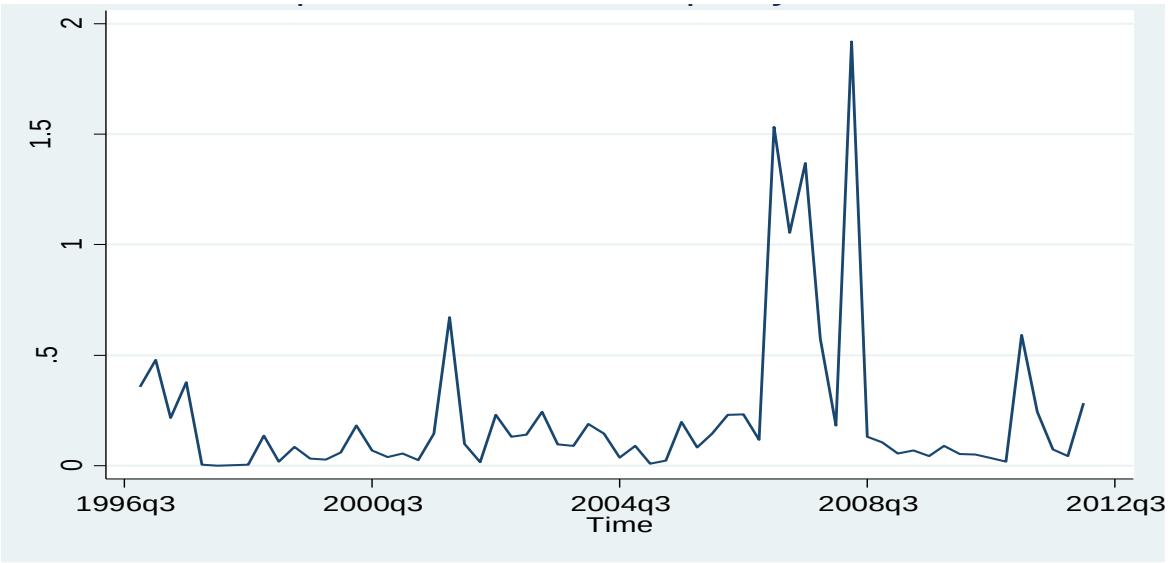


The graph shows that market capitalisation was not stable on the MSE for the period under study. The market capitalisation turned around in the third quarter of 1999 when it registered a significant positive return. This was then followed by a volatile period which lasted to the third quarter of 2001 before picking up in the last quarter of the same year. From the first quarter of 2008, there has been a down ward trend of market capitalisation on the MSE.

2.4 The Market Depth

Market depth refers to the liquidity or the ability to buy and sell shares (Yartey C.A. 2008).This can be measured by total value traded. Total value traded gives the total value of shares traded during the period. The ratio of total value traded to GDP gives a measure of the liquidity in the market. Market liquidity on the MSE is depicted by Figure 2 below, and it measures how easily securities can be bought or sold.

Figure 2: Stock Market Liquidity on the MSE



As depicted in Figure 2 above, market liquidity on the MSE has been relatively unstable. The MSE suffers from the problem of low liquidity. Among others, low liquidity as indicated by Yarty C.A and Adjasi C.K (2007) implies that it will be harder to support a local market with its own trading system, market analysis, and brokers because business volume would be too low.

CHAPTER THREE

THEORETICAL BACKGROUND AND THE LITERATURE

3.1 Introduction

This section reviews the theoretical and empirical literature in relation to the study.

3.2 THEORETICAL REVIEW

The development of stock markets can be identified in a number of ways. Firstly, one can look at changes in stock market dimension. A simple measure of stock market's size is the total value of all the shares in the market at each point in time (market capitalisation), or the average of this over a period. Market size is important because the level of savings mobilization and risk diversification depend on this indicator. A measure of stock market's size needs to take into account the dimension of the overall economic system. Thus the typical measure used is the ratio of market capitalization to gross domestic product (GDP). A developed market is also an efficient and liquid market in which financial funds can be mobilized at low costs and can move easily from one investment to the other. This feature can be captured by indicators such as the volume of shares traded in each period and the degree of concentration. The former measures the level of liquidity in the market, the later take into account the level of risk diversification. The other features can be captured in the regulatory framework which represents the basic organisation of the market (Capasso 2006; Demigue-Kunt and Levine 1996b; Levine and Zervos 1996).The degree of

development of a market is also influenced by the regulatory framework. Differences in regulatory system often explain the differences in equity market development between countries (Capasso 2006).

There are various ways in which the short-run and long-run relationships between macroeconomic variables and the stock market have been modelled in the literature. Let us now examine some of these relationships.

3.2.1 GDP Per Capita and Stock Market Development

Cadeleron-Rossell (1991) developed a behavioural structural model of stock market development. In this model economic growth and stock market liquidity are considered the main determinants of stock market development. Market capitalization is defined as follows:

$$Y = PV \qquad (1)$$

Where,

Y is market capitalization in local currency;

P is the number of listed companies in the stock market; and

V is the local currency average price of listed companies.

Then the model can be presented formally by:

$$Y = PV = Y(G, T) \qquad (2)$$

Where,

$$V = V(G, P) \; and \; P = P(T, V)$$

The exogenous variable G represents per capita GNP in local currency and variable T represents the turnover ratio. The endogenous variables are V, P, and T. The structural equations are then expressed in the following reduced behavioural model:

$$Log\ Y = \theta_1\ Log\ G + \theta_2\ Log\ T \qquad (3)$$

This can be rewritten as:

$$Log\ Y = Log(PV) = \alpha_1 Log\ G + \alpha_2 Log\ T + \gamma_1 Log\ G + \gamma_2 Log\ T \qquad (4)$$

Which leads to,

$$Log\ Y = (\alpha_1 + \gamma_1) Log\ G + (\alpha_2 + \gamma_2) Log\ T \qquad (5)$$

Where, $\theta_1 = (\alpha_1 + \gamma_1)$ and $\theta_2 = (\alpha_2 + \gamma_2)$

Equation (5) shows the impact of economic growth, *G*, and stock market liquidity, *T* on stock market development, *Y*. The model shows that stock market development is the result of the combined effects of economic growth and liquidity on both stock prices and the number of listed companies. Calderon-Rossell used data from 42 countries from the main active stock markets in the world with annual observations from 1980–87 to verify this model. The analysis shows that stock market liquidity and economic growth are important determinants of stock market development.

3.2.2 The Arbitrage Pricing Theory and the Capital Asset Pricing Model

Another approach in which the short-run and long-run relationships between macroeconomic variables and the stock market have been modelled in the literature

has been from an asset-pricing perspective referred to as the Arbitrage Pricing Theory (APT). Here, the asset-pricing model is used as a framework to address the question of whether risk associated with particular macroeconomic variables is reflected in expected asset returns. Examples include the work by Chen, Roll and Ross (1986) who applied the model to the United State of America as did Chen and Jordan (1993).

A closely-related analysis, based on intertemporal investor optimisation, is that of the capital asset pricing model (CAPM) which concentrates on a single macro influence, the growth of aggregate consumption (Grossman and Shiller 1981). The direction of influence underlying the asset-pricing literature is the traditional one which is based on the notion that ultimately the share market reflects the fundamental strengths and weaknesses of the aggregate economy so that the direction of influence is from the economy to the share market.

A similar focus is found in the literature which explores the response of aggregate share prices to the (expected) inflation rate in the spirit of the Fisher effect. Early work carried out in this area is by Bodie (1976), Fama and Schwert (1977), and Gultekin (1983) whereas more recent applications include those by Graham (1996), and Boucher (2006).

3.2.3 Multiple Equilibria Models

This school of thought suggests that differences in equity market size may reflect multiple equilibria arising from market externalities among market participants (Pagano 1993a). As participation affects the riskiness of securities and their sensitivity to order flow, a market in which actual and potential participants expect low participation, riskier assets and poor liquidity, can be trapped into self-validating persistent stagnation (Pagano 1989a and 1989b). In a similar vein, the number of

listed companies enhances risk sharing opportunities and the ability by investors to diversify their equity portfolio. As the demand for shares depends on the magnitude and variety of shares supplied, a market where few issues are expected to be listed will generate expectations of low demand, thus making entrepreneurs reluctant to go public and pay the related private costs (Battilossi S. and Morys M. 2011).

3.2.4 Stock Market Development and Globalisation.

Rajan and Zingales (2003b) propose an interest group theory. Here, the development of securities markets goes hand in hand with globalization. In a closed economy, incumbents in finance and industry are against the development of capital markets. Globalisation lowers entry barriers and tends to enhance competition, thus eroding the incumbents' dominant position since external competition arising from international trade and capital flows may require enhanced access to finance. Rajan and Zingales empirical tests suggest that, after controlling for the level of economic development, financial development is in fact positively correlated with trade and capital openness.

3.2.5 Stock Market Development and Economic Development

Another strand of theoretic literature suggests that the development of stock markets is positively correlated with the level of economic development and capital accumulation. This appears to be true across time and for many countries (Capasso 2006). Studies by Atje and Jovanovich (1996); Dermigue-Kunt and Maksimovic (1996); Levine and Zervos (1996) confirms that as economies develop, equity markets tend to expand both in terms of listed companies and in terms of market capitalization.

Capasso (2006) summarises the stylized facts about the development of stock markets. In the early stages of economic development, financial markets are very thin and very rudimentary. During these stages, the financial markets are dominated by banks, or similar types of financial intermediaries. Stock markets are completely absent or, if they exist in any form, their size is negligible. As capital accumulates financial intermediaries develop, the number of financial instruments increases, as does the level of sophistication and complexity of financial contracts and the flow of resources and funds accruing to the financial market increases in size. Stock markets start developing both in terms of the number of listed firms and capitalization.

As the economy continues to grow, equity markets develop further and so do banks and other financial intermediaries. Stock markets appear to develop in non-linear ways. In economies where stock markets are relatively small, capital accumulation seems to be followed by a relative increase in banks' share in the financial system. In economies where the stock market has already reached a reasonable size, further development of the market causes an increase in the equity markets' share (Capasso 2006).

3.2.6 The Modigliani-Miller Theorem

The Modigliani-Miller Theorem provides conditions under which a firm's financial decisions do not affect its value. With well-functioning markets, neutral taxes and rational investors, who can 'undo' the corporate financial structure by holding positive or negative amounts of debt, the market value of the firm (debt plus equity) depends only on the income stream generated by its assets. It follows, in particular, that the value of the firm should not be affected by the share of debt in its

financial structure or by what will be done with the returns paid out as dividends or reinvested (Modigliani 1980).

The Modigliani and Miller theorem is based on three key propositions. Firstly, the firm, acting rationally, will tend to push investment to the point where the marginal yield on physical assets is equal to the market rate of interest. Secondly, the expected rate of return on yield, *i* on the stock of any company *i*, belonging to *Kth* class is a linear function of leverage. This can be given as:

$$S=Pk+(Pk-r)Di/Si \quad (6)$$

Where S = expected rate of return or yield

Pk = capitalization rate

r = interest charged

Di = market value of debt for company

Si = market value of common share in the company

Lastly, if a firm, in class k, is acting in the best interest of the stockholders at the time of the decision, it will exploit an investment opportunity if and only if the rate of return on the investment, say "*P*", is as large as or larger than *Pk* and will be completely unaltered by the type of security used to finance the investment (Modigliani, 1988; Miller, 1988).

3.3 EMPERICAL LITERATURE REVIEW

Let us now review the empirical literature in relation to this study. To begin with, Ajayi and Mougoue (1996) investigated the short- and long- run relationship between stock markets and exchange rates in eight advanced economies. Their finding

is that currency depreciation leads to a decline in stock prices in the short run. The exchange rate depreciation suggests higher inflation in the future, which makes investors sceptical about the future performance of companies, as a result, the stock prices drop.

Granger, Huang and Yang's (2000) work further illustrates that the two markets can jointly affect each other. Their interest was to find whether currency depreciation lead to lower stock prices or whether declining stock prices lead to depreciating currencies during the Asian Crisis of 1997. The data on some of the Asian countries support the case of bivariate causality. Depreciation of an exchange rate could either raise or lower the value of a company, depending on whether the company mainly imports or mainly exports.

A number of studies have shown a significant relationship between stock market development and interest rates. Using monthly data from January 1988 to March 2003 Mahmudul and Gazi (2009) found that interest rate exerts significant negative relationship with share price for markets of Australia, Bangladesh, Canada, Chile, Colombia, Germany, Italy, Jamaica, Japan, Malaysia, Mexico, Philippine, South Africa, Spain, and Venezuela. For six countries from this sample, they show the availability of significant negative relationship between changes of interest rate and changes of share price. Mahmudul and Gazi (2009) further argue that if the interest rate is considerably controlled in these countries, it will be the great benefit for their Stock Exchange through demand pull.

Based on data from 23 February 2001 to 11 January 2008 for Turkey; Aydemir and Demirhan (2009) studied the causal relationship between stock prices and exchange rates. The study found a bidirectional causal relationship between

exchange rate and all stock market indices. They found a significant negative relationship between exchange rate and all stock market indices.

Sundararajan (1987) examined the linkages among interest rates, the debt–equity ratio of firms, the overall cost of capital, savings, investment and growth in the Korean economy during 1963–81. He used a dynamic framework that recognizes the complex interactions among these variables. According to this study, a change in the administered interest rate affects the unregulated rate, the overall cost of capital, the real interest rates and the debt-equity choice of firms. This thereby sets in motion a chain of responses influencing the desired level of the capital stock and its profitability, as well as the availability of savings and the consequent speed of adjustment of the actual capital stock to the desired level. The debt-equity ratio is important since the overall cost of capital to investors; which influences fixed investment, its efficiency and profits; can be expressed as a weighted sum of the opportunity cost of bank debt and that of equity, with the weights depending on the debt-equity ratio. Therefore, the multiplier effects of changes in the interest rate on the overall cost of capital, and hence on investment incentives and the productivity of capital, depend, among other things, on the share of debt in investment financing and on the induced adjustments in this share, and in the cost of equity. By implication, there exists an optimum debt-equity mix for firms. Consequently, the cost of capital depends on the debt-equity mix first falling and then rising as the debt ratio rises.

Ionnides, Katrakilidis and Lake (2002) investigated the relationship between stock market returns and inflation rate for Greece over the period 1985 to 2000. They argued that stock market can hedge inflation in line with fisher's hypothesis. Another argument was that the real stock market was immune to inflation pressures. The study attempted to investigate the three types of relationship; whether, firstly, the stock

market had been a safe place for investors in Greece. Empirical evidence classified the relationships into three types. First, there is a positive relationship between the stock market returns and inflation. They used ARDL co-integration technique in conjunction with Granger Causality to test the long run and short run effects between the involved variables as well as the direction of these effects. There was a long run negative relationship from inflation to stock market returns over the first sub-period. Bidirectional long run causality resulted in second sub period. There was a causal effect running from stock market returns to inflation.

Madsen (2002) used Fisher's hypothesis to estimate the relationship between share returns and inflation. Fisher hypothesis was tested for the process governing inflation, measurement of inflation expectations, and the time aggregation of data. The study demonstrated theoretically and empirically standard tests of the Fisher hypothesis that would be explained by differences in model specification, time aggregation of the data, inflation persistence in the data sample and whether instruments have been used for expected inflation. The interaction between model specification and inflation persistence was found to be particularly influential. The more persistent was inflation, the more favourable were estimates which used nominal share returns as the dependent variable to the Fisher hypothesis. In addition, tests were more favourable to the fisher hypothesis when low frequency data and instruments for expected inflation were used under the circumstances where nominal share returns were used as the independent variable.

Al-Rjoub (2003) investigated the effect of unexpected inflation on stock returns in five MENA countries: Bahrain, Egypt, Jordan, Oman, and Saudi Arabia. The study used Threshold GARCH and exponential GARCH to catch the news effect that unexpected inflation may have on stock market returns in all the MENA

countries. The impact is high and significant in Bahrain, Egypt, Jordan and Saudi Arabia and Oman. The negative leverage effect for Bahrain indicated the existence of the leverage effect in stock market return during the 1999:01 through 2002:07 sample periods. The impact was asymmetric. The leverage effect for Egypt was positive and it indicated the non existence of the leverage effect in stock market return during the 1999:01 through 2002:07 sample period. Results were similar for Jordan. In the case of Oman and Saudi Arabia, there was no news effect of inflation on stock market data. The study found negative and significant relationship between unexpected inflation and stock returns in MENA countries and indicate the stock markets of the listed MENA countries does not feel the fluctuation movements in the market.

Geyser and Lowies (2001) analysed the impact of inflation on stock prices in two SADC countries: South Africa and Namibia. The study used simple regression analysis. The result was that none of the selected countries offers a perfect hedge against inflation. The South African experience shows that the companies listed in the mining sector are negatively correlated against inflation. The selected companies in the financial services, information technology, and food and beverage sectors show slightly positive correlation between stock prices changes and inflation. All the selected companies for Namibia except Alexander Forbes show a strong positive correlation between stock price changes and inflation.

Saryal (2007) studied the impact of inflation on conditional stock market volatility in Turkey and Canada. The study examined the following two questions: first, how does inflation determine stock market volatility? Second, does the relation differ between countries with different rates of inflation? Canada and Turkey data were selected for comparison on the basis of their inflation level. Turkey was an emerging market with high inflation rate and Canada a developed country with a low

inflation rate. The results suggest that the higher the rate of inflation, the higher the nominal stock returns, consistent with the simple Fisher effect. The result showed the rate of inflation was one of the underlying determinants of conditional stock market volatility particularly in a country with high inflation rate like Turkey. The variability in the inflation rate had a stronger impact in forecasting stock market volatility in Turkey than in Canada.

Using Spline-GARCH model, Engle and Rengle (2005) finds that volatility in macroeconomic factors such as GDP growth, inflation and short term interest rates are important explanatory variables to the increase in stock market volatility. They observed positive relations among the long term market volatility and each of the following variables: emerging markets, inflation growth and macroeconomic volatilities. The study compared Spline-GARCH model results with the results of annual realized volatility as an alternative measure of unconditional volatility. Inflation variables were found to be insignificant due to the fact that realized volatility is a noisier measure of unconditional volatility.

Institutional quality is another important factor for stock market development because efficient institutions tend reduce risk in equity investment. The development of good quality institutions can affect the attractiveness of equity investment and lead to stock market development. Good quality institutions such as law and order, democratic accountability, bureaucratic quality are important determinants of stock market development in Africa because they reduce political risk and enhance the viability of external finance (Yartey 2007a).

The idea that the prosperity of a society depends on its economic institutions goes back at least to Adam Smith, for example in his discussions of mercantilism and the role of markets, and was prominent in the work of many nineteenth century

scholars such as John Stuart Mill. Societies are economically successful when they have good economic institutions and it is these institutions that are the cause of prosperity. We can think of these good economic institutions as consisting of an inter-related cluster of things. There must be enforcement of property rights for a broad cross-section of society so that all individuals have an incentive to invest, innovate and take part in economic activity. There must also be some degree of equality of opportunity in society, including such things as equality before the law, so that those with good investment opportunities can take advantage of them (Acemoglu D., Johnson S., Robinson J.A. 2005).

Using data on 44 developed and emerging markets from 1986 to 1993, Demirguc-Kunt and Levine (1996a) find that large stock markets are more liquid, less volatile, and more internationally integrated than smaller markets. Furthermore, institutionally developed markets with strong information disclosure laws, international accounting standards, and unrestricted capital flows are larger and more liquid markets.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1Introduction

This chapter gives the research methodology that has been employed inoder to achieve the objectives of the study.

4.2 Analytical Framework

Many time series exhibit a heteroskedastic (nonconstant variance) structure. In analysing macroeconomic data, Engle (1983) found evidence that for some kind of data, the disturbance variances in time series models were less stable than usually assumed. He suggested the autoregressive conditionally heteroskedastic process. The ARCH model has proven to be useful in studying the volatility of stock market returns (Engle, Lilien, and Robins 1987). This study will use the Generalised ARCH model developed by Bollerslev (1986). This model allows us to reduce the number of estimated parameters by imposing nonlinear restrictions. Empirical evidence has shown that to capture conditional variance dynamics one has to select a higher ARCH order. The GARCH (p, q) model expresses the variance as:

$$\sigma_t^2 = w + \alpha(L)\epsilon_t^2 + \beta(L)\sigma_t^2$$

Where $\alpha(L) = \sum_{i=1}^{q} \alpha_i L^i$ and $\beta(L) = \sum_{j=1}^{p} \beta_j L^j$

4.3 Model Specification: GARCH (1,1)

In order to test the determinants of stock market development, we will invoke the variables of interest into the GARCH model discussed above. We are going to estimate two models as described below. Let the first model be Model A. In this model, we let MC_t be market capitalisation at time *t;* INF_t be the inflation rate at time *t;* INT_t be the interest rate at time *t;* ER_t be the real exchange rate at time *t;* $TAXB_t$ be the tax burden at time *t* and GDP_t be the gross domestic product at time *t*. Then Model A will be presented as follows:

$$MC_t = \beta_0 + \beta_1 INF_t + \beta_2 INT_t + \beta_3 ER_t + \beta_4 TAXB_t + \beta_5 GDP_t + \quad (7)$$

$$\mu_t \setminus \Omega_{t-1} \sim N(0, h_t) \quad (8)$$

$$h_t = \phi_0 + \lambda_1 \mu_{t-1}^2 + \theta_1 h_{t-1} + \phi_1 INF_t + \phi_2 INT_t + \phi_3 ER_t + \phi_4 TAXB_t \quad \phi_5 GDP_t \quad (9)$$

Where: β_i, ϕ_j , λ_1,and θ_1 are coefficients to be estimated. For all *i, j=1, 2,3,4,5.* The conditional mean equation is given by (7) while (9) is the volatility equation.

Now let the second model be Model B. In this model let TVT_t be total value traded at time *t;* INF_t be the inflation rate at time *t;* INT_t be the interest rate at time *t;* ER_t be the real exchange rate at time *t;* $TAXB_t$ be the tax burden at time *t* and GDP_t be the gross domestic product at time *t*. Then Model B will be presented as follows:

$$TVT_t = \alpha_0 + \alpha_1 INF_t + \alpha_2 INT_t + \alpha_3 ER_t + \alpha_4 TAXB_t + \alpha_5 GDP_t + \varepsilon_t \quad (10)$$

$$\varepsilon_t \setminus \Omega_{t-1} \sim N(0, h_t) \quad (11)$$

$$h_t = \varphi_0 + \lambda_1 \varepsilon_{t-1}^2 + \theta_1 h_{t-1} + \varphi_1 INF_t + \varphi_2 INT_t + \varphi_3 ER_t + \varphi_4 TAXB_t + \varphi_5 GDP_t \quad (12)$$

Where: α_i, φ_j, λ_1, and θ_1 are coefficients to be estimated(*i, j* = 1,2,3,4,5). Equation (10) is the conditional mean expression; equation (11) gives the distribution of the error term and (12) gives the volatility equation.

Bollerslev(1986) shows that imposing $w > 0, \quad \alpha_i \geq 0 \ (\text{for } i = 1, \ldots, q)$ and $\beta_j \geq 0 \ (\text{for } j = 1, \ldots p)$ is sufficient for the conditional variance to be positive.

4.4 Diagnostic Tests

4.4.1Test for Stationarity

A time series is stationary if its mean, variance, and auto covariance are time invariant. Such a time series will tend to return to its mean – mean reversion – and the variance will be constant. Stationary time series matters because if a time series is non stationary, we can study its behaviour only for the time period under consideration, as a result, it is not possible to generalise it to other time periods (Gujarat 2004). The unit root test is the test for stationarity that has become popular. Having a unit root in a series mean that there is more than on trend in the series. Here, the study uses the Augmented Dickey-Fuller (ADF) test. The null hypothesis is that the series has a unit

root. If we fail to reject this null hypothesis, taking first difference of the variables is one of the remedies of dealing with the stochastic trends.

4.4.2 Test for ARCH Errors

It is both logically inconsistent and statistically inefficient to use volatility measures that are based on the assumption of constant volatility over some period when the resulting series moves through time (Campbell, Lo, and MacKinlay 1997). Here, a test based on the Lagrange multiplier (LM) principle is applied. We have considered the null hypothesis of no ARCH errors versus the alternative hypothesis that the conditional error variance is given by an ARCH(q) process. The study uses the test approach proposed in Engle (1982) which regresses the squared residuals on a constant and q lagged values of the squared residuals. From the results of this auxiliary regression, a test statistic is calculated as: $(N-q)\cdot R^2$ .There is evidence to reject the null hypothesis if the test statistic exceeds the critical value from a chi-square distribution with q degrees of freedom.

4.5 Data Compilation, Analysis and Descriptive Statistics

The study uses data from the following sources: Financial and Economic Review(Various editions); Malawi stock exchange reports (Various editions); The Heritage foundation website; Reserve Bank of Malawi; International Monetary Fund Financial Statistics; and World Bank Development Indicators. The thesis has used quarterly data from 1996q4 to 2012q1 (which is our sample period). The descriptive statistics, econometric analyses and diagnostic tests are conducted using STATA-11. Below, the study gives the analysis of the descriptive analysis for market capitalisation, total value traded, inflation rate, exchange rate, interest rate and tax burden; which are our variables of concentration.

To begin with, our sample shows that 1% of the values of market capitalisation are equal to or less than 0.129. Percentiles are calculated by ordering the values of a variable from lowest to highest and finding the value that corresponds to whatever percent you are interested in. The value in the 50^{th} percentile (which is the median) is 315.905. This entails that 50% of the values of market capitalisation are equal to or less than 315.905.

The four smallest values of the market capitalisation are 0.129; 0.13; 0.133 and 0.14; while the four highest values are 577.07; 696.71; 700.67; and 703.65.

The arithmetic mean (which is a measure of central tendency) is 285.3547. We have to keep in mind that the mean is sensitive to the extremely large or small values (outliers).

The standard deviation and variance for market capitalisation is 183.336 and 33612.09 respectively. These give the information regarding to the spread of the distribution of the variable.

Skewness measures the degree and direction of asymmetry (asymmetric distribution such as a normal distribution has a skewness of 0, and a distribution that is skewed to the left, for instance when the mean is less than the median, has a negative skewness). Here, market capitalisation has a skewness of 0.1790.

Kurtosis is a measure of the tails of a distribution. A normal distribution has a kurtosis of 3. Heavy tails distributions will have kurtosis greater than 3 and light tailed distribution will have kurtosis less than 3. Market capitalisation has a light tailed distribution with a kurtosis of 2.8297.

The descriptive statistics for the exchange rate shows that in our sample; 1% of the values of the variable are equal to or less than 14.1; while 50% of the values of the variable are equal to or less than 108.923.

The four smallest values of exchange rate are 14.1; 14.23; 19.32; and 21.35; while the four largest values are 150.801; 163.752; 165.97; and 167.426.

The arithmetic mean for the distribution of the exchange rate is 100.2858 with a standard deviation of 46.5194 and variance of 2164.055.

The distribution is skewed to the left with a skewness of -0.4033. The distribution is light tailed with a kurtosis of 1.806675.

Thirdly, the descriptive statistics of GDP shows that 1% of the values of the variable are equal to or less than3727.8 and 50% of the variable are equal to or less than 18895.3

The four smallest values of GDP are 3727.8; 4278.4; 4410.4 and4412.2. The four largest values of the distribution are 61540 (three times) and 69609.41.

The arithmetic mean is 25070.69, with a standard deviation of 18726.05. The distribution of GDP is skewed to the right with a skewness of 0.8593494. The variable has a light tailed distribution with a kurtosis of 2.455161.

For the inflation rate, the descriptive statistics shows that in our sample; 1% of the values of the variable are equal to or less than 84.16; while 50% of the values of the variable are equal to or less than 167.7.

The four smallest values of the inflation rate are 84.16; 85.85, 87.64; 87.73; while the four largest values are 326.87; 350.3; 351.1; and 390.2. The inflation figures are proxies of the consumer price index.

The arithmetic mean for the distribution of the inflation rate is 191.2559 with a standard deviation of 85.21823 and variance of 7262.146.

The distribution is skewed to the right with a skewness of 0.4644381. The distribution is light tailed with a kurtosis of 1.979102.

The descriptive statistics for the tax burden shows that in our sample; 1% of the values of the variable are equal to or less than 1407.825; while 50% of the values of the variable are equal to or less than 10733.92.

The four smallest values for the variable are 1407.825; and 1459.65 (three times); while the four largest values are 44447.1; 46571.1; 53088; and 59108.5.

The arithmetic mean for the distribution is 16283.41 with a standard deviation of 15183.74.

The distribution is skewed to the right with a skewness of 1.021934. The tax burden has a normal distribution with a kurtosis of 3.0049.

The stock market liquidity descriptive statistics shows that in our sample; 1% of the values of the variable are equal to or less than 0.001; while 50% of the values of the variable are equal to or less than 0.098.

The four smallest values of the stock market liquidity are 0.001; 0.003; and 0.004 (two times); while the four largest values are 1.055; 1.369; 1.533 and 1.92.

The arithmetic mean for the distribution is 0.2266774 with a standard deviation of 0.3683686 and variance of 0.1356955.

The distribution is skewed to the right with a skewness of 3.02047. The distribution is heavy tailed with a kurtosis of 12.14754.

Lastly, the descriptive statistics for bank rate shows that in our sample; 1% of the values of the variable are equal to or less than 13; while 50% of the values of the variable are equal to or less than 25.

The four smallest values of the bank rate is 13 (four times); while the four largest values are 47 (two times); 50.23; and 56.16.

The arithmetic mean for the distribution is 28.80468 with a standard deviation of 13.14108 and variance of 172.6879.

The distribution is skewed to the right with a skewness of 0.3784977. The distribution is light tailed with a kurtosis of 1.717778.

4.6 Variables and Apriori Expectations

In line with the theoretic and empirical expositions outlined, this section presents the variables which have been used to achieve the objectives of the study. The dependent variables are market capitalisation and total value traded; while the explanatory variables are the inflation rate, the exchange rate, the interest rate, tax burden and GDP.

Market Capitalisation

Market capitalisation is the ratio of the value of listed companies (the number of all companies listed in the country's stock exchange at any point in time) to GDP. It gives a measure of the size of the stock market relative to the size of the economy. It is a good measure of the relative size of the stock market to the economy.

Total Value Traded

Total value traded gives the total value of shares traded during the period. The ratio of total value traded to GDP gives a measure of the liquidity in the market. Market liquidity measures how easily securities can be bought or sold. This indicator complements the market capitalization ratio and signals whether market size is matched by trading activity.

Inflation Rate

The importance of inflation as a macroeconomic variable in the literature comes from its ability to reflect the economic stability of a country and the ability of the government to control the economy through its monetary and fiscal policies. Inflation is seen as negative news in the stock market because it erodes consumer spending hence company earnings. Saryal (2007) shows that the higher the rate of inflation, the higher the nominal stock returns, consistent with the simple Fisher effect.

Exchange Rate

Real Exchange Rate (RER) of a country is equilibrium real price, and does not depend on the foreign currency that one uses as a numeraire (Harberger 2003). It can be defined as a relative national price level or it may be thought of as ratio of price levels of tradable goods to non tradable ones (Popov 2005). The effect of exchange rate depreciation will be different for each company depending on whether it imports or exports more, whether it owns foreign units and whether it hedges against exchange rate fluctuations. Heavy importers will suffer from higher costs due to weaker domestic currency and will have lower earnings, thus lower share prices (Ajayi and Mougone, 1996).

Bank Rate

There is an inverse relationship between interest rate and stock price which in turn influences the total value traded. An increase in interest rate increases the return

to interest earning investment such as treasury bills, while also increasing the opportunity cost of holding cash. As a result investors will opt to invest in high interest earning investments other than stocks and this ends up driving stock prices and their subsequent returns down. On the other hand, as interest rates go down, investors switch to buying stocks thereby driving up prices and consequently their returns (Govati 2010). The bank rate is the opportunity cost of shares.

Institutional Factors - Tax Burden

The most natural test of the reaction to tax news is the change in aggregate share values. The cash flow hypothesis predicts that increased taxes will lead to a decline from capitalisation. (Cutler D.1988). The tax burden imposed by government is captured in the fiscal freedom index measures which include both the direct tax burden in terms of the top tax rates on individual and corporate incomes and the overall amount of tax revenue as a percentage of GDP. High tax pressure should have negative effect on the domestic investments hence negatively affecting the stock market (Butsa.Y2008).

4.7 Conclusion of Methodology

This chapter has set out the methodology that will be used to estimate our models of interest. It has also given the descriptive statistics of the data which has been used in the study.

CHAPTER FIVE

RESULTS AND DISCUSSION OF THE STUDY

5.1 Introduction

This chapter gives the empirical estimation and results. All econometric estimations are done in the Stata computer package. Firstly, we give the diagnostic test estimation and results there after we give the estimation and results of our GARCH (1, 1) models.

5.2 Stationarity test

In this study, Augmented Dickey Fuller (ADF) is used for unit root test. The ADF and statistics for the levels of exchange rate, GDP, Inflation rate, tax burden, bank rate and market capitalisation do not exceed the critical values in absolute terms. Thus we fail to reject the null hypothesis of the presence of unit root in the variables. These variables are stationary after first difference or integrated of order one, I~ (1). The ADF test shows that stock market liquidity is stationary in levels.

5.3 Test for Arch Errors

ARCH fits regression models in which the volatility of a series varies through time. Usually, periods of high and low volatility are grouped together. Arch models estimate future volatility as a function of prior volatility. To accomplish this, arch fits models of autoregressive conditional heteroskedasticity by using conditional maximum likelihood. To test for ARCH errors, we have used the Engle's Langrage-

Multiplier test (estat archlm) and the results are summarised in Table 3 and Table 4 below.

Table 3: LM Test for ARCH

LM test for autoregressive conditional heteroskedasticity (ARCH)

lags(*p*)	chi2	df	Prob > chi2
1	8.982	1	0.0027

H0: no ARCH effects *vs.* H1: ARCH(*p*) disturbance

Table 4: LM Test for ARCH

LM test for autoregressive conditional heteroskedasticity (ARCH)

lags(*p*)	chi2	df	Prob > chi2
1	8.423	1	0.0037

H0: no ARCH effects *vs.* H1: ARCH(*p*) disturbance

In Table 3, the LM test shows a P-value of 0.0027, which is below 0.05, thus we reject the null hypothesis of no ARCH effects. Likewise, in Table 4 the LM test shows a p-value of 0.0037 which is well below 0.05, hence we reject the null of no ARCH (1) effects. Thus we can further estimate our GARCH models.

5.4 Estimation Results

The estimation results for model A are reported in Table 5 while the estimation results for model B are reported in Table 6.

Table 5: Estimation Results for Model A

MC MEAN EQUATION				
VARIABLE	COEFICIENT	STD.ERR	z	P>lzl
D.ER	1.146347	1.153143	0.99	0.32
D.GDP	0.0062651	0.0012718	-4.93	0.000*
D.INF	-0.6834998	0.2254825	-3.03	0.002*
D.TR	-0.0035196	0.0014925	-2.36	0.018*
D.BR	-3.011595	1.158499	-2.60	0.009*
CONS	14.12927	7.074313	2.00	0.420
MC VARIANCE EQUATION				
VARIABLE	COEFICIENT	STD.ERR	z	P>lzl
D.ER	-0.0711258	0.0694317	-1.02	0.306
D.GDP	-0.0000591	0.0000733	-0.81	0.42
D.INF	-0.0293768	0.0149738	-1.96	0.05*
D.TR	0.0000358	0.0000842	0.42	0.671
D.BR	-0.206336	0.1782145	-1.16	0.247
arch L1	0.8468984	0.4403244	1.92	0.054*
garch L2	0.1395721	0.1622307	0.86	0.390

Note: Model A is denoted by equation 7 to 9. * denote significance at 10% or lower.

Table 5 reports the parameter estimates for the determinants of market capitalization on the MSE. In the mean equation, the results show that the gross domestic product, the inflation rate, the tax burden and the bank rate have significant effect on stock market capitalization. Conversely, the exchange rate has no significant impact on stock market capitalization.

In the variance equation the sum of the ARCH and GARCH coefficient is 0.9864705, which is very close to one, indicating that volatility shocks are quite persistent. The multiplicative heteroskedasticity shows that all coefficient estimates, except for inflation, are significant. As seen from the results in Table 5, the estimated coefficient on the inflation rate is 0.0293768 which is statistically significant. A 1% increase in inflation causes a 0.02% increase in conditional volatility. The significant ARCH term implies that the variance is autoregressive conditionally heteroskedastic.

Table 6 shows the results of GARCH (1, 1) on the determinants of stock market liquidity and volatility on the MSE. In the mean equation, the results show that the exchange rate, inflation rate, tax burden, the bank rate, and the exogenous variables have significant effect on stock market liquidity. The GDP has insignificant effect on SML on the MSE.

In the variance equation, the sum of the ARCH and GARCH terms (which is the persistence parameter) is 0.205. This indicates that the impact of shocks do not last for a long time period. All the parameter estimates of the multiplicative heteroskedasticity are significant. This means that all of the explanatory variables under study account for the conditional volatility in our model. The ARCH parameter is insignificant. The GARCH parameter is significant, confirming the sufficiency of our model.

Table 6: Estimation Results for Model B

SML MEAN EQUATION				
VARIABLE			z	P>lzl
	COEFICIENT	STD.ERR		
D.ER	-0.0030583	0.0010243	-2.99	0.003*
D.GDP	0.0009984	0.0012517	0.8	0.425
D.INF	-0.0024925	0.0004562	-5.36	0.000*
D.TR	-0.00455	0.0006184	-6.00	0.000*
D.BR	-0.0103036	0.0031829	-3.24	0.001*
CONS	0.1379345	0.0102784	13.42	0.000*
SML VARIANCE EQUATION				
VARIABLE			z	P>lzl
	COEFICIENT	STD.ERR		
D.ER	-0.2583833	0.0972793	-2.66	0.008*
D.GDP	-0.0002584	0.0000784	3.29	0.001*
D.INF	0.0863193	0.0287825	-3.00	0.003*
D.TR	0.0004842	0.0002863	1.69	0.091*
D.BR	-0.5562783	0.2109952	-2.64	0.008*
arch L1	0.1765468	0.1204637	1.47	0.143
garch L2	0.0001321	0.0002662	0.50	0.062*

Note: Model B is denoted by equation 10 to 12. * denote significance at 10% or lower.

5.5 Conclusion of Empirical Results and Estimations

This chapter has presented the estimation results of the unit root test and the test for ARCH effect. Further, it has given the estimation results and interpretation of our GARCH (1, 1) models, with multiplicative heteroskedasticity included in the variance equation.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

This study was undertaken to find out the macroeconomic and institutional determinants of stock market development in the case of the Malawi stock exchange. Stock market development was being measured by market capitalisation ratio and the total value traded as a ratio of the GDP. The data was analysed within the GARCH (1,1) framework based on the prior validated evidence of volatility clustering prevalent on the MSE.

The study has shown that the gross domestic product; the inflation rate measured by the consumer price index, the tax burden and the bank rate were significant determinants of the market capitalisation on the MSE; while inflation rate was the only variable that explained its volatility.

Further, the study has shown that the exchange rate, the inflation rate, the tax burden, and the bank rate significantly explained the stock market liquidity while the exchange rate, the gross domestic product, the inflation rate, the tax burden and the bank rate explains its volatility.

6.2 Policy Implication

The findings of this study have important elements that can help the policy makers and investors in decision making. It is evident from the results that stock market performance is influenced by many factors. If these regressors are unstable, the stock market will also be volatile.

The policy implications of this study are categorised generally into two categories. There are monetary policy implications on the one hand and fiscal policy implications on the other. These policies must complement rather than supplant each other.

Firstly, the macroeconomic behaviour of the bank rate and the real exchange rate fall within the scope of the monetary policy. We have seen that these two variables have a significant impact on the stock market development and volatility. In Malawi the Reserve Bank serves as the state's principle instrument for the control of money supply, currency and the institutions of finance and it is required to serve generally in accordance with the normal functions of the central bank.

It is evident from the findings that by controlling the bank rate and allowing for the exchange rate that reflects the market conditions, the government can effectively reduce the volatility of the MSE and encourage its development. This calls for a greater need of removing political influence and control by the central government over the Reserve Bank which is the key player as far as monetary policy is concerned. This will ensure that the bank does not operate just as a mere currency board.

Another crucial finding of this study is that gross domestic product significantly affects stock market development. Further, there is an inverse relationship between GDP and stock market volatility. Thus there is need to put in place measures that will stimulate growth, such as encouraging small holder farmers and other entrepreneurs to save for further investments. This in the long run will lead to sustained economic growth.

Another measure that can be employed by the government is by investing in human capital. This will increase the average labour productivity hence any wage increase will be transitory and will not have a significant impact on the long run price levels. Thus through this technical progress, real output and wages will go up and there will be no tendencies to bid up the general price level which increases stock market volatility and dampens its development.

Moreover, complementary policies, such as industrial incentives such as tax reliefs and reduction in tariffs can facilitate the development of the MSE. The possible policy directions might include encouraging the supply of investment funds through significant reducing the rate of personal taxation.

6.3 Direction of Future Research

To buttress this study in finding out the determinants of stock market development and volatility, future studies, besides macroeconomic variables, can look at other measures of institutions such as political risk, rule of law and corruption.

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8.0 APPENDICES

Appendix A1: Correlogram of Market Capitalisation

```
. corrgram mc, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.9062   0.9063   53.415  0.0000          |------          |------
2        0.7985  -0.1366   95.576  0.0000          |-----           -|
3        0.6899  -0.0395   127.59  0.0000          |----            |
4        0.5921   0.0328   151.57  0.0000          |---             |
5        0.4623  -0.3029   166.45  0.0000          |--              -|
6        0.3358  -0.0127   174.44  0.0000          |-               |
7        0.2134  -0.0677   177.73  0.0000          |-               |
```

Appendix A2: Correlogram of Exchange Rate

```
. corrgram  er, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.9475   0.9823   58.396  0.0000          |------          |------
2        0.8937  -0.0181   111.21  0.0000          |------          |
3        0.8401   0.0809   158.68  0.0000          |-----           |
4        0.7938   0.1044   201.78  0.0000          |-----           |
5        0.7493   0.2665   240.86  0.0000          |----            |-
6        0.7049   0.2366   276.08  0.0000          |----            |-
7        0.6582   0.0801   307.33  0.0000          |----            |
```

Appendix A3: Correlogram of GDP

```
. corrgram  gdp, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1        0.9182   1.0146   54.847  0.0000          |------          |------
2        0.8685   0.4363   104.73  0.0000          |-----           |-
3        0.8181   0.3141   149.75  0.0000          |-----           |-
4        0.7660   0.3089   189.89  0.0000          |-----           |-
5        0.7000  -0.0700      224  0.0000          |----            |
6        0.6474  -0.0465    253.7  0.0000          |----            |
7        0.5896  -0.1598   278.77  0.0000          |---             -|
```

Appendix A4: Correlogram of Inflation Rate

```
. corrgram    inf, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
 1       0.9189   1.0115    54.93  0.0000          |------          |------
 2       0.8695   0.2714   104.93  0.0000          |-----           |-
 3       0.8374   0.3446   152.09  0.0000          |-----           |-
 4       0.8129   0.4032    197.3  0.0000          |-----           |--
 5       0.7505  -0.3101   236.51  0.0000          |-----          -|
 6       0.7066   0.0264   271.89  0.0000          |----            |
 7       0.6704   0.0468   304.32  0.0000          |----            |
```

Appendix A5: Correlogram of Tax Burden

```
. corrgram     tr, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
 1       0.8989   1.0371   52.559  0.0000          |------          |------
 2       0.8655   0.7539    102.1  0.0000          |-----           |-----
 3       0.8225   0.7086    147.6  0.0000          |-----           |----
 4       0.7483   0.3601    185.9  0.0000          |----            |-
 5       0.7098   0.3804   220.98  0.0000          |----            |--
 6       0.6441  -0.3998   250.37  0.0000          |----           -|
 7       0.5997   0.8076   276.32  0.0000          |---             |-----
```

Appendix A6: Correlogram of Stock Market Liquidity

```
. corrgram     sml, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
 1       0.3329   0.3330   7.2068  0.0073          |--              |--
 2       0.3032   0.2186   13.286  0.0013          |--              |-
 3       0.2983   0.1752   19.269  0.0002          |--              |-
 4       0.1518  -0.0293   20.846  0.0003          |-               |
 5       0.2205   0.1058   24.231  0.0002          |-               |
 6      -0.0746  -0.2860   24.625  0.0004          |               -|
 7      -0.1196  -0.1770   25.657  0.0006          |                |
```

Appendix A7: Correlogram of Bank Rate

```
. corrgram      br, lags(7)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------------
 1       0.9572   0.9808  59.596  0.0000           |-------           |-------
 2       0.9143  -0.0087  114.88  0.0000           |-------           |
 3       0.8795   0.1254   166.9  0.0000           |-------           |-
 4       0.8230  -0.3638  213.24  0.0000           |------          -|
 5       0.7648  -0.0212  253.96  0.0000           |------            |
 6       0.7083  -0.0995  289.51  0.0000           |-----             |
 7       0.6510   0.0995  320.09  0.0000           |-----             |
```