THE UNIVERSITY OF HULL

Essays on Investor Behaviour and Corporate Governance in Sub-Saharan African Frontier Markets

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by

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DEDICATION

To my lovely wife Mercy, and our wonderful children; Getrude, Elisagrace, and Gabriel Jnr.

ABBREVIATIONS

2SLS-IV	Two-Stage Least Square – Instrumental Variable
ASEA	African Securities Exchanges Association
BAKITA	Baraza la Kiswahili la Taifa (National Kiswahili Council)
BRVM	The Bourse Régionale des Valeurs Mobilières
CAPM	Capital Asset Pricing Model
CDS	Central Depository System
CMA	Capital Market Authority
CMSA	Capital Market and Securities Authority
CoSSE	Committee of Southern African Development Community Stock Exchanges
CSAD	Cross-Sectional Absolute Deviation
CSSD	Cross-Sectional Standard Deviation
DJIA	Dow Jones Industrial Average index
DSE	The Dare es salaam Stock Exchange
EA	East Africa
EAC	East African Community
EASEA	East African Securities Exchanges Association
EMH	Efficient Market Hypothesis
ERP	Economic Recovery Programme
EUT	Expected Utility Theory
FEMs	Frontier Equity Markets
FMs	Frontier Markets
FTSE	Financial Times Stock Exchange
GDP	Gross Domestic Product
ICGU	Institute of Corporate Governance of Uganda
ICT	Information and Communication Technology
IFC	International Finance Corporation
IMF	The International Monetary Fund
IPO	Initial Public Offer
JSE	Johannesburg Stock Exchange

KMO	Kaiser-Meyer-Olkin
MSA	Measure of Sampling Adequacy
NSE	Nairobi Securities Exchange
NYSE	New York Stock Exchange
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PERD	Public Enterprises Reform and Divestiture
PSCGT	Private Sector Corporate Governance Trust
SOEs	State-Owned Enterprises
SSA	Sub-Saharan Africa
TZS	Tanzanian shilling
UK	United Kingdom
UNDP	United Nations Development Programme
URL	Uniform Resource Locator
US	United States
USE	Uganda Securities Exchange
WB	World Bank

ABSTRACT

This thesis consists of three essays that address the question, whether the dynamics of investing in the developed markets are applicable in the Sub-Saharan African (SSA) frontier markets following the emerging market's experience. The first essay (chapter 3) explores the existence of herding behaviour among investors in a sample of 10 frontier markets. The study employs the cross-sectional absolute deviation (CSAD) test for detecting presence of herding behaviour. The findings reveal the presence of herd formation during the period under study in all markets. Furthermore, the evidence shows a non-existence of herding during periods of extreme market conditions. Moreover, the South African market does not seem to motivate herding in other African markets.

The second essay examines the impact of corporate governance practices of the East African Community (EAC) listed companies on performance. The present study employs the fixed-effects (FE) and the random-effects (RE) – two-stage least square – instrumental variable (RE-2SLS-IV) regression models to analyse data from a sample of 47 firms. The empirical investigation shows that the size of the board has a positive impact on market values but a negative effect on operating performance. The essay also documents that the largest investors, most of whom are strategic investors too, have an adverse effect on market values, whereas they have little or no effect on improving operating performance. The result also suggests foreigners and civil servants (or politicians) board members to impact positively on operating performance.

The third study is an examination of the influence of psychological factors on retail investors' trading behaviour at the Dar es Salaam Stock Exchange (DSE). The study employed a survey approach. The main finding is that retail investors in the market are prone to several behavioural biases. Perceived trading knowledge and perceived experience, for example, affect both the trading frequency and portfolio diversification. The tendency to focus on attention grabbing stocks explains why retail investors at the DSE prefer domestic over foreign stocks and the extent of diversifying their portfolios. The tendency to exhibit the disposition effect is mainly explained by gender, extrapolation of past performance, and perceived competence.

CHAPTER 1: THE RESEARCH BACKGROUND

1.1 Background and Aims of the Study

Investment holdings in the traditional emerging[1] markets have become part of core global portfolio diversification strategy for most active fund managers (Kratz, 1999, Nellor, 2008, FTSE, 2014). In the recent past, however, frontier[2] equity-markets (FEMs) have surfaced as eye-catching investment destinations attracting the interest of a wide range of stakeholders, including; regulators, academicians and both retail and professional investors (Kratz, 1999, Nellor, 2008, Berger et al., 2011, IMF, 2011, FTSE, 2014). Investors have embraced this opportunity, although the markets are characterized as being less accessible, small in terms of market capitalization and turnover, illiquid, and lacking transparent institutional and legal framework (Girard and Sinha, 2008). Other features of these frontier markets include; higher transaction fees, unprecedented volatility, large currency fluctuations, substandard financial reporting and political instability, particularly in African countries. The main reasons for the growing interests despite the higher risks, is that FEMs provide greater returns potentials, and low correlations to other markets, thus, further opportunities for diversification (Girard and Sinha, 2008, IMF, 2011).

During the mid-1990s, the world witnessed a rapid growth and development of emerging markets. Many investment professionals, however, were left on the losing side because they employed untested investment approaches in these markets, for example, Russia's market (Kratz, 1999, Nellor, 2008). More specifically, in the mid-1990s, equity markets from Eastern Europe and Russia were on the radar of emerging equity investment and were included in the major emerging-market indices. The markets offered higher returns than those investors used to earn on blue-chips from developed market investments. Many institutional investors, mutual funds and hedge funds, therefore, considered these markets as convenient investment opportunities and embraced them at an unprecedented speed. Many of these investment professionals' ended-up making huge losses because they took the double-digit returns for granted. That is, they did not provide adequate attention to the investment decision-making processes as they were complacent with the

[1] When referring to emerging markets, the literature, international financial institutions, and developed countries normally seem to pay attention to Asian and Latin American capital markets in contrast to the developing countries' markets, particularly, African capital market. This can be evidenced by the limited literature on the development of capital markets in Africa.

[2] The term frontier markets refers to smaller and less developed countries as compared to emerging markets; however, investors consider them to have bright growth future. There is no generally accepted set of criteria that is used for the country classification (IMF, 2011; FTSE, 2014). Different organizations have their own inclusion considerations. The FTSE country classification, for example, focuses on the depth and breadth of financial markets, legal and regulatory environment, and market access (FTSE, 2014). In addition to these, the IMF (2011) adopted a loose definition of frontier markets for the sub-Saharan Africa (SSA), whose country selection criteria included; the endowment natural resources, recent economic growth and the political conditions and perspectives. According to the IMF (2011) they include Botswana, Ghana, Kenya, Namibia, Nigeria, Tanzania, Uganda, Zambia and Zimbabwe.

conventional analysis methods. The Russian stock market case offers useful insights of investing in frontier markets. According to Kratz (1999), financial analysts of Russian securities had been working in an environment where audited financial statements were not available (or were frequently in local accounting standards). Another obstacle was the lack of disclosure of important information such as ownership structure, operational and strategic information of the company. This situation caused financial analysts' failure to provide earnings estimates or separate winners from the losers. The application of the traditional fundamental analyses in such an environment was justifiably not the right method for making investment decisions.

In recent years, a similar Russian equity market situation has been observed in the African FEMs. The emerging market's experience raises the question of whether the dynamics of investing in the developed markets are applicable in frontier markets. That is, despite the recent significant changes in the global growth landscape and investment opportunity presenting the inclusion of FEMs' securities in portfolios as a core investment strategy, the search for yield and diversification benefit for investors has abated. In other words, these benefits alone do not provide enough justification for investing in FEMs. Africa's financial markets face a more complex, more integrated global environment than did emerging markets during the 1990s. Today, institutional investors can access a wide range of financial activities, including equity, domestic bonds, and foreign exchange markets. Information technology also has become more sophisticated blurring the line between mature and developing markets. This means that FEMs face immediate challenges than the Asian markets could adapt in the 1990s. To craft effective FEMs' investment strategies; therefore, it is important that investors balance both macro and micro considerations when approaching these markets. Issues like detailed governance practices, the business and regulatory environment, sectorial, and company information, are of vital significance for investors to achieve their investment goals. Studies that offer insights on this category of financial markets are very scarce, and particularly so, for the Sub-Saharan Africa (SSA) frontier markets.

The purpose of this thesis is to contribute to the growing literature and enhance the understanding of SSA frontier markets by exploring the dynamics of investing in them. More specifically, the study aims at providing new empirical evidence on three different aspects of a well-functioning stock market:

1. The existence of herding behaviour amongst investors in African frontier markets
2. The effect of corporate governance mechanisms on firm performance
3. The influence of psychological factors on retail investors' trading behaviour at the Dare-es-salaam Stock Exchange (DSE)

The thesis, therefore, consists of three empirical chapters, each of them addressing one aspect. The first and third essays are both related to investors' decision-making behaviour. What differentiates them is that the first essay focuses on one behavioural trait (herding) and uses secondary data (stock returns) to examine it. The third essay on the other hand investigates several behaviours of individual investors on trading decisions by employing primary survey data. The second essay focuses on corporate governance mechanisms as an integral part of investment decision-making process. The following subsections provide the rationale for focusing on the above issues.

1.1.1 Exploring Herding Behaviour among Investors

Herding behaviour refers to the tendency of investors to imitate the actions (rational or irrational) of others in the markets while at the same time concealing their own belief when making choices (Devenow and Welch, 1996). The herd mentality can be caused by excitement, greed or fear (Shefrin, 2002). Empirical evidence on the existence of herding behaviour is inconclusive, and even absent on frontier SSA markets. To the best of researcher's knowledge, this is a pioneering comprehensive African-wide study examining herding behaviour in these markets. The aims of this study are twofold. The first aim is to examine whether investors in African frontier markets have a tendency to exhibit herding behaviour. The second aim is to investigate whether investors make investment choices by herding during extreme conditions.

It is important to understand herd investing because it may affect the trading behaviour of investors in an adverse way. In the short-run, when investors imitate each other and form collective decisions, market prices deviate from fundamental values. In the long-run, herding may cause instability and inefficiency in the market.

1.1.2 The Effect of Corporate Governance Mechanisms on Firm Performance

The quality of how corporations are governed and controlled is associated with how well a stock market is functioning. In well-functioning markets, resources are often properly allocated among competing enterprises and investors get assured on the safety of their investments. The literature indicates that effective and efficient governance mechanisms should matter more in environments of uncertainty that are characterized by information asymmetry and incentive conflicts (La Porta et al., 1998, La Porta et al., 1999, La Porta et al., 2000, La Porta et al., 2002). It is argued that, these features are mostly found in underdeveloped markets, where the legal and regulatory frameworks are weak, and the enforcement of the laws is lacking (La Porta et al., 2000, Klapper and Love,

2004, Peters et al., 2011). The laxity on enforcement also results in wide inter-firm variations in governance behaviour (Shleifer and Vishny, 1997).

The aim of this essay therefore, is to examine the effect of corporate governance mechanisms on the performance of firms listed in the East African (EA) frontier markets. These markets have more or less similar background and institutional frameworks. Moreover, the region is at an advanced stage towards integration of their operations into a single stock market. Like other developing economies in the world, EA countries are eager to entice foreign investors from developed countries to invigorate the markets by bringing in more capital. What differentiates this study from others is that the choice of the governance mechanisms variables was guided by the aims of the economic reforms of the 1990s. Among others the reforms aimed at addressing the weaknesses in corporate governance practices.

1.1.3 The Influence of Psychological Factors on Investors' Trading Behaviour

The traditional finance paradigm posits that capital markets are always orderly as suggested by the efficient market hypothesis (EMH). In addition, investors act in a rational unbiased manner and take decisions by selecting the best choices possible to maximize their utility. Advocates of a new school of thought – behavioural finance, however, document that human beings are prone to cognitive and emotional biases (Shefrin, 2002, Barberis and Thaler, 2003). As a result, individuals show patterns of systematic errors when processing information signals and do not behave rationally (Shefrin, 2002, Ritter, 2003). A growing body of literature on this field (e.g. Barber and Odean, 2001, Barber and Odean, 2008, Barber et al., 2009c, Chen et al., 2007, Bailey et al., 2011) shows that several psychological biases influence investors' decision-making in a flawed way. For example; investors over- or under-react to news (De Bondt and Thaler, 1985, De Bondt and Thaler, 1987), sell stocks that have appreciated in price and keep for too long those that have depreciated (Shefrin and Statman, 1985), and trade excessively (Barber and Odean, 2000, Barber and Odean, 2001).

Only a few studies have examined investors' psychology using a cross-section survey approach, and majority of them are from emerging and mature markets (see, Beckmann and Menkhoff, 2008, Graham et al., 2009). The main aim of this study is to examine the investment decision-making behaviour of retail investors from the Dar es Salaam stock exchange (DSE), a frontier market whose cultural background is quite different from that of investors from developed markets. More specifically, the essay intends to establish: firstly, the behavioural biases that influence the trading

behaviour of retail investors at the DSE; and secondly, to assess how the identified psychological factors affect the retail investors' trading behaviour.

1.2 Outline and Contributions of the Thesis

This thesis consists of five chapters organized as follows.

1.2.1 Chapter 1: The Research Background

Chapter 1 is an introductory chapter that provides the research background and aims of the study. It also presents the outline and the contributions of the three self-contained empirical chapters and the concluding chapter. Each of the empirical chapters (3, 4 and 5) is written as a separate standalone paper. That is, it has its own literature review, data and methodology description, results and discussion, a summary and conclusion section. Since each paper is independent of the other, there may be some slight overlaps.

1.2.2 Chapter 2: Financial Systems Development and Economic Growth

Chapter 2 presents the development of the financial systems and economic growth in the SSA region. This summary shows how various policy reforms and liberalization of the SSA financial systems have enabled and created a more conducive environment to the functioning and facilitation of further development of the financial sectors. It also discusses the developments that African FEMs have achieved since the 19980s and impediments that investors encounter when considering investing in these markets. The chapter ends with a brief review of the literature on the role of stock markets on economic development.

1.2.3 Chapter 3: Herding Behaviour in African FEMs

The essay in chapter 3 explores the existence of herding behaviour among investors in 10 African FEMs. The study employs Chang et al. (2000) test, the cross-sectional absolute deviation (CSAD), for detecting presence of herding behaviour effects in a sample of African markets. The main contribution is that the study capitalizes on a long span data set, which ranges from 2000 to 2015 to investigate this phenomenon. The African region has been largely overlooked in previous studies, therefore, and in addition, this essay provides three other contributions to knowledge. First, the essay provides indisputable evidence of herd formation in all the sample markets during the period of study. The study finds that herding is more pronounced with small capitalization stocks. Second, with regard to the behaviour of investors in the presence of information asymmetry, the essay offers for the first-time comprehensive evidence that African investors do

not follow the consensus of the market during periods of extreme conditions. Third, the study documents that the South African market produces no herding effects in the sample markets except for small caps in Botswana and Namibia.

1.2.4 Chapter 4: Corporate Governance Mechanisms and Firm Performance

Chapter 4 is about corporate governance mechanisms and firm performance. This study uses a sample of 47 non-financial companies primarily listed on EA frontier stock markets, covering the period from 2000 to 2013. The study employed the fixed-effects (FE) for the Tobin's Q regression and the random-effects – two-stage least square – instrumental variable (RE-2SLS-IV) estimation for the return on assets (ROA) estimation. These methods were meant to take care of the endogeneity problem. This essay makes the following contributions to the literature. First, although research on corporate governance in SSA FEMs is growing (Munisi et al., 2014, Munisi and Randøy, 2013, Waweru, 2014a, Waweru, 2014b), none has specifically focused on investigating the variables of board and ownership structures in the EAC region. Munisi et al. (2014) for example, used data from 12 SSA countries to analyse firms' board structures. Other studies like Melyoki (2005), Wanyama et al. (2009) and Wanyama et al. (2013) focused their studies on individual-countries. It is argued in this study that the evidence obtained from using data on listed firms from the three EA stock exchanges, allows novel insights on the practice of corporate governance for the entire region. Second, the study demonstrates that the size of the board of firms listed in EA exchanges has positive effects on market values and negative effect on operating performance. The essay also documents that the largest investors, most of whom are strategic investors too, are value destroyers, and have little or no effect on improving operating performance. The presence of foreigners and civil servants (or politicians) on the boards of directors, on the other hand, has positive impacts on operating performance.

1.2.5 Chapter 5: Psychological Factors and Investors' Trading Behaviour

Chapter 5 examines the influence of psychological factors on investors' trading behaviour using a cross-section survey design. The analysis of the data involved carrying out factor analysis, ordered logistic regression, binary logistic regression, and multiple linear regressions. This chapter offers two main contributions to the extant knowledge. First, the present study is a pioneering study about the influence of psychological factors on trading behaviour from the context of the Tanzanian stock market - the DSE. This study shows that several behavioural factors do matter in explaining the trading behaviour of retail investors in frontier markets, specifically the DSE. Secondly, in order to test the applicability of existing theories in explaining the trading behaviour

of retail investors, this study developed a number of items to measure these constructs. The essay shows that most of these behavioural factors are applicable in the Tanzanian market. The study, therefore, has contributed to the reliability of measurement items that were adopted from previous studies, and added new ones for the measurement of some of the psychological constructs.

1.2.6 Chapter 6: Summary and Conclusion

In chapter 6 the summary and conclusions of the entire thesis are presented. The chapter provides a summary of the findings of each chapter, policy implications and recommendations for further research.

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CHAPTER 2: DEVELOPMENT OF FINANCIAL SYSTEMS AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

2.1 Introduction

A large body of the literature supports the view that there is a link between a well-functioning developed financial system, and economic growth (Levine, 2005, Beck, 2009). For example, King and Levine (1993) indicate financial depth is a determinant of economic growth, while Levine and Zervos (1998) found that stock market liquidity and bank development promotes the growth of gross domestic product (GDP). Beck et al. (2009a) contend that the economies of affluent countries are highly-developed as a result of having more developed capital markets. Bekaert et al. (2005) report that countries which implemented the equity market liberalization in the late 20th century enjoyed a percentage increase in growth. The authors further point out that the benefits of liberalization accruing to the national economies depend on the quality of the institutional reforms. They note that the benefits are three times more for higher-quality in comparison to those with low quality institutions. Moreover, for countries with a regulatory and policy environment which is conducive for investments, the benefits are even greater than four times. Likewise, Gamra (2009) examined the relationship between financial liberalization and economic growth using data from the East Asian region. The author concluded that the relationship depends on the nature and intensity of financial sector's liberalization. That is, economic growth is more pronounced where there is moderate-partial than with full liberalization of the financial sector. On the other hand, Ali Abbas and Christensen (2007), find a positive relationship between the growth of bond markets and economic growth given that the level of domestic government debt is kept moderate (less than 35% of bank deposits).

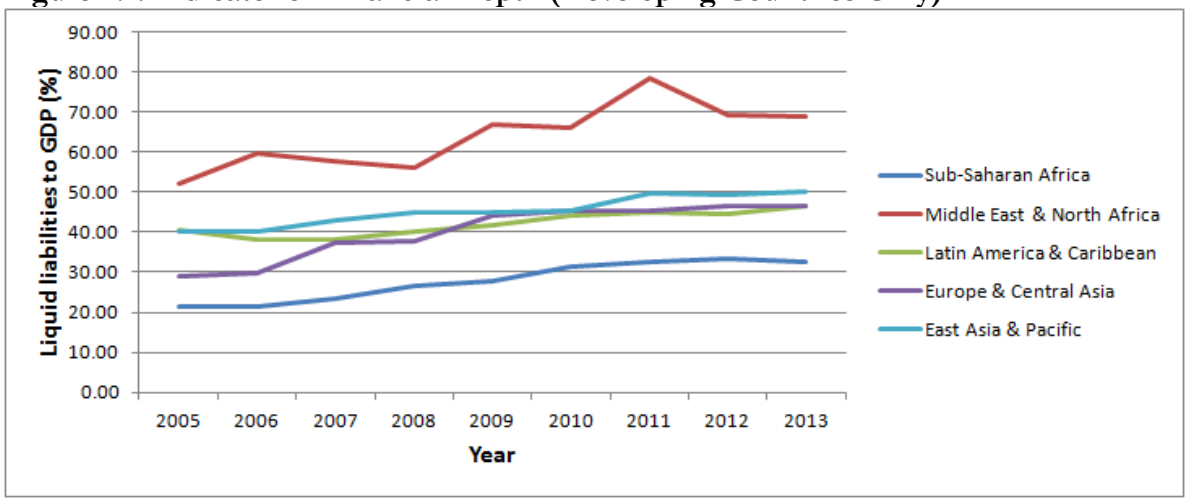
A few other researchers, however, question the link between financial development and economic growth, arguing that most of the empirical evidence is severely dated or exaggerated due to the econometric methods used. Arestis et al. (2001) for example, point out that there is wide-spread scepticism about robustness of the results of studies utilizing cross-country growth regressions, because they are overly general. They further contend that other institutional factors that vary substantially across countries, different time periods and stages of development, also affect the relationship between the financial systems and growth (see also, Demetriades and Law, 2006). Consistently, Rousseau and Wachtel (2002), found that financial deepening had no effect on economic growth for countries with an inflation rate which exceeded the 13 to 25% range. Rioja and Valev (2004) on the other hand, examined the effect of the level of financial development on growth. They report no significant relationship at low levels of financial depth. Furthermore, they

show that the effect is strong and positive in the middle region, and it becomes weaker when financial development reaches very higher levels (see also; Rousseau and Wachtel, 2011, Deidda and Fattouh, 2002). Arcand et al. (2012) also find results which are consistent with the vanishing effect of financial development. They show that when the credit to the private sector reaches 100% of GDP, then financial depth starts to have a negative effect on growth. Despite these debates, the predominant view from the literature is that financial development is associated with strong positive effects on economic growth.

2.1.1 Development of the Sub-Saharan Financial Sector

During the 1980s, most African countries, particularly in SSA, embarked on various policy reforms and extensive liberalization of their financial systems. These were motivated by the support from development partners, including multilateral institutions such as the International Monetary Fund (IMF), World Bank (WB), and bilateral donor countries. Prior to that, the financial sectors were very narrow and entirely state-owned with pervasive government interference. The reforms resulted in a more liberalized financial environment – including; interest rates, removal of credit ceilings, introduction of financial markets and private banking systems. The liberalization pointed towards supporting the private-sector and market-based development by reducing government intervention, introducing appropriate regulatory and institutional frameworks, and information systems. The aim of these reforms was to enable and create an environment more conducive to the functioning and facilitating further development of the financial sectors.

Figure 2.1: Indicator of Financial Depth (Developing Countries Only)



Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

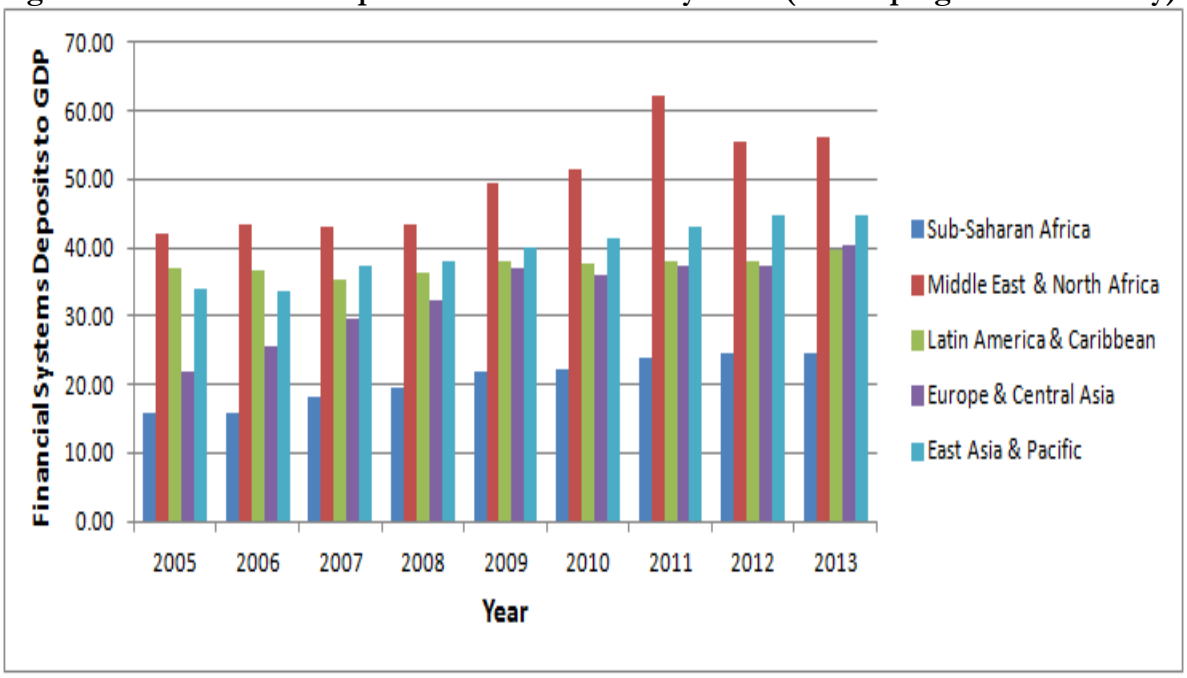
Despite these extensive reform programs, the literature and empirical evidence show that the financial systems of most African frontier markets (for more details, see also; Berger et al., 2011,

Girard and Sinha, 2008, Nellor, 2008) are still underdeveloped in comparison to the other developing and emerging economies.

Honohan and Beck (2007), contend that the shallowness of African financial systems goes together with low income, which leads to low domestic savings. Although, compared to several past years, there have been promising trends and developments in terms of Africa's financial systems depth, efficiency and stability, to mention a few.

Provision of credit is one of the main avenues through which financial intermediaries promote economic growth. According to the WB, (GFDD, 2015), the 2013 liquid liabilities to GDP (%), a broader measure of financial intermediation, for the SSA was 32.65 (up from the 27.74 in 2009). The region recorded an annual growth rate of 5.54% from 2005 to 2013 (see also; Figure 2.1). This was second to the Europe and Central Asia (ECA) growth rate of 6.01%. Figure 2.2, further indicates that there has been a considerable improvement (5.52%) in the SSA region in terms of resources available to the financial sector for lending activities for the period between 2005 and 2013. The annual growth rates for the ECA and the Middle East and North Africa (MNA) regions for the same period were 8.04% and 3.66% respectively.

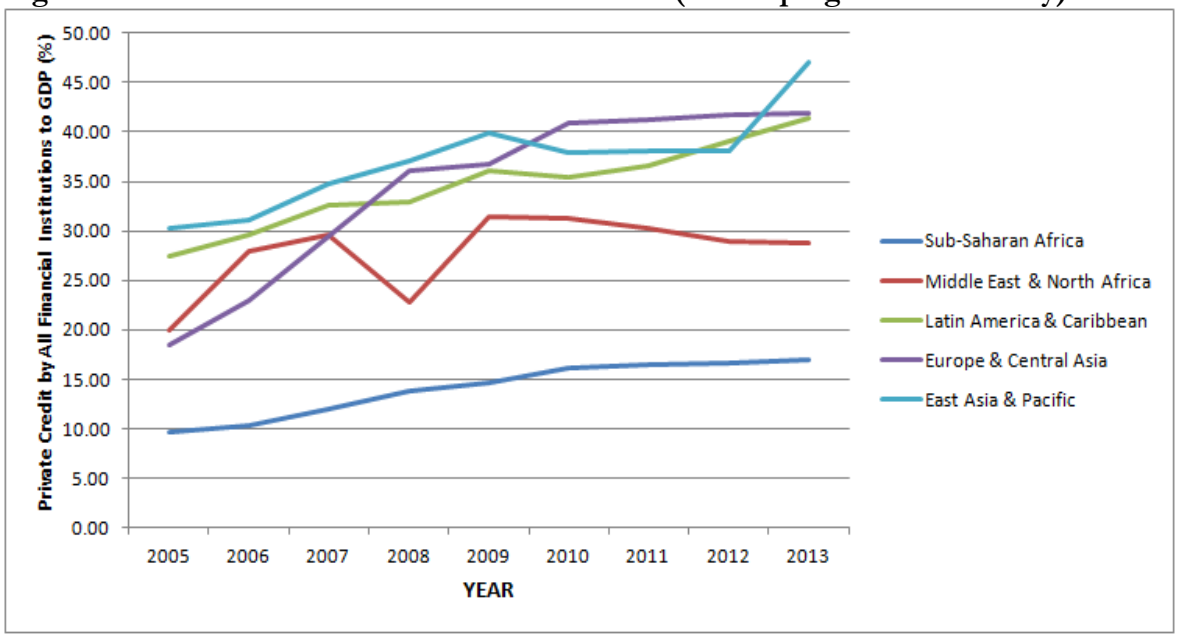
Figure 2.2: Indicator of Deposits of the Financial Systems (Developing Countries Only)



Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

Another important indicator used to measure the contribution of the financial sector to economic growth through credit allocation is the private credit by deposit money banks and other financial institutions relative to the GDP.

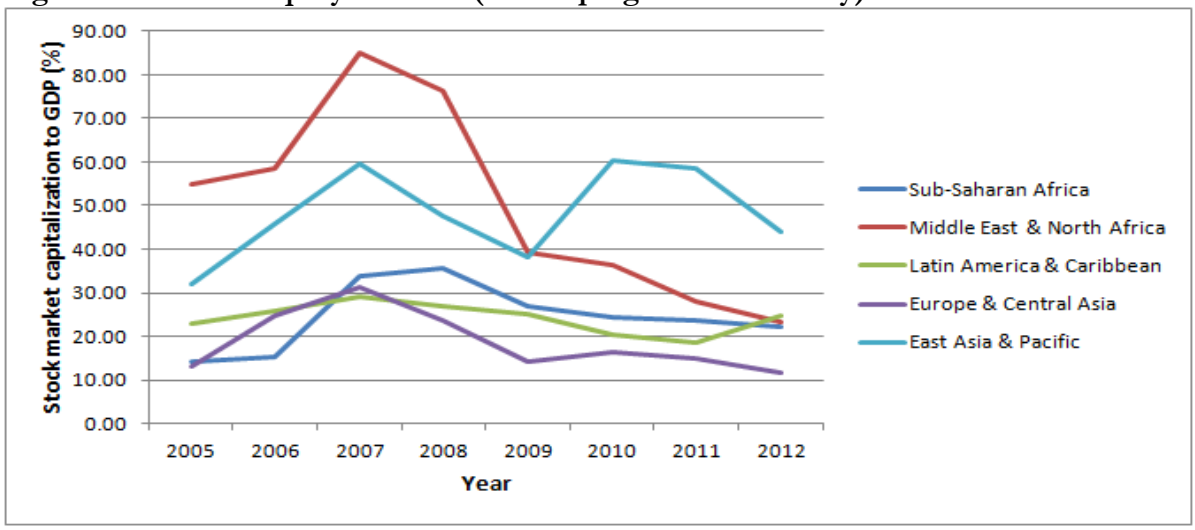
Figure 2.3: Credit Allocation to the Private Sector (Developing Countries Only)



Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

As is the case with other measures, Figure 2.3 shows that SSA is lagging behind in comparison to other regions. The SSA has, however, continued to outperform all except the ECA region in terms of the annual growth rate in the provision of credit to the private sector over the past few years. The measures of private credit show that the SSA grew by 7.39% while that of ECA was 10.79%.

Figure 2.4: Size of Equity Markets (Developing Countries Only)



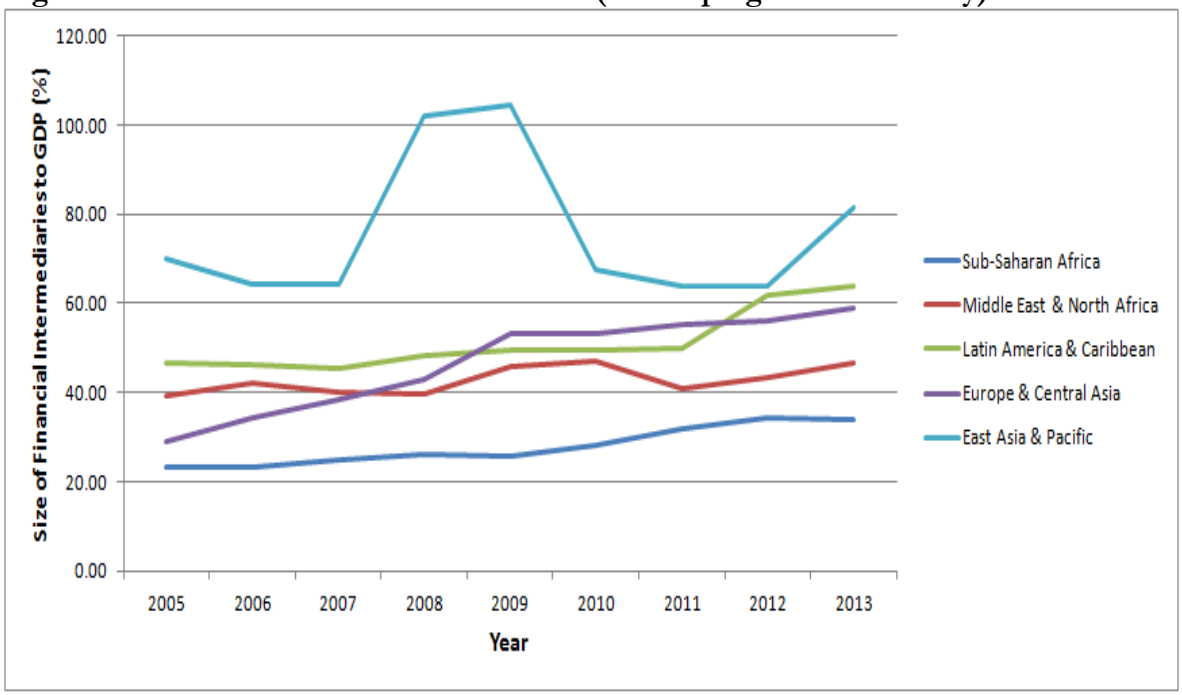
Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

By the end of 2014, there were a total of 29 stock exchanges in African countries. The size of the stock markets to the economy is measured by the stock market capitalization to GDP. The literature has documented that in most of the SSA markets, there is thin trading, which results in market capitalization being influenced by only a few stocks (Yartey, 2008, Ntim et al., 2011).

Despite this shortfall, Figure 2.4 shows that the SSA exchanges outperformed the ECA and LAC markets between 2007 and 2012. Moreover, like the other economies, there has been clear declining performance in terms of the market capitalization between 2007 and 2009. The annual downturn in the SSA region is estimated to be 3.18%. In 2009, the ECA and MNA regions experienced the sharpest plunge by about 10.53% and 10.43% respectively. This could be attributed to the global financial crisis (see also; Allen et al., 2011). Overall, however, the SSA region has experienced an increasing trend for the same period.

It is worth noting that the African financial system comprises of central banks, domestic and foreign banks (including subsidiaries of major international banks), non-bank financial institutions[3] (NBFIs), hundreds of savings and credit cooperatives (SACCOs), several foreign exchange bureaus, and stock exchanges. The banking sector, however, is at the heart of most of the African financial sector.

Figure 2.5: Size of Financial Intermediaries (Developing Countries Only)



Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

Figure 2.5 shows there is a wide disparity across the economic regions in terms of the total claim that financial intermediaries (i.e. central bank assets, deposit money banks' assets, and other financial institutions assets) have on non-financial domestic sectors, relative to GDP. Despite lagging behind, the SSA has experienced an upward trending level of financial intermediation in the years from 2005 to 2013.

[3] i.e. pension funds, insurance companies, and collective investment schemes

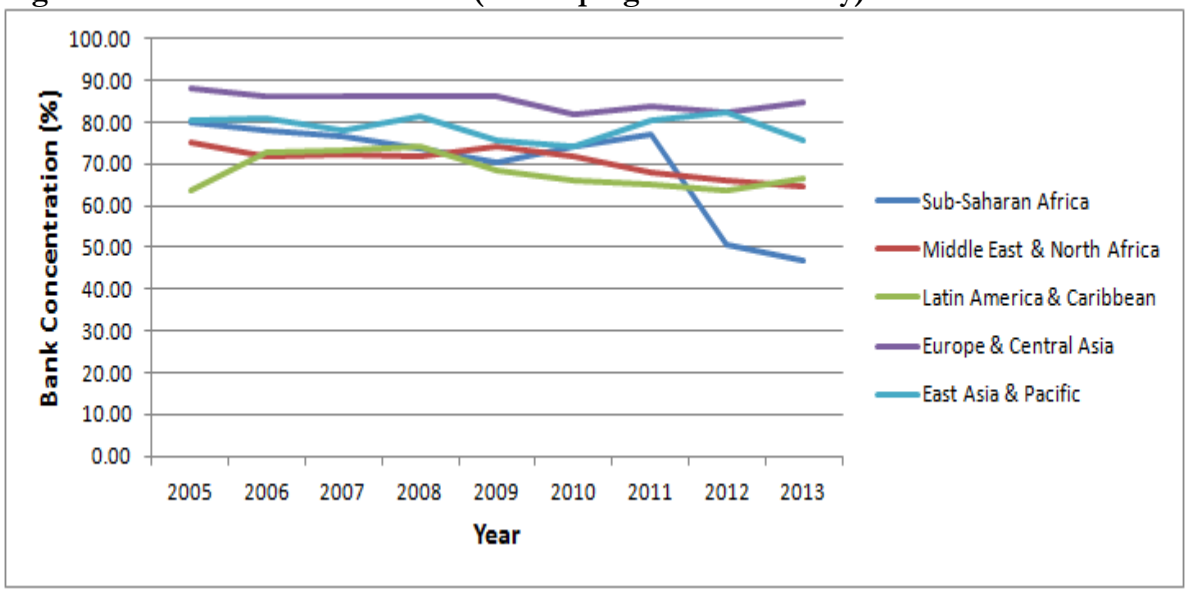
Figure 2.6: Indicators of Intermediation Efficiency (Developing Countries Only)

Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

The banking system in SSA is also characterized by low intermediation efficiency (Honohan and Beck, 2007). The data provided by the World Bank (2015), reveals that the gap in terms of funnelling credit to the private sector between banks in the SSA and other developing regions is narrowing. For the past eight years, all these regions have recorded a small growth in the bank credit to bank deposit ratio. That is, SSA (1.25%), MNA (1.49%) and ECA (1.47%). Likewise, the ratio for the Latin America and Caribbean (LAC) and East Asia and Pacific (EAP) economies grew by 1.35% and 2.67%, respectively. Figure 2.6 show that the SSA region has higher levels of net interest margin, overhead cost, and cost-income ratio in comparison to the other developing economies (see also; Beck et al., 2009a, Beck et al., 2009b, Senbet and Otchere, 2006). On average,

for example, the net interest margin for SSA banks between 2005 and 2013 was 592.91 basis point, in comparison to MNA (301.31, LAC (588.23), ECA (528.72) and EAP (452.01) basis points. The high levels of these indicators imply a low banking intermediation efficiency and lack of competitiveness in the banking sector. Notwithstanding, net interest margins for all economies have narrowed over the last eight years from 2005 to 2013.

Figure 2.7: Bank Market Structure (Developing Countries Only)



Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

The literature reveals that the banking industry in SSA is small, and dominated by a few commercial banks (Allen et al., 2011, Moyo et al., 2014, Senbet and Otchere, 2006). Market concentration, as measured by the ratio of the three largest banks' assets to total banking sector assets show a declining trend for this indicator from 79.79% in 2005 to 46.69% in 2013. More specifically, the SSA has the lowest ratio compared to other economies in years 2012 and 2013 as shown in Figure 2.7. The world average is 60% (Honohan and Beck, 2007). The decline in the concentration ratio in the SSA could be an explanatory factor for the improved soundness and performance of the region in the recent past. It is also an indication of increasing competitiveness in the banking system.

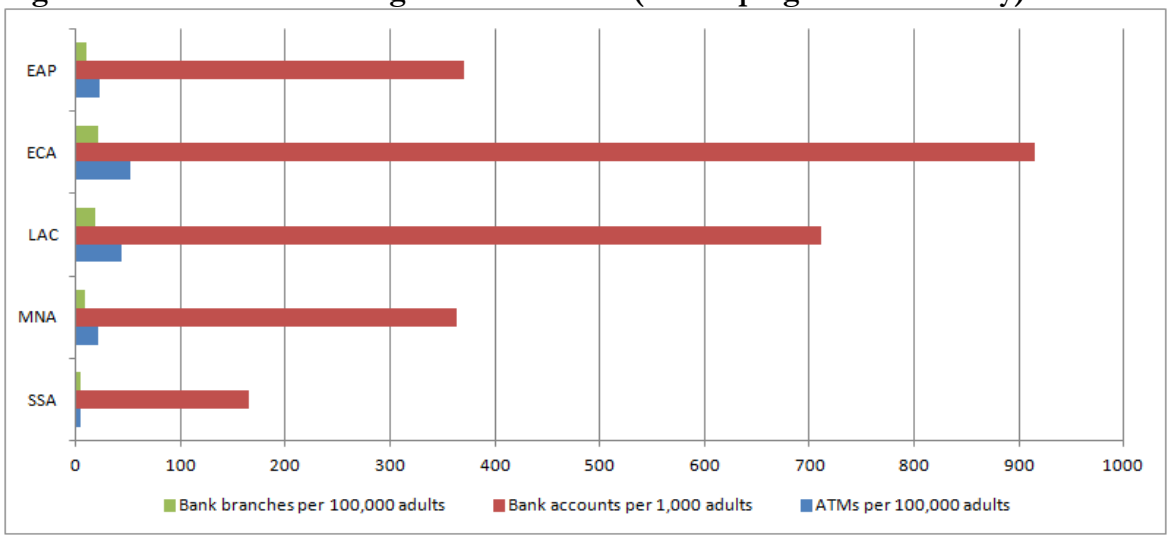
Table 2.1: Bank Average Profit Comparisons, 2005 - 2013

Region	Bank return on equity (%)	Bank return on assets (%)
Sub-Saharan Africa	23.83	2.51
Middle East & North Africa	17.14	1.64
Latin America & Caribbean	18.92	1.99
Europe & Central Asia	11.61	1.49
East Asia & Pacific	16.10	1.66

Source: *Authors' calculations using data from the Global Financial Development Database (GFDD) – The World Bank, September 2015*

Another feature of the banking system in the low-income countries is high profitability. As shown in Table 2.1, the average return on equity for SSA banks is higher than those of other economies over the period 2005 to 2013. It is more than double the profitability of ECA region and higher than the benchmark of around 15% provided by Beck et al. (2010). The average return on total assets for SSA was 2.51% over the same period. Like other developing economies, the ratio plunged between 2007 and 2009, then rose, and declined again in 2013.

Figure 2.8: Access to Banking Services in 2013 (Developing Countries Only)



Source: *The Global Financial Development Database (GFDD) – The World Bank, September 2015*

Access to banking services has also been low over the past few decades (Beck et al., 2009b). This limited outreach is highlighted by the stark difference between SSA and the other regions in terms of the access indicators. The overall scores for the SSA are very low in every aspect, see Figure 2.8. For example, according to the World Bank, (GFDD, 2015), in 2013, the number of bank accounts per 100,000 adults was approximately 166, compared to 915 in the ECA region. Overall, and similar to other regions of the world, access indicators have improved in SSA since 2005.

2.1.2 Overview of African Stock Markets

The role of well-functioning capital markets in promoting economic development and growth by facilitating and diversifying sources of finance to firms cannot be overemphasized (see also; Demirguc-Kunt and Levine, 1996, Levine and Zervos, 1996, Levine and Zervos, 1998, Beck and Levine, 2004). In recognition of this, and following the extensive economic reforms and privatization programmes inspired by the IMF and the WB, there has been a considerable surge in the number of stock exchanges in African countries, from only eight in the 1980s to 29 by the end of 2014 (Smith et al., 2002, ASEA, 2015a). The South African Stock Exchange (JSE Ltd), formed in 1887 is the largest among African stock exchanges and most advanced by world

standards. It is also one of the world's 20 largest exchanges in terms of market capitalisation values (ASEA, 2015b). Following the classification as suggested by Smith et al. (2002), the other markets in SSA include (year of establishment in brackets):

1. *Medium sized markets:* Egypt (1883), Zimbabwe (1896), Morocco (1929), Kenya (1954), Nigeria (1960), and Tunisia (1969).
2. *Small new markets which have experienced rapid growth:* Cote d'Ivoire (1973), Mauritius (1988), Botswana (1989), Ghana (1989), and Namibia (1992).
3. *Small new markets which have yet to take off:* Algeria (1997); Cameroon (2001); Cape Verde (2005); Libya (2007); Malawi (1995); Mozambique (1999); Rwanda (2008); Seychelles (2012); Sierra Leone (2009); Somalia (2012); Sudan (1994); Swaziland (1990); Tanzania (1998); Uganda (1997); and Zambia (1994). Others are: the Bourse Régionale des Valeurs Mobilières d'Afrique Centrale, or BVMAC, located in Libreville, Gabon; Abuja Securities and Commodities Exchange (1998) and Agricultural Commodities Exchange of Zambia (2007).

Except for the South African market, other African markets are described as frontier markets. Basically, these are markets that are relatively small in terms of the number of listed companies, market capitalization and liquidity levels in comparison to their developed and emerging counterparts. Figure 2.9 shows the number of listed domestic companies in 10 selected African stock markets[4] during the period 2000 to 2012 (see also, Table 2.2).

Table 2.2: Development Statistics on Selected African Exchanges at the end of 2014

Country	Year Established	Number of listed Companies	Change (%) (2013-2014)	Market Capitalization (US$bn)	Change(%) (2013-2014)	Total Value Traded (US$m)	Change(%) (2013-2014)
Botswana	1989	35	0.00%	4.40	-8%	229.10	-14%
BRVM	1973	38	2.70%	11.70	-1%	288.96	-3%
Ghana	1989	35	2.94%	20.10	-32%	108.10	-51%
Kenya	1954	65	6.56%	25.57	15%	2370.60	31%
Namibia	1992	38	11.76%	148.48	11%	744.40	30%
Nigeria	1960	189	-0.53%	61.72	-25%	7192.90	10%
Tanzania	1998	21	16.67%	12.80	22%	652.90	307%
Uganda	1997	16	0.00%	9.49	16%	16.80	73%
Zambia	1994	21	5.00%	66.50	14%	57.70	-18%
Zimbabwe	1896	65	-2.99%	4.33	-17%	452.87	-7%
South Africa	1887	391	1.30%	1150.50	4%	405004.40	-2%

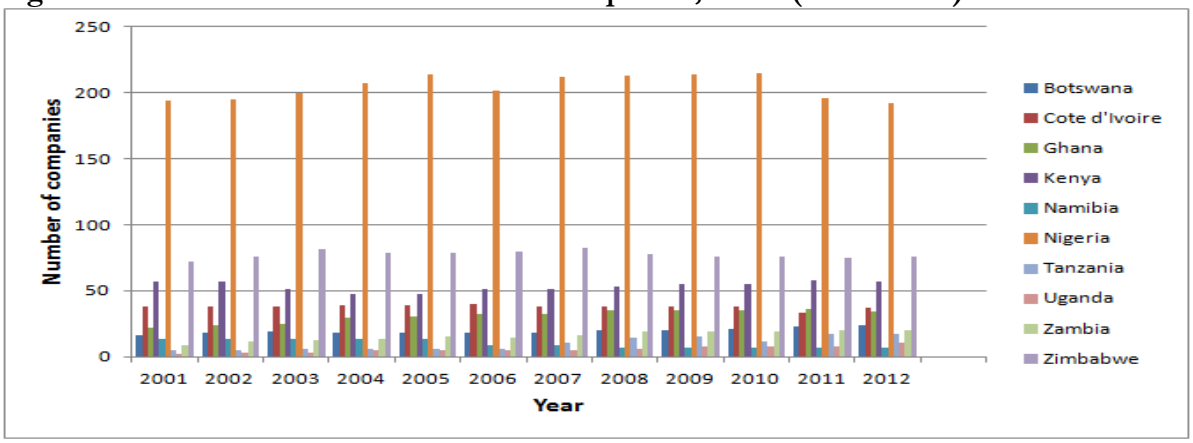
Source: *African Securities Exchanges Association (ASEA), 2014 Annual Reports and Statistics*

[4] The markets for Kenya, Tanzania and Uganda were chosen because they in the process of establishing a regional exchange with operations in each of the partner states. The regional integration initiative began in 1997 with the establishment of the East African Securities Regulators Association (EASRA). During that time Rwanda and Burundi did not have stock markets. The implementation progress is promising, as the common market is likely to take off in a year or two (EASEA, 2015).

Excluding Nigeria, most of the markets have less than 100 listed companies as of 2010 and some with as few as seven. It also shows that the average number of companies in each country does not change regularly, implying that newer listings and delisting in the markets are low with Nigeria recording highest drop in the year 2011. As Table 2.2 depicts, the Tanzanian stock exchange recorded the highest increase in newer listings whereas delisting was greater in the Zimbabwean market.

Overall, however, the net number of domestic listed companies has increased by only 48 at the end of 2012 in comparison with 2000. The small number of listed firms with each stock exchange having its own regulatory and operational systems is an obstacle for attracting investors who want to put funds in Africa. This is because it might be costly to transact in a large number of small exchanges.

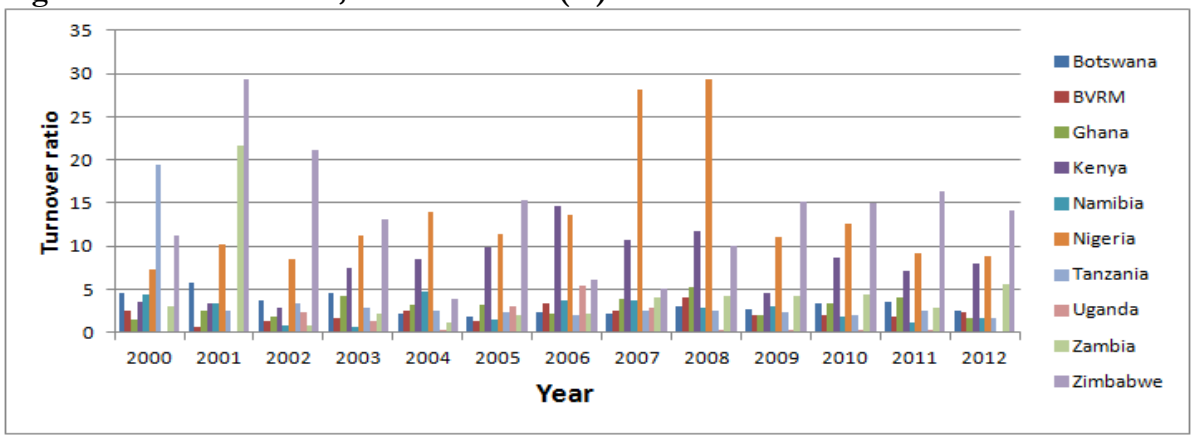
Figure 2.9: Number of Listed Domestic Companies, Total (2000 – 2012)



Source: *World Development Indicators*

Investors would be interested to invest in stocks only when there is assurance that the stocks are regularly traded. However, it is well documented that all African markets are deemed to be illiquid (Smith et al., 2002, Ntim et al., 2011, Smith and Dyakova, 2014). Furthermore, Yartey (2008) contends that thin trading occurs even in the most advanced mature African stock markets (including South Africa). As stated earlier, the lack of significant numbers of listed firms in most of these African markets offers few investment options for investors to engage in trading. This in turn, explains the little daily trading and the lack of liquidity (Ntim et al., 2011). As shown in Figure 2.10, the liquidity of African stock markets (excluding Zimbabwe) from 2000 to 2012 as measured by the turnover ratio is on average less than 10%.

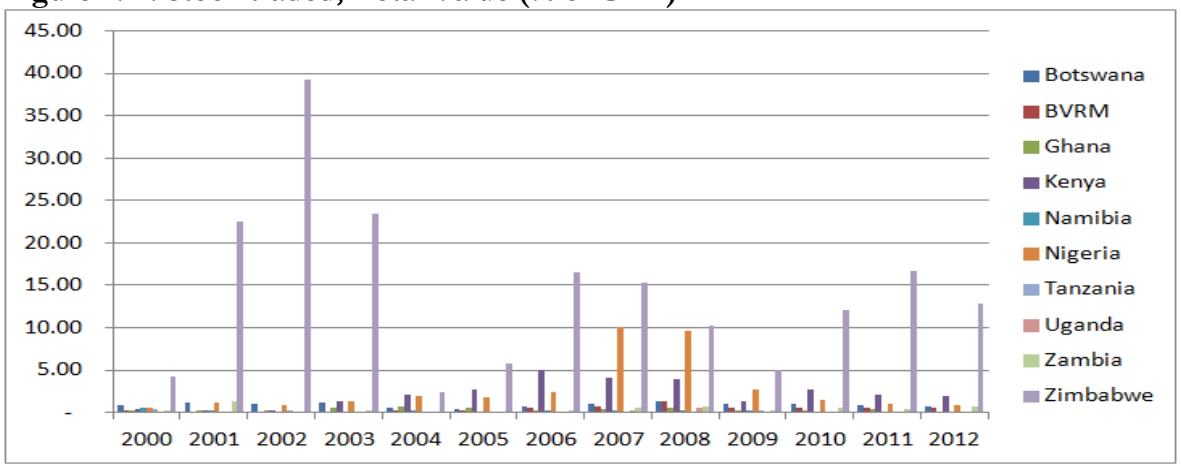
Figure 2.10: Stock traded, Turnover ratio (%)



Source: *World Development Indicators*

Similarly, when the activity of the stock market is measured using the total value traded as a share of gross domestic product (GDP), that is, the value of transactions relative to the size of the economy; we see the same pattern (see Figure 2.11).

Figure 2.11: Stock traded, Total Value (% of GDP)



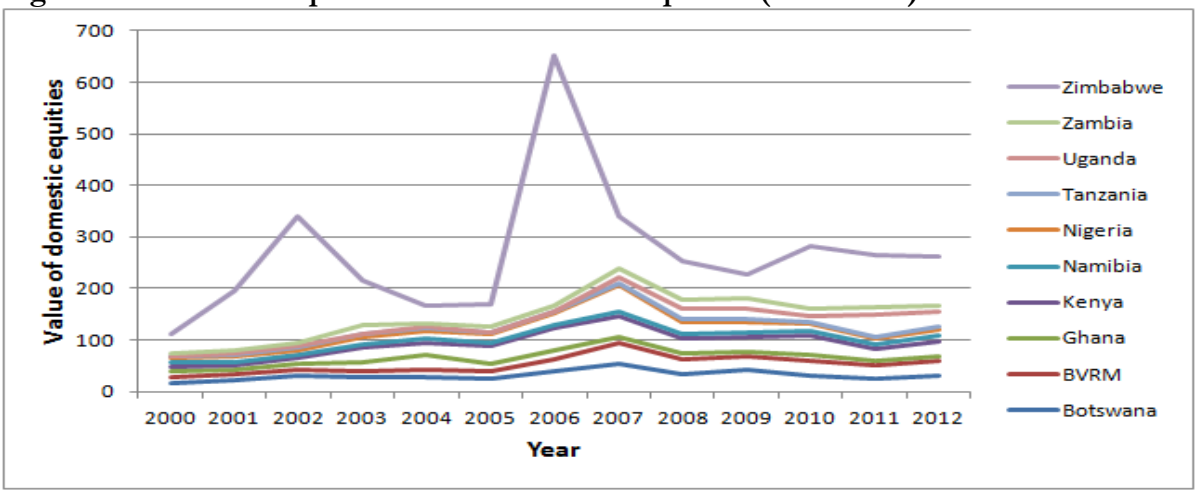
Source: *World Development Indicators*

The highest total value to GDP ratio is in 2002 for the Zimbabwean market. Since then the ratio has experienced a downward trend, the lowest being recorded in 2004. It is also evident from Figure 2.11 that for the duration under consideration, the Nigerian market has recorded an insignificant ratio, except for year 2007 and 2008 respectively. The 2013-2014 change in the absolute amount of the total value traded as presented in Table 2.2 reveals that the Tanzanian market topped the list. The greatest decline in the total value of shares traded was in the Ghanaian market.

Figure 2.12 further portrays the market sizes of the 10 selected African stock markets as measured by stock market capitalization of listed domestic equities as a percentage of GDP. Except for Zimbabwe, the remaining markets have experienced fast growth between years 2000 to year 2007. For Zimbabwe, on the other hand, we see a sharp increase in the market capitalization as a

percentage of GDP ratios between year 2000 and 2002. Thereafter, the ratio declines before a sharp rise to reach its peak in 2006 one year before the start of the financial crisis. Between years 2007 and 2008, during the global financial crisis, Figure 2.12 displays a sharp decline in the sizes of all markets. Since then, the size of the markets has been growing steadily but not to the extent of the highs of year 2007. In comparison to 2000 however, most of these stock markets have almost doubled their capitalizations, even though the registered sizes are lower than in most emerging and developed counterparts.

Figure 2.12: Market Capitalization of Listed Companies (% of GDP)



Source: *World Development Indicators*

The information presented in Table 2.2 shows that the market capitalizations of the Nigerian, Ghanaian and Zimbabwe markets plunged significantly between the 2013-2014 periods. On the contrary, the capitalizations of the markets that are considered small and yet to take off (see for example the Tanzanian, Ugandan and Zambian markets) have continued to perform well in terms of growth. It is also important to note here that the low market capitalization in most African markets may partly be explained by the small number of listed companies. Furthermore, due to thin trading, the total market capitalization is largely accounted for by few large stocks.

Despite relatively low market capitalization, African equity markets are still attractive diversification opportunities for international investors. As such, a number of globally recognized indices that investors use to measure frontier market performance have been developed. The indices include FTSE ASEA Pan Africa Index, MSCI Emerging Frontier Markets Africa index, S&P Africa Frontier and S&P Pan Africa.

Many African economies have the most promising growth potential (World Bank, 2014, FTSE, 2014). However, institutional frameworks pose yet another serious impediment to investors considering to put their funds in African frontier stock exchanges. In addition to being small

exchanges and illiquid, they are also poorly regulated (Yartey and Adjasi, 2007, Yartey, 2008). The quality and level of supervision by the regulators in most of these markets is not adequate and operational standards do not meet investors' standards needed to attract foreign portfolio. The exchanges lack predictable sets of rules and systems that operate properly (Yartey and Adjasi, 2007). The available evidence summarised in Table 2.3 shows that all markets have a regulatory authority, and that they are regulated by enacted laws. In line with this, Yartey (2008) contends that the problem is not lack of laws and regulations, but that enforcement actions are either non-existent or rarely done. The regulators and supervisors in these frontier markets are not well-trained and experienced to manage the state-of-the-art regulatory frameworks they have adopted from mature markets. He further points out that non-compliance with the laws and rules is like a tradition in many of these markets.

Table 2.3: Institutional, Operational and Infrastructural Developments as at the end of 2013

Country	Market Regulator	Government law	Trading Session hours	System of trading	Foreign participation	WFE Status	Clearing and Settlement	Derivative trading	Margin Trading	Intraday Trading	Online Trading
Botswana	Yes	Yes	1030 - 1330HRS	Automated	33%	N/A	T + 3	N/A	Yes	Yes	Yes
BRVM	Yes	Yes	0830 - 1030HRS	Automated	N/A	N/A	T + 3	N/A	No	Yes	No
Ghana	Yes	Yes	0930 - 1500HRS	Automated	50%	Correspondent	T + 3	Yes	Yes	No	Yes
Kenya	Yes	Yes	0900 - 0300HRS	Automated	47%	Affiliate	T + 3	N/A	No	Yes	No
Namibia	Yes	Yes	0900 - 1710HRS	Automated	N/A	Affiliate	T + 5	N/A	Yes	Yes	No
Nigeria	Yes	Yes	0930 - 1430HRS	Automated	51%	Member	T + 3	N/A	Yes	Yes	Yes
Tanzania	Yes	Yes	1000 - 1400HRS	Automated	23%	N/A	T + 3	N/A	No	No	Yes
Uganda	Yes	Yes	1000 - 1200HRS	Manual	N/A	N/A	T + 5	N/A	No	No	No
Zambia	Yes	Yes	1100 - 1400HRS	Automated	36%	N/A	T + 3	N/A	No	Yes	No
Zimbabwe	Yes	Yes	1000 - 1130HRS	Manual	50%	N/A	T + 7	N/A	No	Yes	No
South Africa	Yes	Yes	0900 - 1700HRS	Automated	16%	Member	T + 5	Yes	Yes	Yes	Yes

Source: *African Securities Exchanges Association (ASEA), 2014 Yearbook*

In addition, participants in these markets are subjected to regulatory complexities, uncertainty and high compliance costs due to existence of multiple regulators. For example, in Kenya, the Nairobi Stock Exchange (NSE) and the Capital Market Authority (CMA); and in Tanzania, the Dar-Es-salaam Stock Exchange (DSE) and the Capital Markets and Securities Authority (CMSA) both serve as regulators. The capital market authorities' acts as the industry regulatory bodies while the exchanges have powers to make regulations and rules on various aspects of the market trading.

Informational and disclosure deficiencies are also often cited weaknesses of the African frontier markets for example publication of false financial statements (Mgwabati, 2009). The situation is said to be worse for stocks that are not frequently traded. During the past two decades, the dominance of manual systems and processes have hampered the trading, settlement and delivery operations. Table 2.3, however, shows that except for Uganda and Zimbabwe, all other exchanges have automated trading systems. Moreover, the clearing and settlement period for all except Zimbabwe, is utmost five days.

Another important element of stock market development is the participation of foreign investors. It helps to invigorate trading and consequently, liquidity of markets. Many African frontier markets have opened up to foreigners but a few of them have some restrictions on foreign participation. In 2014, for example, Tanzania amended her foreign exchange (listed securities) regulations to allow foreign investors to participate freely in the DSE and to a limited extent (up to 40%) in government securities. Before that, foreigners were limited to only 60% in listed securities and not allowed to participate in government securities at all. Table 2.3 displays the percentage participation of foreigners in African exchanges. Some studies have associated the low liquidity of African stock markets with the length of trading sessions (e.g. Ntim et al., 2011). They point out that most of the markets trade in relatively short hours because they have a small number of listed companies.

Despite the promising economic growth, the participation of the local citizens in the African stock markets is very negligible due to low saving and investment rates (Kenny and Moss, 1998). One of the reasons is that a huge proportion of the African population is living below the international poverty line. The literature identifies a number of factors that have contributed to this situation, including; political instability, disease and war. Others; are economic mismanagement, inefficient financial institutions, and large government deficit budgets (Levine and Zervos, 1996, Levine and Zervos, 1998, Kenny and Moss, 1998). Another reason is the lack of a saving culture and tradition, which is said to be inherited from one generation to another. Uy (2009) on the other hand, showed that less than 20% of people living in Africa have bank accounts that could enable them to save, make cheque payments and borrow. The report concluded that higher costs of running and maintaining the account are the main factors for the observed phenomenon. The lack of savings, in turn, constrains the demand and supply of securities in the markets, and hence hampers the development of capital markets.

Political uncertainties and economic policies in some of the African countries have also contributed to painting the negative attitude towards the African stock markets by investors. A good example is the Zimbabwe Stock Exchange, which was considered to be among the best-performing markets during the 1990s. Starting from 1998, the market experienced poor performance in terms of its turnover and market capitalization. This was mainly due to loss of investors' confidence on the political and economic policies that the government was implementing. Similarly, in Kenya, the NSE recorded a decline in market performance due to political unrest when the country was going for general elections in 2002. However, confidence in the market was restored when the new government was reinstated in 2003.

Protection of the interests of minority shareholders in some of the African markets is still an unresolved issue (Yartey, 2007, Yartey and Adjasi, 2007). As a result of weak enforcement of the laws, some companies have continued to be listed in the markets for a while despite failing to comply with the laws and regulations, and corporate governance guidelines. When companies continue to operate under poor governance, investors will have reduced confidence in the markets. In June 2011, for example, National Investments Company Limited (NICOL) which was listed on 15/07/2008 was delisted from the DSE following persistent defiance to comply with the CMSA and DSE rules. In 2009, the company was alleged to prepare false financial statements for the year 2008 aiming at deceiving her shareholders. Instead of taking stern measures, the CMSA just issued a warning to the board members for failure to comply with its directives (Mgwabati, 2009). The NSE, on the other hand, suspended the CMC Holdings in September 2011 following court cases and board wrangles over claims of fraud and bad governance (Business Daily, 2015). A one, Mr. Muthoka, was accused of breaching corporate governance standards by serving on the boards of both the CMC Holdings, and a CMC supplier, Andy Forwarders. The boardroom fights ended after ousting him as a chair. CMC Holdings was officially delisted from the NSE effective 11th February 2015, after a successful buyout of the company (NSE, 2015).

Another important feature of African stock markets is the lack of a well-developed and active domestic investor base. The participation of institutional investors is limited, while that of retail investors in the markets is less than one percent (Yartey, 2007, Elinaza, 2015). It should be recalled that many of these markets were established following the economic reforms that the governments undertook in the early 1980s. During that time, countries embarked on privatization of the state-owned enterprises (SOEs). This was expected to be mainly carried out using stock exchanges to ensure that people are empowered economically through ownership of the firms in an equitable and inclusive manner. When it came to the implementation of this policy, however, many governments chose the private/trade sale approach to be the main driver of the privatisation process. The consequences are that out of the many privatized SOEs, only a small number of them were listed. This explains why these markets are economically weak, in terms of investors' base and adequate supply of securities. Apart from stocks and corporate and government bonds (ASEA, 2015a), Table 2.3, for example, shows that derivatives are only traded in Ghana and South Africa.

2.1.3 The Role of Stock Markets on Economic Development

The influence of the overall financial development, and stock markets in particular, on improved resource allocation and growth of economic activity cannot be overemphasized. As noted by

Demirguc-Kunt and Levine (1996) the world has witnessed a considerable development of stock market in emerging markets. They further point out that as part of efforts to revolutionize their capital markets and integrating with world capital markets, many of the emerging economies removed barriers to international capital flows to attract foreign portfolio flows.

There are several explanations for the increase of stock markets in world and its relation to economic growth. An important role of stock markets, which affect economic growth, is the creation of liquidity. Levine (1997) points out that, economic development is unlikely to occur in countries where the financial systems do not enhance the liquidity of long-term investments. This is because projects whose payback period is long, but which yield higher profits; require huge injections of capital for a considerably long period. A liquid and well-functioning stock market facilitates long-term commitment of capital (Levine and Zervos, 1996). It provides mechanisms whereby investors can easily trade on their securities whenever they need to do so (Demirguc-Kunt and Levine, 1996, Demirguc-Kunt and Maksimovic, 2002). In other words, initial investors do not lose access to savings during the gestation period of their investments (Levine and Zervos, 1996). By so doing, liquid capital markets are regarded as efficient tools for allocating resources among competing users of capital, and boosting economic growth (Beck and Levine, 2004). For the same reasons, liquid secondary capital markets lower trading costs as well, particularly for long-gestation investments (Levine, 1997, Levine and Zervos, 1996).

Stock market development is also linked with liquidity risk-reduction. According to Levine (1997), informational asymmetry and transaction costs are associated with inhibiting liquidity and hence deepening liquidity risk. Stock markets are therefore, needed to reduce both the information asymmetry and transaction costs in order to boost liquidity, which is necessary for better resource allocation and the steady-state economic growth. Similarly, Demirguc-Kunt and Levine (1996) claim that, the ease with which investments can be acquired and disposed in a liquid market makes them less-risky and attractive. They further contend that this situation facilitates mobilization of more savings, and attracts even more investments in highly illiquid assets. On top of that, Demirguc-Kunt and Levine (1996) and Levine and Zervos (1996) assert that liquid stock markets provide companies with permanent access to long-term capital through issuance of equity, which is good for economic growth.

In addition to reducing liquidity risk, developed financial systems also provide risk diversification benefits. Since stock markets facilitate long-term commitment of capital into higher-risk investments that promise higher returns, it is prudent to suggest that the markets facilitate risk diversification too. Consistent with this, Demirguc-Kunt and Levine (1996) and Levine and

Zervos (1996) argue that greater risk diversification, is likely to occur in stock markets, which are large, well-functioning, and more internationally integrated. That is, internationally integrated stock markets encourage portfolio shifts from low to high return projects, and therefore, facilitating economic growth (Hondroyiannis et al., 2005, Levine and Zervos, 1996).

Stock market development is associated with the presence of costs of obtaining information, and transactions (Levine, 1997). Well-functioning and developed capital markets, are needed in order to generate and disseminate information about investment projects, to enable investors make informed decisions (Atje and Jovanovic, 1993). This information is made available to the public through published annual reports, press releases in the media, and historical stock prices, to mention a few. The various forms of mediating information provide access to anyone with an interest and make it easier to decide what action to take on the basis of the same (Levine and Zervos, 1996). Large and liquid stock markets therefore, serve as a means of reducing transaction and information costs which would otherwise be very costly to acquire and process (Levine, 1997). Moreover, the profit generated from low costs of transactions and information, motivate investors to monitor and seek information about firms (Demirguc-Kunt and Levine, 1996, Levine and Zervos, 1996). This in turn ensures better allocation of resources among firms and translates into faster economic growth (Levine, 1997, Demirguc-Kunt and Levine, 1996).

Stock development is also linked with improved monitoring and corporate control (see; Levine, 1997, Demirguc-Kunt and Levine, 1996, Levine and Zervos, 1996). These authors state that well-functioning stock markets are associated with amelioration of the agency problem, which is characterized by informational asymmetry. This can take several forms, e.g. by attaching manager compensation to stock performance and corporate take-over threats (Levine and Zervos, 1996, Levine, 1997). These strategies not only provide the assurance that managers' interests are aligned with those of owners, but also that owners get returns on their investments. Thus, well-functioning stock markets that enhance corporate control, promote improved resource allocation by mobilizing savings; directing the same to profitable investments; and hence affecting economic growth.

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CHAPTER 3: EXPLORING HERDING BEHAVIOUR IN AFRICAN FRONTIER STOCK MARKETS

3.1 Introduction

Herding behaviour is a well-established phenomenon that has received considerable attention in the stock markets' literature. This phenomenon is also referred to as social learning, social interaction, peer pressure, or neighbourhood effect. To date, understanding of the decision-making process of market participants is still a major challenge to both practitioners and academicians, particularly, in light of the shortcomings of the standard (efficient market) financial theory in explaining the behaviour of stock returns in practice. The criticism of the standard theory stems from its main assumptions that investors maximize utility, and that they are homogeneous. That is, investors form expectations based on all publicly available information individually held by every other market participant and use it in a similar way. However, empirical evidence later showed that market participants do not always take decisions independently (see, for example; Shiller, 1995, Devenow and Welch, 1996).

Though the literature does not provide a clear definition of what herding is, Devenow and Welch (1996), Barber et al. (2009c), and Shive (2010) link it to how peoples' actions are correlated. They argue that individuals share useful information and form collective decisions by following the actions of others. Hirshleifer and Teoh (2003) point out several ways in which an individual's behaviour can be influenced by the actions of others. For example, the influence of words or conversation, learning from quantities (individual actions), and learning from observation of outcomes such as market prices. Accordingly, Hirshleifer and Teoh (2003) define herding as a situation where individuals behave in a similar way as a result of interaction amongst themselves.

In the context of a stock market however, herding behaviour is generally taken to mean the investors' tendency of making systematic erroneous investment-decisions by imitating the actions of others over a given period of time. Among the possible consequences of herding behaviour, particularly when it involves professional investors, is to make market prices to deviate considerably from their underlying fundamental values. In the short-run, if the deviations are not corrected by market forces or the regulatory authorities, herding may lead to greater financial instability; exacerbate crises and inefficiency, hence exposing investors to huge losses. A very recent example of the consequences of herding behaviour is in China's main stock market crisis where the markets went up by 150% between June 2014 and June 2015 (Duggan, 2015a, Sudworth, 2015b). However, over a period of one month the Chinese stocks plunged by more than 30% from the high of mid-June 2015 (Duggan, 2015a, Sudworth, 2015b, Shen and Goh, 2015). This

fall in share prices wiped-off the value of companies by approximately $3 trillion (Sudworth, 2015b). More than 90 million people in China were affected, the majority being retail investors who account for around 85% of China's trade (Sudworth, 2015a). This situation caused a panic sentiment in the market, whereby every investor wanted to sell off their holding. The irrational sell-off depleted liquidity on the market (Shen and Goh, 2015). The government's attempt to ameliorate the situation included suspending new share offerings of more than 1,300 companies to prevent their stock prices from falling further (Duggan, 2015a; Sudworth, 2015b; Shen and Goh, 2015). The Chinese authorities also banned shareholders from selling shares for six months if they had a holding of 5% or more in listed firms (Duggan, 2015a; Sudworth, 2015b; Shen and Goh, 2015; Xie and Cao, 2015). In addition, the government also provided liquidity-support to brokerages to buy shares to push the market up. These measures only caused people to panic more and continue the sell-off, therefore, exacerbating volatility (Sudworth, 2015b, Xie and Cao, 2015). Later on the Thursday of 9th July 2015 however, the effects of these interventions started paying off as stock prices started to bounce back. The following day, on Friday, the Shanghai's composite index and the Shenzhen component index closed up 4.5% and 4.6% respectively (Duggan, 2015b, Noble, 2015).

In the literature however, empirical evidence regarding the presence of herding activities is inconclusive. In emerging markets, for example, Demirer and Kutan (2006) report no evidence of herd formation in Chinese markets. Other studies, conversely, provide support for herding behaviour including: in China (Tan et al., 2008, Lee et al., 2013, Chiang et al., 2010); in Taiwan (Demirer et al., 2010); and in Arabic countries (Balcilar et al., 2013, Balcilar et al., 2014). Likewise, Chang et al. (2000) find the presence of herding behaviour in South Korea and Taiwan, and partial evidence in Japan. The findings by Chang et al., (2000) however indicate no herding evidence for participants in Hong Kong and the US markets. On the other hand, studies providing support of herd formation in advanced markets include that of Chiang and Zheng, (2010) and Economou et al., (2011).

Evidence from African frontier[5] stock markets is even very scant. The earliest investigation to detect the existence of herding behaviour among investors was conducted in South Africa by Gilmour and Smit (2002). The authors tested for institutional herding in the unit trust industry, and reported a relationship between herding measures and volatility estimates. In a recent study,

[5] The term African frontier refers to smaller and less developed countries as compared to emerging markets; however, investors consider them to have a bright growth future. According to the IMF they include Botswana, Ghana, Kenya, Namibia, Nigeria, Tanzania, Uganda, and Zambia. Note that the markets for Kenya, Tanzania and Uganda are in the process of establishing a regional exchange with operations in each of the partner states.

Seetharam and Britten (2013) provide support for the herd behaviour only during bear market periods on the Johannesburg Stock Exchange (JSE). Sarpong and Sibanda (2014), on the other hand, contend that equity mutual fund managers on the JSE are susceptible to herd behaviour, and the bias has influences on the performance of the funds.

Typical of FMs, most of ASEA members are at an early stage of development in terms of infrastructure and institutional characteristics. That is, they operate in jurisdictions that lack effective and sound regulatory frameworks; are deficient in disclosure of firm-specific information, have slow disclosure of the same, and low informational efficiency (see also Ntim et al., 2011, Black, 2001, Chang et al., 2000). Other features include the presence of non-sophisticated individual investors, and the dominance by relatively few institutional investors. With the exception of BRVM, Kenya, Nigeria and Zimbabwe, the rest of the markets are a result of the economic reforms that many African governments implemented during the 1980s, and hence are characterised by short trading history. Furthermore, the markets (excluding South Africa) have a small number of listed companies, suffer from thin trading, and have low market capitalization in comparison to developed markets (refer to Table 2.2). Despite being illiquid, the economies of FMs have performed impressively well over the last decade in terms of rates of growth (FTSE, 2014). Equities listed in these markets have attracted the attention of equity investors globally because of their high growth potential. Moreover, since the traditional emerging markets have almost acquired the same development status and become more entrenched in global trade as the matured markets, inclusion of FMs offers attractive diversification destinations because they have different risk and return characteristics. That is, the share values of African FMs lack correlation with developed and emerging markets, and also with each other. Moreover, the low yields in developed markets may have prompted investors to consider putting funds or search high returns in FMs which previously attracted little global portfolio funds.

3.1.1 The Aim of the Study

The aim of this study, therefore, is to examine herding behaviour in 10 African markets (refer to Table 2.2), which are members of the African Securities Exchanges Association (ASEA). This association is open to any stock exchange located in the African region, be it large or nascent. To the best of our knowledge, this is a first comprehensive pioneering African-wide empirical study that has compiled an adequate, diverse dataset to investigate this phenomenon. This study mainly seeks to address the following questions:

1. Do investors in African frontier markets (FMs) have a tendency to exhibit herding behaviour?
2. Do investors in African frontier markets make investment choices by following group trend during extreme conditions?

In general, our results provide indisputable evidence of herding in all our sample markets throughout the study period. Herding appears to be strong when we use the equal-weighted average market returns, which mainly represent small capitalization stocks. These form a large part of the listed stocks in African FMs. The study finds no clear herding effects with respect to the asymmetric impact of market sign. We find such evidence when conditioned on market volatility for the Kenyan market only during high-volatile days. The findings regarding the impact of the recent global financial crisis reveal that herding was intense in only two markets; namely Ghana and Zambia. Our findings regarding the role of South African market in African FMs' herding found that the market motivates herding in small caps in Botswana and Namibia only.

The remainder of the chapter is organized as follows. Section 3.2 provides a review of the theories on herding behaviour. In section 3.3 we analyse the empirical findings from previous studies. The estimations methodology and data sources are discussed in section 3.4. We present the empirical results and discussion of the findings in section 3.5. Finally, we provide the summary and conclusion in section 3.6.

3.2 Theoretical Literature Review on Herding Behaviour

There are many theoretical perspectives that explain why investors exhibit herding behaviour in making investment-decisions (Graham, 1999, Hirshleifer and Teoh, 2003, Sias, 2004). The ensuing discussion provides a review of the main theories identified in the literature.

3.2.1 Psychology-Related Herding

From a psychological point of view, herding is regarded as an irrational behaviour when blindly, imitators conceal or disregard their prior beliefs or information for a particular decision, only because other members of the group are acting differently (Devenow and Welch, 1996). Individuals copy others' or follow crowds' actions because they prefer to conform to the behaviour (or social norms) that majority members of the group share (Banerjee, 1992, Baker and Nofsinger, 2002, Bikhchandani and Sharma, 2000). It is argued that interaction in the community provides a mechanism whereby individuals exchange information through word-of-mouth communication, or observational learning (Banerjee, 1992, Bikhchandani et al., 1992, Bikhchandani et al., 1998).

This results in the formation of social consensus, which shapes people's actions. For example, the participation in stock market trading can be stimulated by the fact that the majority in the local community invest in stock markets (Brown et al., 2008, Ivković and Weisbenner, 2007, Hong et al., 2005). Similarly, noise trading may occur when investors end up making decisions on the basis of the influence of invalid information from others without regard to a rigorous analysis of their own private information (Black, 1986, De Long et al., 1990).

3.2.2 Information-Driven Herding

The term informational cascades refers to a situation where an array of individuals ignore their own private information signals and consider it best to make a decision by inferring on the observation of actions, words, or outcomes of previous individuals (Bikhchandani et al., 1992, Banerjee, 1992). In many situations where people acquire information in a sequence, by observing the actions of others who precede them, they tend to believe that their own judgments are fallible, and that their colleagues acted in a particular way because they are better informed than themselves (Welch, 1992, Banerjee, 1992). Thus, like the domino effect, herding behaviour or cascade occurs, when everyone coming later, choose to mimic the action of the crowd even when his own information suggests a different course of action. The consequence of each subsequent person using the information contained in the decision made by the predecessor is that the action of the former becomes uninformative to those coming afterwards. This leads to convergence of behaviour onto undesirable outcomes. For that reason, Hirshleifer and Teoh (2003) assert that cascades tend to be associated with information blockages where individuals decide without considering the potential information benefit of their action to others. Further details on informational cascades may be found in studies by Bikhchandani et al. (1998).

3.2.3 Principal-Agent Relationship

There are two motivating factors that make herding behaviour from the principal-agent perspective (reputational herding) to be viewed as a rational form of investor behaviour (Devenow and Welch, 1996). First, the effect of predecessor's action on the payoff structure of the imitator (the payoff externality). Second, from the Bayesian explanation, followers use others' information to update their judgments systematically and logically, hence herd because they rationally believe the others' actions are more informative than private signals. From the principle-agent relationship context, herding occurs when a decision-maker, intentionally follows the actions of others who have acted previously, and ignores their own private signals that would otherwise suggest a different course of action, in order to maintain reputation capital (Scharfstein and Stein, 1990,

Bikhchandani et al., 1992). In most cases, agents or professionals like institutional investors and fund managers practice this type of herding; because they want to ensure that their performance does not differ significantly from that of their peers or counterparts (see, for example; Holmes et al., 2013, Hong et al., 2000, Gavriilidis et al., 2013). Moreover, they have an incentive to maintain their good reputation because they need to sustain future remuneration, terms of employment, and professional status in the market, to mention a few. All these depend on how their principals assess their abilities. Agents are more likely to downplay their own private information about an investment opportunity if they find out that what they have is different from what others have received. Being under this situation, they decide to discount their own useful signals, and follow the herd in fear of signalling to the labour market that their ability is low, or they are incapable, particularly when the outcome is poor.

3.2.4 Spurious Herding

The literature shows that herding may also be driven by spurious or non-intentional motives. One of the sources of spurious herding is the relative homogeneity of investors' ranks. Institutional investors, for example, when they possess certain similar characteristics, such as professional experience or education background, their actions tend to exhibit correlation (Grinblatt and Keloharju, 2000). This situation creates the impression of herd formation. The reason why investors behave in a similar manner is that they are exposed to the same stimulus. Since they share many traits and are complying with the same framework of professional conducts (Teh and De Bondt, 1997), it is more probable for the investment community to evaluate, interpret and respond to the available signals alike. As a consequence, they end up holding portfolios of similar structure (Lakonishok et al., 1992). Furthermore, Voronkova and Bohl (2005) argue that stringent investment regulations enhance this kind of homogeneity, hence propagating herding tendencies. They report presence of herding behaviour and feedback trading by pension funds in the Polish stock markets where investors are subjected to restrictions in the pool of stocks from which they can select for investment.

On the other hand, it is suggested that what might be seen as herding is in fact characteristic-trading or investing style (Bennett et al., 2003). This is a type of communality between investors that arise as a result of employing the same investment style, or trading on stocks of specific characteristics such as sector, size, or past performance without mimicking others (Falkenstein, 1996). Investors using momentum-trading for example, will buy or sell identical stocks, because they all analyse the same indicators, thus leading to high correlation in trades (Grinblatt et al., 1995).

3.3 Previous Empirical Studies on Herding Behaviour

Herding behaviour has been extensively studied in the financial markets literature because of its potential to explain several financial phenomena such as stock-price volatility, positive-feedback trading (i.e. buy when the market is booming, and sell when the market is falling), to mention a few. Researchers that have examined herding behaviour amongst institutional investors, however, offer mixed findings. For instance, studies such as those by Shiller et al. (1984) and Barber and Odean (2008) suggest that institutional investors are less biased by behavioural aspects than individual investors, and therefore less likely to fall prey of intentional herding. Institutional investors have more skilled people and the required resources for gathering and processing information to enable them make decisions based on specialized knowledge (see also Kim and Wei, 2002).

Other empirical studies, on the contrary, show that institutions exhibit herding, although the reported extent differs from one study to another. For example, Lakonishok et al. (1992) examined a sample of 769 US all-equity, tax-exempt funds which were managed by institutional money managers during the period covering 1985 to 1989. In order to reflect the quantity and quality of information available, they segregated the companies in terms of their market capitalization. Their results provide evidence of high levels of herding for small stock trades compared to trades in large capitalization stocks. In spite of this observation, they report that institutions' trading activities do not destabilize stock-price movements. Consistent with these results, Wermers (1999) documents that mutual funds exhibit a slightly greater tendency to herd than pension funds. In addition, the stocks purchased by herds perform significantly better than what they sell. In this study, Wermers (1999) compared the tendency to herd by fund managers between small and large stocks, and found that growth-oriented funds exhibit herding behaviour frequently by up to four percent higher when selling, than when buying small-capitalization stocks. Using a dynamic herding measure Sias (2004) confirms the correlation of institutional trades over time. On the contrary, Goodfellow et al. (2009) show that institutions do not exhibit herding in their trading activities in the Polish stock market.

Another strand of the literature links the level of institutional herding with the stage of financial markets' development. For instance, Walter and Weber (2006) assert that the level of development of the financial market in Germany is not comparable to that of either the US or United Kingdom (UK). Consistent with the prediction of the theory, their results show that the herding level of German mutual fund managers is higher than that reported in US-based studies. Using the same reasoning, it may be prudent to argue that herding level should be higher in emerging markets, and

for that matter, FMs, compared to the developed markets (Chiang and Zheng, 2010, Chiang et al., 2010). Numerous explanations around inefficient institutional infrastructure including: ineffective regulatory frameworks to facilitate the efficient functioning of the markets, under-developed IT infrastructure, lack of sophisticated and well-informed professional analysts, and lack of transparency can cause high levels of herding in these markets (Appiah-Kusi and Menyah, 2003, Antoniou et al., 1997). In addition, issues related to compliance with corporate disclosure requirements and quality of information, raise concerns on the reliability of the disseminated information for public consumption. Studies that document evidence of herding behaviour in emerging markets include: pension funds in Poland (Voronkova and Bohl, 2005); foreign and domestic investors in Indonesia (Bowe and Domuta, 2004); and Unit Trust industry in South Africa (Gilmour and Smit, 2002).

Another factor that has impacts on the level of herding is the degree of noise in information. The findings by Wermers (1999) show that in small-capitalization stocks, private information may be noisy to the extent of increasing the chances of information cascades occurring. That is, investors tend to rely much on herds when deciding to invest in these stocks than in large-capitalization securities where signals are less noisy (Sias, 2004). Related to this, Hirshleifer and Teoh (2003) point out that the level of herding varies depending on the size of firm. The reason is that large firms have informational advantage compared to small firms, in terms of the precision, and acquisition cost. Thus, the buyers of stocks of small-firms are more likely to mimic than buyers of stocks of large-firms.

Apart from institutional investors, empirical evidence also indicates the prevalence of herding behaviour among security or financial analysts in their decisions. Consistent with reputational motives for herding, Trueman (1994) shows that market analysts tend to herd in their forecasts of future earnings. That is, their forecasts in certain circumstances are biased toward the prior earnings' expectations of the market, and sometimes they make releases that are very close to those made previously by others. In addition, he documents that the propensity of an analyst to herd depends on one's level of predictive ability. This means that the weaker or less-skilful analysts show a greater propensity to herd than stronger analysts (see also Hong et al., 2000). Stickel (1990) also finds that changes in the prior consensus analysts' forecast positively affect an individual's next revision forecast. The effect is less for the analyst who is a member of a team than for non-members. This implies that the tendency to herd is stronger for non-members compared to members. Similar studies such as Graham (1999) find some evidence of herding on the recommendation of investment newsletters, where analysts with better information show less-propensity to herd on the market leader; and Welch (2000), who consistent with information-

cascade models, finds some herding evidence by security analysts in the buy or sell recommendations they give.

Whereas institutional investors may herd for rational or spurious reasons, individuals do the same based on irrational or intentional grounds (see, for example; Goodfellow et al., 2009, Bikhchandani and Sharma, 2000, Wermers, 1999, Scharfstein and Stein, 1990). However, the evidence from these previous studies is mixed. For example, Nofsinger and Sias (1999) investigated the existence of herding by comparing institutional and individual investors for securities listed on the New York Stock Exchange (NSYE). Their findings reveal the existence of herding behaviour by both institutional and individual investors, although the impact of the former on returns is larger than that of the latter. They also report a contemporaneous strong positive relation between annual changes in institutional ownership and returns over the herding interval. They further show that the stocks institutional investors purchase later outperform those they sell (see, also; Wermers, 1999). Venezia et al. (2011) have also reported similar findings of herding tendency among both amateur and professional investors, with the latter less likely to herd than the former. They further suggest that the driving motives for amateurs' herds are information-seeking with higher tendencies of behaving irrationally. In turn, they conclude that herding by amateurs exacerbates stock-price volatility in the Granger causality sense. Another study by Grinblatt and Keloharju (2000) provides evidence that the degree to which investors exhibit momentum-investment strategies (herding) is monotonically related to their level of sophistication. In addition, they point out that in comparison to individuals, stocks that institutional investors buy have superior performance.

Information asymmetry is also associated with herd formation. The study by Kim and Wei (2002) shows that individuals' herding is twice as big as that of institutional investors. They further show that heterogeneity among investors matters. That is, non-resident foreign investors are more likely to engage in momentum trading and in herding than resident foreign investors. However, their results point out that reputation motive does not explain the differences between institutions' and individuals' herding behaviour. Ekholm and Pasternack (2008) on the other hand, explore the relation between investor size and behaviour following the disclosure of new information showing that the reaction to news is positively associated with investor size. That is, in comparison to small investors, large investors react more positively (negatively) to good (bad) news, (see also Ekholm, 2006). They further provide support for the proposition that investor size is negatively associated with level of overconfidence, which also reflects the differences in trading behaviour. This implies that the investment decisions of small investors are affected by their high degree of overconfidence, which in turn adversely affects their performance (Gervais and Odean, 2001,

Odean, 1999, Graham et al., 2009, Langer, 1975). Furthermore, the results by Ekholm and Pasternack (2008) imply that Finnish individuals are much more likely to fall prey of herding than institutional investors.

In addition, the literature shows that herding motives vary depending on the type of investors, level of experience of the agents, and the environment in which they operate. Hong et al. (2000) find that, consistent with career-concern-motivated herding, inexperienced security analysts deviated less from consensus forecasts. With comparable findings, Sias (2004) reports that similarly classified institutional investors are more likely to imitate each other. Also Prendergast (1993) examined the incentives for subordinates to make recommendations consistent with their superiors' opinions. The findings show that yes-men are more likely to be less-able workers, and workers with less-able managers. Zwiebel (1995) on the other hand, argues that conventional explanations which focus on moral hazard and risk aversion, as motivation for herding, are not always convincing. He demonstrates that reputation concerns may lead agents to herd, and take inferior standard actions, particularly when the basis of evaluation of their success is on a known standard benchmark. Otherwise, managers will always consider success to be the best option. In addition, he points out that in terms of managerial ability, while good-quality agents are most likely to herd, the highest- and lowest-ability agents will deviate from the herd and undertake superior innovations when an opportunity arises (see also Hirshleifer and Teoh, 2003). In other words, Zwiebel (1995)'s model suggests that the tendency to herd is context specific. That is, under certain circumstances agents may follow a standard benchmark because they are risk averse, but under others, they may intentionally choose highly-risky projects and deviate from the benchmark to succeed.

Other studies have also examined herding behaviour from different economic environments or states of the market, such as during extreme market volatility or financial crises. A good number of researchers have documented that the propensity to herd is stronger during periods of high market stress, as investors may be seeking the comfort of a pack agreement. In the Korea stock exchange, Choe et al. (1999) observed that the tendencies to herd and momentum trading by foreign investors were more pronounced before Koreas' economic crisis of 1997 than during the crisis period itself. In addition, their findings for the whole sample period, suggest that participation by foreigners helped the market to quickly and efficiently adjust, in contrast to the notion that foreigners destabilize stock-price movements. A similar observation is reported by Kremer and Nautz (2011) who investigated herding behaviour of institutional investors from the German stock exchange. Using daily data, they find that short-term herding is not strong during turbulent times. Slightly different results are reported by Bowe and Domuta (2004) who also

analyzed investor herding behaviour during the 1997 Asian crisis. They reveal that foreign herding increases following the onset of the crisis, and they find no evidence of positive feedback trading. In a related study, Chiang and Zheng (2010) assert that crises prompt herd formation and may have a contagion effect. Over the whole sample period, strong evidence of herding in Latin American markets was only found during the crisis period.

Another group of studies report that herding occurs under upward and downward market conditions. They include: Tan et al. (2008) who studied the Chinese stock market; Hwang and Salmon (2004) who used data from US and South Korean stock markets, and Chiang and Zheng (2010) who examined herding behaviour from 18 markets. In contrast, other researchers fail to detect herding in periods of market stress. Demirer and Kutan (2006) investigated the Chinese markets, and their study reveals no evidence of herding formation; while Christie and Huang (1995) studied the US equity market, and conclude that investors do not herd during periods of market stress (see also Gleason et al., 2004).

Another body of literature has emerged that examines herding behaviour from the social interaction or peer influence context (Shiller, 1995, Shiller and Pound, 1989, Grinblatt et al., 2008, Hong et al., 2004, Andersson et al., 2009). It refers to a situation where in making decisions, investors directly influence each other, through their words, actions, or observation of outcomes (Hirshleifer and Teoh, 2003). This is consistent with the literature on informational cascades (Banerjee, 1992, Bikhchandani et al., 1992, Welch, 1992) which provides reasons why information obtained from others, through social interaction, is important in making investment decisions.

A study conducted by Shiller and Pound (1989) examines how investors develop interest in and receive essential information that ultimately leads to making investment decisions. Using contagion or epidemic models and a survey approach to data collection, they provide evidence that the influence by exchange of opinion (or word-of-mouth effect) among investors plays an important role in financial markets. Their results strongly suggest that both individual and institutional investors get initial interest in a particular stock through direct interpersonal communication. Another study carried out by Hong et al. (2005) tested the hypothesis that investors use word-of-mouth communication to transmit information and ideas about stocks to one another. For example, they report that fund managers from the same geographical location, hold stock-portfolios that are more similar compared to those coming from other cities (see also Ivković and Weisbenner, 2007). They further argue that this regularity holds true even after taking into account the effect of local preference, implying that when making investment decisions, investors exchange opinions within their social information networks. Grinblatt and Keloharju (2001a) however make

a distinction that the influence of social interaction is less prominent among professional investors than among individuals.

As Hirshleifer and Teoh (2003) point out, informational cascade plays an important role in deciding whether or not to participate in something. They argue that social interaction provides the means for information exchange via a word-of-mouth and/or observational learning which is so informative to the extent that individuals disregard their own private signals when making investment decisions (see also Banerjee, 1992). Hong et al. (2004) proposed a model to explore the influence of social interaction on stock market participation. The study reveals that social investors find the market to be more attractive when peers participate. The authors document that socially active households are substantially more likely to invest in the stock market (see also Brown et al., 2008). Similarly, Shive (2010) shows significant social effects on the trading patterns of Finish individual investors. The analysis by Grinblatt et al. (2008) on social influence and consumption shows that recent past purchases by neighbours determine a consumer's automobile selection. Madrian and Shea (2000) and Duflo and Saez (2002) present evidence of peer effects in the context of retirement plans. These studies demonstrate that the decisions of other employees affect an individual's decisions on whether or not to participate in a particular employer-sponsored retirement plan.

Kaustia and Knüpfer (2012) on the other hand, studied how peer performance can influence stock market entry. Their findings demonstrated Shiller (1995)'s argument that regular interaction leads people to behave in similar fashion. They found that success stories from existing investors about stock market investing encourage new investors to enter the market. They further point out that extrapolation of peer experiences plays a part in influencing a number of investing aspects such as investment style, approaches of trading, and selection of types of stocks.

Private conversations with peers can influence investor's decisions as well. According to Shiller (1995), conversation is a behaviour that is common to all human societies and it involves a free-flowing exchange of ideas and thoughts (see also Stein, 2008). Shiller (1995) posits that interpersonal conversation is more effective than the media since it provides more interaction and reinforces memories of information held by the peers. In the context of financial markets, evidence shows that investors enjoy talking about the challenges of investing in the stock markets with their friends and colleagues; in the same way they would get pleasure from similar discussions about other things in which they share interests (Hong et al., 2004, Brown et al., 2008, Shiller et al., 1984). This suggests that the investor's social network or private conversations with peers may have significant effects on their decisions to participate in the stock markets.

3.4 Methodology and Data Sources

To our best knowledge, this is the pioneering study that provides comprehensive evidence testing for presence of herding behaviour in the African frontier market. The following sub-sections present the tests that were performed, and the sources of data.

3.4.1 The Estimation of Herding Behaviour

Christie and Huang (1995) and Chang et al. (2000) have introduced, tests that are popularly used for detecting herding behaviour effects in financial markets. These statistical measures mainly compute the cross-sectional dispersion of stock returns for any given observation period. The main idea behind this approach is to assume we know the average return of all stocks in the market. If there is co-movement between stocks (i.e. highly correlated), all stocks will provide a similar return in any given period. More precisely, the deviation of the individual stocks' return from the average market return will be small at any point in time, despite the market return itself varying over time. However, if the dispersion of the individual returns around the average market return in a given period is large, it will be an indication that the stocks are not moving together. When this happens, it implies that there is an opportunity for active investors to diversify risk (or make profits). In particular, Christie and Huang (1995) developed a cross-sectional standard deviation (CSSD) of returns as a measure of the degree of deviation of individual stock returns from the overall market portfolio return. The CSSD is defined as:

$$CSSD_t = \sqrt{\frac{\sum_{i=1}^{N}\left(\mathrm{R}_{i,t} - \mathrm{R}_{m,t}\right)^2}{N-1}} \tag{3.1}$$

where $\mathrm{R}_{i,t}$ is the observed return on firm *i* at time *t, N* is the number of stocks in the market portfolio and $\mathrm{R}_{m,t}$ is the cross-sectional average (market portfolio) return at time *t*. The daily returns ($\mathrm{R}_{i,t}$) are computed from the logarithm transformed daily stock price or index data as follows:

$$R_{i,t} = ln\left(P_{i,t}\right) - ln\left(P_{i,t-1}\right) \tag{3.2}$$

where $P_{i,t}$ is the price of the stock at time *t*; $P_{i,t-1}$ is the one day lagged daily price per share; and *ln* is the natural logarithm.

According to Christie and Huang (1995), rational asset pricing models predict a positive correlation between returns dispersion and the absolute value of the portfolio returns since the sensitivity of

individual stocks to the market return differs. In other words, investors use private information, which by definition is diverse, to make their investment decisions. Christie and Huang (1995) further assert that the tendency to herd is more likely to occur in extreme conditions e.g. a stock market crush. Under this situation, investors suppress their prior private information and beliefs and trade by following group consensus. This may cause the deviation of returns from the overall market portfolio returns to become small. Putting it differently, when investors form herds, the dispersion of returns around their cross-sectional average is low. To examine this phenomenon, Christie and Huang (1995) estimate the following linear regression model:

$$\mathrm{CSSD}_t = \propto + \beta_1 D_t^L + \beta_2 D_t^U + \varepsilon_t \tag{3.3}$$

Where $D_t^L = 1$ if the market return on day *t* lies in the extreme lower tail of the distribution; and equal to zero otherwise, and $D_t^U = 1$, if the market return on day *t* lies in the extreme upper tail of the distribution; and equal to zero otherwise. The dummy variables represent the differences in return dispersions during the periods of market stress relatively normal markets. When the estimates β_1 and β_2 are negative and statistically significant, it implies there is presence of herd formation. The $\propto$ coefficient stands for the average dispersion of the sample excluding the regions covered by the two dummy variables. Further, Christie and Huang (1995) used two arbitrary criteria to define an extreme market condition to estimate equation (3.3). They defined it as one that lies in the 1% (or 5%) percent lower (or upper) tail of the return distribution.

As a linear model, the CSSD is criticized for being a very stringent test (Chang et al., 2000). It limits the examination of herding behaviour to periods of market stress, while the cut-off point to returns is arbitrarily defined (Chiang et al., 2010). This is regarded as a shortcoming, because in practice what constitutes an extreme return is subjective (see, also; Demirer et al., 2010, Chiang et al., 2010). Moreover, since herding behaviour is said to be more pronounced during a period of market stress, it implies that the CSSD cannot capture the herding that occurs at other times of a return distribution continuum. It therefore, opens the possibility of detecting and making incorrect inferences about herding behaviour. Furthermore, the results of the CSSD may be affected if the data contains outliers or if the market has a relatively short history. Chang et al. (2000) also claim that herding results obtained from the CSSD may be misleading because of the linearity assumption inherent in the rational asset pricing models. They argue instead that, during large market swings the relationship between the dispersion in individual asset return, and the portfolio return is expected to be non-linear. When this happens, Chang et al. (2000) further contend that the correlation among asset returns is expected to increase. The corresponding dispersions of the returns, however, decrease or increase at a decreasing rate with the portfolio return. In light of

this, they introduce an alternative measure for detecting herd behaviour, a quadratic regression specification, the cross-sectional absolute deviation (CSAD) in the following form:

$$\text{CSAD}_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right| \tag{3.4}$$

where $R_{i,t}$ denotes the return on asset *i* on day *t*; $R_{m,t}$ is the weighted average return on the market portfolio on day t; $i = 1, \ldots, N$ and $t = 1, \ldots, T$. In order to capture the non-linear relation between the security return dispersion and the market return, Chang et al. (2000) estimated the following quadratic regression model:

$$\text{CSAD}_t = \propto + \gamma_1\left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \varepsilon_t \tag{3.5}$$

where $\left|R_{m,t}\right|$ is the absolute value of a cross-sectional average realized return of all available securities on day *t* when the market is either up or down. Under the standard asset pricing model, a positive value of the coefficient γ_1 ($i.e. \gamma_1 > 0 \; and \; \gamma_2 = 0$) indicates the absence of herding effects. It has been noted earlier that herding behaviour exists when the cross-sectional dispersion increases at a decreasing rate relative to the market return during periods of large price movements (extreme conditions), and that stock returns do not deviate too far from the market portfolio. The introduction of the squared market return in equation (3.5) above is meant to capture this non-linearity aspect in the model. A negative and statistically significant estimate of the coefficient γ_2 ($i.e. \gamma_2 < 0$) implies the presence of herding effects in the model.

The literature on herding activities in global markets is abundant. However, to our best understanding this is the pioneering study to examine herding behaviour in FMs using a large sample of ten (10) countries. African markets are characterized by most of the features of FMs, such a relatively short history, which according to Cajueiro and Tabak (2009) and Chang et al. (2000) poses another challenge for examining herding behaviour. These features make the identification of extreme market returns difficult when the CSSD is applied. Accordingly, the CSAD approach is considered more appropriate. We therefore, hypothesize that:

H_{1-0}: Stock returns in African frontier markets exhibit presence of herding effects ($i.e. \gamma_2 < 0$)

H_{1-1}: Stock returns in African frontier markets do not exhibit presence of herding effects ($i.e. \gamma_2 \geq 0$)

A bulk of previous studies has demonstrated that the behaviour of returns dispersion varies in different market conditions (Scharfstein and Stein, 1990, Gleason et al., 2004, Tan et al., 2008, Chang et al., 2000). The commonly studied asymmetries in herding behaviour include market returns, volatility, and trading activity or volume. In the ensuing sections however, we do not examine the volume asymmetric characteristic of asset returns because of unavailability of data on the same.

3.4.1.1 Asymmetric effects of market returns

There is an extensive strand of the literature documenting that the tendency to herd is more prevalent when investors experience negative market returns (Christie and Huang, 1995, Chang et al., 2000, Chiang and Zheng, 2010, Chiang et al., 2010, Demirer et al., 2010, Economou et al., 2011). One explanation for institutional investors, who are assessed based on the performance of their peers, is that herding occurs when the market returns decline because it helps them conceal their weaknesses particularly when everyone else in the market does not perform well (Choi and Sias, 2009, Gavriilidis et al., 2013). Closely related to this argument, Gleason et al. (2004); Olsen (1996) and Tan et al. (2008) claim that the tendency to move with the crowd increases when one seeks the comfort of the group. For example, during the October 1998 stock market crash, despite being aware that the stock prices were likely to fall as they were already too high, fund managers continued to hold onto their positions. They wanted to maintain their good reputation by avoiding selling their holdings because they would be seen by others as lone fools in case prices continued to rise (Scharfstein and Stein, 1990). As already stated elsewhere, both retail and institutional investors in FMs, are considered to be not as sophisticated as those in developed markets. Thus, we hypothesize that:

H_{2-0}: Stock returns in African frontier markets exhibit presence of herding effects during days with negative market returns ($i.e. \gamma_3 < 0 \; and \; \gamma_4 < 0, with \; \gamma_4 < \gamma_3$).

H_{2-1}: Stock returns in African frontier markets do not exhibit presence of herding effects during days with negative market returns ($i.e. \gamma_3 < 0 \; and \; \gamma_4 < 0, with \; \gamma_4 \geq \gamma_3; \; or \; \gamma_3 and \; \gamma_4 \geq 0$).

Following a dummy approach variable used by Chiang and Zheng (2010), Chiang et al. (2010) and Economou et al. (2011), we test for the asymmetric behaviour of market return by estimating the following model:

$$\mathrm{CSAD}_t = \propto + \gamma_1 D^{up} \left|R_{m,t}\right| + \gamma_2 (1 - D^{up}) \left|R_{m,t}\right| + \gamma_3 D^{up} R_{m,t}^2 + \gamma_4 (1 - D^{up}) R_{m,t}^2 + \varepsilon_t \quad (3.6)$$

where D^{up} is a dummy variable. We set D^{up}=1 for days with positive market returns, and D^{up}=0 otherwise.

3.4.1.2 Asymmetric effects of volatility

Market returns volatility is positively associated with the level of information flow. However, investors differ in terms of their ability to interpret the content of the available information. As a result, consensus seeking may be stronger when volatility of market return is high because many retail investors are not capable of analysing massive flows of information. They (both retail and institutional investors) thus resort to concealing their own assessment of the information and imitate others' previous actions (see, also; Choi and Sias, 2009, Banerjee, 1992, Bikhchandani et al., 1992, Gavriilidis et al., 2013). Thus, we hypothesize that:

H_{3-0}: Stock returns in African frontier markets exhibit presence of herding effects during days with high market volatility ($i.e. \gamma_3 < 0 \; and \; \gamma_4 < 0, with \; \gamma_3 < \gamma_4$)

H_{3-1}: Stock returns in African frontier markets exhibit presence of herding effects during days with high market volatility ($i.e. \gamma_3 < 0 \; and \; \gamma_4 < 0, with \; \gamma_3 \geq \gamma_4; or \; \gamma_3 \; and \; \gamma_4 \geq 0$)

Using the same dummy approach like before; we employ the following regression equation to examine the asymmetric behaviour of returns' dispersion with respect to market volatility:

$$\text{CSAD}_t = \propto + \gamma_1 D^{H\sigma} \left|R_{m,t}\right| + \gamma_2 (1 - D^{H\sigma}) \left|R_{m,t}\right| + \gamma_3 D^{H\sigma} R_{m,t}^2 + \gamma_4 (1 - D^{H\sigma}) R_{m,t}^2 + \varepsilon_t \quad (3.7)$$

where $D^{H\sigma}$ is a dummy variable. We set $D^{H\sigma}$ =1 for days with high market volatility, and $D^{H\sigma}$=0 otherwise.

Market volatility is measured by the square of the daily market return. Using the same approach as Economou et al. (2011) and Tan et al. (2008) we regard trading volatility as high, if on a particular day, it is higher than the previous 30-day moving average. Likewise, volatility is regarded as low if it is less than the 30-day moving average.

3.4.2 Data Source

The dataset consists of daily closing prices and market capitalizations, in United States dollars (USD), of companies composing the main stock indices in each of the 10 African frontier stock exchanges included in the study. The data was mainly sourced from Bloomberg database. For the

Tanzanian market, however, data covering the period 2000 to 2007 was obtained from the DSE, because this was not available in the Bloomberg database.

Table 3.1: Countries Involved in the Study, Starting Dates and Indices

Country	Year Established	Data Starting Date	Index	Index Name	Number of Companies
Botswana	1989	03 January 2000	BGSMDC	Botswana Gaborone Index	23
BRVM	1973	06 January 2000	BRVM-C	BRVM Composite Index	49
Ghana	1989	04 January 2000	GGSECI	Ghana Stock Exchange Composite Index	35
Kenya	1954	03 January 2000	NSEASI	Nairobi Securities Exchange Ltd All share Index	62
Namibia	1992	05 January 2000	FTN098	FTSE/JSE Namibia Overall Index	27
Nigeria	1960	25 January 2002	NGSEINDX	Nigerian Stock Exchange All Share Index	181
Tanzania	1998	03 January 2000	DARSTSI	Dar es Salaam Stock Exchange Tanzania Share Index (local	11
Uganda	1997	22 January 2009	USELCI	Uganda Stock Exchange Local Company Index	7
Zambia	1994	06 January 2000	LUSEIDX	Lusaka Stock Exchange All Share Index	21
Zimbabwe	1896	18 February 2009	ZHINDUSD	Zimbabwe Industrial Index USD	73
South Africa	1887	03 January 2000	JALSH	FTSE/ Johannesburg Stock Exchange Africa All Share Index	172

Source: *Bloomberg Database*

The overall sample period for the study runs from January 2000 to 15th July 2015. Depending on the availability of data however, the sample periods vary between countries (Table 3.1). More specifically, the starting period for Botswana, BRVM, Ghana, Kenya, Namibia, Tanzania and Zambia is January 2000. The data range for the markets in Nigeria; Uganda and Zimbabwe begin from January 2002, January 2009, and February 2009 respectively. Similarly, the starting dates for the companies in respective countries vary depending on their listing dates.

The choice of the start of the sample period was dictated by the fact that many African governments started establishing stock exchanges during the 1990s (see Table 3.1). Moreover, many African markets do not have data for years before 2000 since they were not maintained in computerized databases. Furthermore, this was the period when most of the markets became more active due to increased number of listed firms. The use of daily data to examine the herding behaviour is more appropriate because it reveals the short-term nature of the phenomenon (Caporale et al., 2008). Many previous empirical studies (e.g. Economou et al., 2011, Chang et al., 2000, Demirer and Kutan, 2006, Cajueiro and Tabak, 2009, Christie and Huang, 1995) have also employed the same approach.

Since FMs are characterized by infrequent trading, the data was carefully inspected for any gaps, and missing data were interpolated using EViews 7. Moreover, the researcher ensured that the data for the variables are normally distributed in order to comply with the assumptions underlying the OLS regressions by investigating the presence of outliers. This was achieved by standardizing the observations of the daily mean-return and the cross-sectional absolute deviations of returns'

variables into their Z-scores. The value of Z represents the distance between a row variable score and a population mean in units of the standard deviation. We used the absolute value of 3 as the cut-off criteria for establishing the outliers in our data set. That is, any observation with a Z-score greater than 3 was removed from the sample.

3.5 Results

3.5.1 Descriptive Statistics

Table **3.2** contains summary statistics for the daily mean returns and cross-sectional absolute deviations of returns for the 10 African FEMs and the South African market (emerging market). Panels A and B present information on equal-weighted and value-weighted market returns and CSADs respectively. In general, the findings regarding the daily mean returns are consistent with the evidence in other prior studies (e.g. Ntim et al., 2011, Chang et al., 2000). For Panel A, it is observed that the daily mean returns range from a low of -0.03 for the Zimbabwean market to a high of 0.10 in the case of the Tanzanian market. An important observation is that the annualized[6] percentage average returns of the medium-sized markets [i.e. Kenya (750%), Nigeria (500%) and Zimbabwe (-750%)] are relatively small compared to the markets with a short trading history like Tanzania (2,500%). The average daily returns in Panel B on the other hand, appear to be higher for all exchanges than those reported in Panel A. The daily average return ranges from a low of 0.03 for BRVM to a high of 0.13 for Tanzania. Overall, Table 3.2 shows that the value-weighted returns are generally higher than the equal-weighted returns. Also, all R_m values are positive (except for Ghana) for the equal-weighted case. In addition, the value-weighted averages are always larger than the equal-weighted values (except for Ghana and Zambia).

We also examine the standard deviations, a measure of volatility of the market returns. Statistics in both panels of Table 3.2 reveal that frontier stock markets' returns have higher magnitudes of variation as compared to values reported in (Chang et al., 2000). In the case of Panel A, the observed standard deviation values range from 0.43 (BRVM) to 1.55 (Zimbabwe). Similarly, in Panel B the lowest deviation is 0.49 (BRVM), and the highest is 3.42 (Ghana). We also notice that the standard deviations of value-weighted R_m are always greater than the equal-weighted ones except for Tanzania and Zimbabwe. This observation means that the average market returns are more volatile when size is taken into account. The reason is that large-capitalization stocks are more represented in value-weighted market returns, rendering their values to fluctuate more.

[6] We calculate the average daily return for each market and then multiply it by the number of trading days in a year (i.e., 250 in our case) to obtain the annualized return.

Table 3.2: Descriptive statistics

	Botswana		BRVM		Ghana		Kenya		Namibia		Nigeria		Tanzania		Uganda		Zambia		Zimbabwe		South Africa	
	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m	CSAD	R_m
Panel A: Equally weighted market returns																						
Mean	0.58	0.06	0.67	0.02	0.67	0.06	1.32	0.03	0.98	0.03	1.38	0.01	0.76	0.10	1.72	0.01	1.22	0.09	2.33	-0.03	1.32	0.04
Median	0.33	0.04	0.60	0.00	0.51	0.03	1.25	0.02	0.89	0.04	1.24	-0.01	0.54	0.11	1.12	0.06	0.90	0.06	1.91	-0.01	1.24	0.07
Minimum	0.00	-4.01	0.05	-3.89	0.04	-9.85	0.59	-3.35	0.21	-5.84	0.02	-2.15	0.18	-4.95	0.10	-7.47	0.08	-8.47	0.43	-7.55	0.00	-5.60
Maximum	5.52	3.94	1.69	4.13	2.25	11.99	2.41	4.84	2.29	5.41	3.42	2.69	2.44	5.14	4.75	6.41	3.70	3.87	6.05	6.41	4.07	3.52
Std. Dev	0.73	0.49	0.45	0.43	0.58	0.93	0.48	0.64	0.54	0.75	0.59	0.53	0.61	0.72	1.49	1.55	1.03	0.93	1.55	1.22	0.45	0.71
Panel B: Value weighted market returns																						
Mean	0.58	0.07	0.80	0.03	1.97	0.05	1.40	0.07	1.17	0.04	1.62	0.06	0.01	0.13	2.10	0.09	1.09	0.07	2.31	0.10	1.47	0.05
Median	0.37	0.03	0.67	0.00	1.53	0.03	1.32	0.06	1.07	0.02	1.52	0.03	0.01	0.06	1.52	0.04	0.77	0.01	1.92	0.03	1.35	0.06
Minimum	0.00	-4.87	0.04	-1.03	0.07	-45.56	0.65	-5.06	0.21	-17.14	0.04	-4.24	0.00	-1.22	0.09	-15.27	0.06	-10.88	0.43	-1.69	0.00	-7.95
Maximum	6.42	5.62	2.26	1.16	5.90	34.31	2.58	7.53	2.72	8.50	4.02	4.50	0.03	1.73	8.13	11.77	3.65	11.19	6.17	2.05	5.61	7.27
Std. Dev	0.67	0.51	0.62	0.49	1.62	3.42	0.50	0.86	0.66	1.33	0.66	1.04	0.01	0.69	2.13	2.94	1.01	1.24	1.56	0.83	0.59	1.27
observations	3098		3458		3405		3843		3590		3221		2042		921		2436		1571		3098	
Index	BGSMDC		BRVM-C		GGSECI		NSEASI		FTN098		NGSEINDX		DARSTSI		USELCI		LUSEIDX		ZHINDUSD		JALSH	
Number of Companies	23		49		35		62		27		181		11		7		21		73		172	

Notes: This table presents descriptive statistics of the percentage daily cross-sectional absolute deviation (CSAD) computed as $CSAD_t = \frac{1}{N}\sum_{i=1}^{N}|R_{i,t} - R_{m,t}|$ where $R_{i,t}$ denotes the return on stock i on day t; $R_{m,t}$ is the weighted average return on the market portfolio on day t (in decimals computed as in equation (3.2)); $i = 1, \ldots, N$ stocks; and $t = 1, \ldots, T$. Panel A reports the descriptive statistics of equally weighted market returns, while panel B contains the weighted average return statistics computed by employing market capitalization weights. The data covers the period from January 2000 to mid-July 2015. The starting dates for some companies however, vary depending on their listing dates. Missing information which is mainly caused by infrequent trading was carefully inspected and interpolated using EViews 7. Companies involved in the study are those composing the all share indices of the respective stock markets. BGSMDC stands for Botswana Gaborone Index; BRVM-C for BRVM Composite Index; GGSECI for Ghana Stock Exchange Composite Index, NSEASI for Nairobi Securities Exchange Ltd All share Index; and FTN098 for FTSE/JSE Namibia Overall Index. The NGSEINDX is the Nigerian Stock Exchange All Share Index, DARSTSI is the Dar es Salaam Stock Exchange Tanzania Share Index (local companies); USELCI is the Uganda Stock Exchange Local Company Index; LUSEIDX represents the Lusaka Stock Exchange All Share Index; ZHINDUSD is for Zimbabwe Industrial Index USD; and JALSH for the FTSE/ Johannesburg Stock Exchange Africa All Share Index. BRVM is a regional stock exchange serving eight (8) West African countries, namely Benin, Burkina Faso, Guinea Bissau, Cote d' Ivoire, Mali, Niger, Senegal and Togo.

Table 3.2 also contains summary statistics for CSAD, a measure of the proximity of the individual returns to the market portfolio return. In the case of perfect correlation, the CSAD value is zero, and the value increases as the individual returns begin to deviate from the R_m. A higher value of the CSAD, therefore, implies higher market variations. In Panels A and B, we find that the average daily CSAD values for Botswana, BRVM, and Tanzania are relatively low compared to others. Zimbabwe has the highest values of 2.33% (2.31%) for the equal- (value-) weighted respectively. In both Panels, the South African market pales in comparison to the studied FMs in terms of maximum values of the daily CSAD. The CSAD standard deviations of the 10 FMs under consideration in both Panels, suggest a presence of unusual cross-sectional variations. These may be caused by unexpected shocks or news in the markets. These summary statistics for the daily CSAD, are consistent with those of previous studies (e.g. Tan et al., 2008, Chang et al., 2000). It was expected, to see high means for the CSAD for the South African market and the medium-sized markets, in comparison to the new markets. This is because the former markets are relatively developed and have been in existence longer. They thus, have experienced and sophisticated investors who know how to get relevant information and have analytical tools to allow them informed decisions (Tan et al., 2008). The Ugandan market, however, seems to contradict this argument in both the equal- (value-) weighted values. In terms of volatility, the CSAD is more volatile in the Zimbabwean (Ugandan) market when calculated on equal- (value-) weighted basis. Conversely, it is less volatile for BRVM (Tanzania) based on equal- (value-) weighted basis, respectively. Overall, the value-weighted CSADs are higher compared to the equal-weighted equivalents except for Botswana, Kenya and Tanzania.

3.5.2 Empirical Evidence

In this sub-section, we present the results of our estimates of the herding equations as follows. First, we report the result of the aggregate model in equation (3.5) for each market for the full sample period. The next set of results show the estimates of equations (3.6) and (3.7) which examine the presence of asymmetric effects between CSAD and market returns. We further explore whether the South African market has any influence in the distribution of the returns on a selected country's markets. And, as a robustness check, we also investigate whether the recent financial crisis impacted on the African FMs' returns.

3.5.2.1 Evidence on Herding

Table 3.3 reports the results of estimating the benchmark herding regression represented by equation (3.5). According to the literature, a positive estimate of the coefficient γ_1 means the

absence of herding effects while a negative value on the coefficient γ_2 suggests the presence of herding (see, also; Chang et al., 2000, Economou et al., 2011).

Table 3.3: Estimating herding behaviour during the entire sample period

	Constant	γ_1	γ_2	R^2 adj.
Panel A: Equally weighted market returns				
Botswana	0.0649 (0.0059)***	1.9152 (0.0300)***	-0.1123 (0.0154)***	0.8807
BRVM	0.2829 (0.0079)***	1.7637 (0.0301)***	-0.4013 (0.0174)***	0.6320
Ghana	0.4069 (0.0158)***	0.7925 (0.0593)***	-0.0966 (0.0118)***	0.3183
Kenya	0.9436 (0.0092)***	1.0374 (0.0216)***	-0.1652 (0.0072)***	0.4809
Namibia	0.4943 (0.0097)***	1.1445 (0.0222)***	-0.1636 (0.0077)***	0.6103
Nigeria	0.8847 (0.0130)***	1.6655 (0.0476)***	-0.4088 (0.0268)***	0.4974
Tanzania	0.1555 (0.0106)***	1.5830 (0.0337)***	-0.2472 (0.0121)***	0.7972
Uganda	0.0354 (0.0235)	2.0493 (0.0386)***	-0.2087 (0.0092)***	0.8910
Zambia	0.2204 (0.0227)***	1.8778 (0.0740)***	-0.2048 (0.0307)***	0.8334
Zimbabwe	0.9457 (0.0387)***	2.1764 (0.0548)***	-0.2176 (0.0105)***	0.6368
Panel B: Value weighted market returns				
Botswana	0.2152 (0.0092)***	1.3658 (0.0433)***	-0.0696 (0.0157)***	0.6040
BRVM	0.3258 (0.0088)***	1.6255 (0.0562)***	-0.2199 (0.0518)***	0.6812
Ghana	0.5410 (0.0455)***	0.7900 (0.0369)***	-0.0194 (0.0029)***	0.7376
Kenya	1.0088 (0.0098)***	0.8016 (0.0190)***	-0.0902 (0.0056)***	0.4770
Namibia	0.6333 (0.0137)***	0.7080 (0.0229)***	-0.0414 (0.0056)***	0.6165
Nigeria	1.0315 (0.0161)***	0.8862 (0.0279)***	-0.0752 (0.0092)***	0.5491
Tanzania	0.0037 (0.0002)***	0.0086 (0.0007)***	0.0012 (0.0004)***	0.5522
Uganda	0.7488 (0.0458)***	0.9901 (0.0426)***	-0.0257 (0.0044)***	0.7788
Zambia	0.5838 (0.0151)***	1.3704 (0.0380)***	-0.1176 (0.0069)***	0.6190
Zimbabwe	1.4458 (0.0504)***	1.3831 (0.1876)***	0.1321 (0.0979)	0.4121

Notes: This table presents the results of the benchmark model; $CSAD_{i,t} = \propto + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for the cross-sectional absolute deviation of stock returns with respect to the corresponding return on the market portfolio on day *t* for each market. The sample period is January 2000 to mid- July 2015 for Botswana, BRVM, Ghana, Kenya, Namibia, Tanzania and Zambia. The data range for the markets in Nigeria, Uganda and Zimbabwe is from January 2002, January 2009, and February 2009 respectively, to Mid July 2015. Reported in Panel A, are the estimated coefficients obtained from using an equally weighted market return, while in Panel B are the corresponding coefficients obtained when using a value weighted market portfolio return. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively.

The presentation in Panels A and B of Table 3.3 reveals that consistent with asset pricing models, the coefficients of the absolute market returns (γ_1) are all positive and significant. The theoretical expectation is that there is a positive association between the cross-sectional dispersion of returns and absolute market returns. We further examine whether the CSAD decreases, or at least increases at a decreasing rate with market returns during extreme market movements. Using the equal-weighted estimations, the results in Table 3.3 suggest the presence of significant herding (that is, the values of coefficient γ_2 are significantly negative) for each of our 10 sample markets for the entire sample period. We find similar evidence of herd formation for all markets when the value-weighted market return is employed, except for the Tanzanian and Zimbabwean markets. Save for this exception, our results; therefore, confirm the null hypothesis that stock returns in African FMs exhibit presence of herding effects (H_1) for the 8 sample markets in both, the equal- and value-weighted $CSAD/R_{m,t}$ estimations. In addition, herding in these markets seems to be stronger for equal-weighted estimations[7], as their absolute coefficients (γ_2) are greater than the

[7] This is mainly composed of small capitalization stocks. This finding is consistent with notion that size is a key determinant of herding (Lakonishok et al., 1992, Sias, 2004). The reasons are that these stocks suffer from limited

value-weighted estimations. In the case of Tanzanian and Zimbabwean markets, the coefficient γ_2 is significant and negative, consistent with the prediction of H_1, only when the equal-weighted market portfolio return is employed (see Panel A). In Panel B, on the contrary, the coefficient γ_2 is positive for both markets and insignificant for Zimbabwe. The result therefore, does not show support for reduced CSAD around the market returns for Tanzania and Zimbabwe when the value-weighted portfolio return is used.

Table 3.3 also reports the explanatory power of the estimated benchmark herding regressions. The adjusted R^2 shows there is a strong relationship between the CSADs and the market returns, and the values are similar to those reported in previous studies. Overall, our results provide sufficient evidence of the presence of herding behaviour in African FMs. This evidence supports the assertion by Chiang et al. (2010) and Economou et al. (2011) that herding behaviour is more likely to take place in emerging or for that matter, FMs. These authors argue that lack of well-developed financial systems, thin trading, and dominance by relatively few institutional investors are among the characteristics that may be associated with herd formation in FMs. Most of the markets in our sample possess these characteristics, and this study presents evidence in support of this phenomenon.

3.5.2.2 Herding Under Rising and Falling Markets

Following Economou et al. (2011), we estimate the herding regression represented by equation (3.6) to examine the asymmetric characteristics of stock returns. As in previous empirical researches (e.g. Chang et al., 2000, Chiang et al., 2010, Chiang and Zheng, 2010), we examine whether investors in FMs' exhibit an asymmetrical relationship in herding behaviour under extreme market conditions. Table **3.4** reports the corresponding regression results; refer also to equation (3.6). Findings show that herding is strong during both rising and falling market days for all tests in Panels A and B in all our sample markets except for BRVM, Tanzania and Zimbabwe in Panel B. More specifically, the equal-weighted results are consistent with the earlier findings in Table **3.4**, in that, coefficients γ_3 and γ_4 which are used to detect the presence of herding are strongly significant and negative for each market. The results in Panel B indicate that: only γ_3 is significant for the BRVM; the estimates γ_3 and γ_4 for Tanzania are positive and strongly significant; and none of the herding coefficients for Zimbabwe are negative and significant in value-weighted estimations.

information in terms of amount and precision, low visibility, and liquidity risk. Investors holding position in them, therefore, are motivated to herd with peers' trades in order to free-ride on information (information cascades).

It is worth recalling that, it was hypothesized that herding effects are likely to be more prevalent during days with falling market returns (i.e. $\gamma_3 < 0$ *and* $\gamma_4 < 0, with\ \gamma_4 < \gamma_3$). A closer examination of the results using both the equal- and value-weighted estimates reveals that herding during down markets is stronger in Botswana only. Coefficient γ_3 for Ghana and Tanzania in Panel A is larger than γ_4, thus suggesting the presence of herd formation during falling market returns in the respective markets. Panel C of Table **3.4** is reporting similar results for value-weighted estimations for Uganda and Zambia. The Wald test in Panels B and D, which tests whether the herding coefficients of the estimated model are equal (i.e. $\gamma_3 = \gamma_4$), however, fails to reject the equality hypothesis at the conventional 5% level. This suggests that herding in Ghana (equal- and value-weighted), Tanzania (equal-weighted), and Uganda (equal- and value-weighted) entails no asymmetry in its manifestation with regards to market returns.

The γ_3 coefficient for Zambia for equal-weighted estimation is less than that of γ_4, suggesting that herding is stronger during up-market days. The Wald test results, reported in Panel B of Table **3.4**, reject the equality of herding coefficient hypothesis. The finding thus refutes the null of H_2 for Zambia. That is, investors in Zambia display herding behaviour in rising market conditions. The result contradicts the theoretical prediction, and the findings reported in previous studies in advanced markets (e.g. Chang et al., 2000, Chiang et al., 2010, Chiang and Zheng, 2010).

Contrary to the null hypothesis H_{2-0}, the results for the BRVM market suggest that herding is more pronounced during rising market returns (as reflected by $\gamma_3 < 0$ *and* $\gamma_4 < 0, with\ \gamma_4 > \gamma_3$) for all tests in Panels A and B of Table **3.4**. The Wald tests in Panels B and D, however, fail to reject the hypothesis that the rising- and down-market coefficients are equal. Thus, there is no asymmetric herding conditional upon market return at the BRVM market.

The estimates presented in Table **3.4** suggest there is asymmetric herding behaviour distinguishing days when the market is up or down in equal-weighted estimations (Panel A and B) for the Kenyan and Nigerian markets. The Wald tests, however, fail to reject the equality hypothesis at the 5% significant level, for the same markets in value-weighted estimations (Panel D). More specifically, the findings indicate that there is strong herding during up market days on these markets.

Table 3.4: Estimates of herding behaviour on days of rising and declining market conditions

	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Panel A: Equally weighted market returns						
Botswana	0.0660 (0.0060)***	1.8165 (0.0396)***	2.0548 (0.0377)***	-0.0826 (0.0243)***	-0.1508 (0.0168)***	0.8830
BRVM	0.2835 (0.0079)***	1.7890 (0.0358)***	1.7290 (0.0329)***	-0.4062 (0.0234)***	-0.3948 (0.0195)***	0.6322
Ghana	0.4044 (0.0140)***	0.7757 (0.0645)***	0.8366 (0.0641)***	-0.0896 (0.0133)***	-0.1099 (0.0117)***	0.3221
Kenya	0.9465 (0.0094)***	1.0819 (0.0251)***	0.9614 (0.0313)***	-0.1788 (0.0089)***	-0.1351 (0.0145)***	0.4826
Namibia	0.4940 (0.0096)***	1.1620 (0.0243)***	1.1259 (0.0270)***	-0.1686 (0.0084)***	-0.1584 (0.0102)***	0.6107
Nigeria	0.8895 (0.0130)***	1.8244 (0.0548)***	1.4645 (0.0591)***	-0.5067 (0.0330)***	-0.2880 (0.0360)***	0.5026
Tanzania	0.1545 (0.0107)***	1.5598 (0.0370)***	1.6273 (0.0443)***	-0.2401 (0.0131)***	-0.2614 (0.0194)***	0.7974
Uganda	0.0342 (0.0227)	2.0577 (0.0396)***	2.0457 (0.0479)***	-0.2124 (0.0078)***	-0.2065 (0.0123)***	0.8907
Zambia	0.1972 (0.0145)***	2.0161 (0.0339)***	1.8942 (0.0492)***	-0.2749 (0.0119)***	-0.1933 (0.0210)***	0.8359
Zimbabwe	0.9445 (0.0386)***	2.1894 (0.0690)***	2.1702 (0.0613)***	-0.2228 (0.0133)***	-0.2142 (0.0123)***	0.6364
Panel B: Wald tests for equality of herding coefficients						
	Botswana	**BRVM**	**Ghana**	**Kenya**	**Namibia**	**Nigeria**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Chi-square ($\gamma_1 - \gamma_2$); H_0: $\gamma_1 = \gamma_2$	(25.63)***	(2.74)*	(0.64)	(15.63)***	(1.72)	(34.92)***	(2.43)	(0.05)	(7.17)***	(0.07)
Chi-square ($\gamma_3 - \gamma_4$); H_0: $\gamma_3 = \gamma_4$	(5.97)**	(0.17)	(1.54)	(8.39)***	(0.77)	(27.40)***	(1.08)	(0.19)	(15.22)***	(0.30)
Panel C: Value weighted market returns						
	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Botswana	0.2152 (0.0091)***	1.3413 (0.0502)***	1.4026 (0.0629)***	-0.0668 (0.0177)***	-0.0693 (0.0258)***	0.6041
BRVM	0.3276 (0.0089)***	1.6338 (0.0690)***	1.5634 (0.0778)***	-0.2453 (0.0631)***	-0.1288 (0.0832)	0.6813
Ghana	0.5241 (0.0314)***	0.8113 (0.0251)***	0.7956 (0.0339)***	-0.0226 (0.0020)***	-0.0182 (0.0029)***	0.7419
Kenya	1.0084 (0.0098)***	0.8211 (0.0209)***	0.7803 (0.0242)***	-0.0927 (0.0062)***	-0.0882 (0.0070)***	0.4774
Namibia	0.6132 (0.0115)***	0.8074 (0.0161)***	0.7012 (0.0186)***	-0.0700 (0.0032)***	-0.0388 (0.0042)***	0.6218
Nigeria	1.0324 (0.0161)***	0.9085 (0.0316)***	0.8577 (0.0322)***	-0.0838 (0.0115)***	-0.0646 (0.0112)***	0.5491
Tanzania	0.0039 (0.0002)***	0.0065 (0.0007)***	0.0075 (0.0012)***	0.0022 (0.0004)***	0.0031 (0.0011)***	0.5594
Uganda	0.7532 (0.0451)***	0.9291 (0.0481)***	1.0478 (0.0541)***	-0.0198 (0.0047)***	-0.0311 (0.0059)***	0.7793
Zambia	0.5836 (0.0150)***	1.3586 (0.0469)***	1.3877 (0.0524)***	-0.1156 (0.0090)***	-0.1206 (0.0093)***	0.6188
Zimbabwe	1.4517 (0.0516)***	1.4070 (0.2097)***	1.2614 (0.2856)***	0.1128 (0.1075)	0.2179 (0.1782)	0.4116
Panel D: Value weighted market returns						
	Botswana	**BRVM**	**Ghana**	**Kenya**	**Namibia**	**Nigeria**	**Tanzania**	**Uganda**	**Zambia**	**Zimbabwe**
Chi-square ($\gamma_1 - \gamma_2$); H_0: $\gamma_1 = \gamma_2$	(0.75)	(0.62)	(0.24)	(2.80)*	(.3310)***	(2.60)	(0.78)	(3.46)*	(0.20)	(0.27)
Chi-square ($\gamma_3 - \gamma_4$); H_0: $\gamma_3 = \gamma_4$	(0.01)	(1.46)	(1.85)	(0.31)	(44.53)***	(2.01)	(0.59)	(2.65)*	(0.16)	(0.33)

Notes: This table presents the regression results of the model: $CSAD_{i,t} = \propto + \gamma_1 \boldsymbol{D^{up}} |R_{m,t}| + \gamma_2 (1 - \boldsymbol{D^{up}}) |R_{m,t}| + \gamma_3 \boldsymbol{D^{up}} R_{m,t}^2 + \gamma_4 (1 - \boldsymbol{D^{up}}) R_{m,t}^2 + \varepsilon_t$, for ten frontier stock markets (see also, Economou et al., 2011). $CSAD_{i,t}$ is the cross-sectional absolute deviation of the stock returns with respect to the daily market portfolio return $R_{m,t}$ for each market *i* and $\boldsymbol{D^{up}}$is the dummy variable that that is equated to 1 on days with positive market returns and the value 0 otherwise. The sample period is January 2000 to mid-July 2015 for Botswana, BRVM, Ghana, Kenya, Namibia, Tanzania and Zambia. The data range for the markets in Nigeria, Uganda and Zimbabwe is from January 2002, January 2009, and February 2009 to mid-July 2015 respectively. We report the estimated coefficients of the equal and value weighted market portfolio return in panel A and panel C respectively. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively. The Wald tests for the null hypothesis $\gamma_1 = \gamma_2$and $\gamma_3 = \gamma_4$ of the estimated models are presented in panel B and D respectively.

For the Namibian market, the findings in Panels A and C suggest that there is an asymmetrical behaviour in the CSAD and market returns estimations when both the equal- and value-weighted models are used. Contrary to the prediction of H_{2-0}, the magnitude of γ_4 is greater than γ_3 in both Panels. The Walt test results in Panel B, fail to reject the equality of the herding coefficients hypothesis. This means that there is no remarkable herding difference between days with positive and negative market returns as hypothesized for the equal-weighted estimation. The result of the test in Panel D in Table **3.4**, however, shows that herding is much stronger on days with positive market returns.

For the Zimbabwean market, herding is found to be significant during both positive and negative market return days in Panel A, with $\gamma_4 > \gamma_3$. The Wald test in Panel B, however, does not reject the equality of herding coefficient hypothesis at the 5% level of significance. The evidence in Panels A and B of Table **3.4** is not enough to conclude that there is strong herding effects on up-market days in Zimbabwe. The coefficients of the $R^2_{m,t}$ terms in Panel C are positive and insignificant, thus disagree with the necessary condition ($i.e. \gamma_3 < 0 \; and \; \gamma_4 < 0$) for herd formation to hold. We can therefore, conclude that for the value-weighted estimation there is no market returns herding asymmetry in the Zimbabwe market (see also Table 3.3).

3.5.2.3 Herding During Market Volatility

In this section, we examine the possible asymmetric effects in herd formation conditional on market returns' volatility. As in previous studies, we estimate equation (3.7) to test whether investors react differently on days with high volatility as compared to days with low market volatility relative to a 30-day moving average (e.g. Chiang and Zheng, 2010, Tan et al., 2008).

Table **3.5** presents the estimated regression results for equation (3.7). Our decision criterion is based on the signs of the γ_3 and γ_4 coefficients. We conclude that herding prevails more during days with high volatility or otherwise, if γ_3 is negative, and it is less than γ_4. A quick glance at Panel A in Table **3.5** indicates that the coefficients for all 10 countries are negative. The sign of γ_4 estimates for Kenya and Uganda, however, are not significant. The corresponding value-weighted estimates (in Panel B) are indefinite. For the case of γ_3, the results show that BRVM and Ghana have insignificant positive estimates, whereas it is significantly positive for Tanzania and Zimbabwe. The estimate γ_4 for Kenya and Zimbabwe is greater than zero while that of Tanzania is negative, but all are not significant. These results are not surprising. Economou et al. (2011), reported similar findings for the case of the Italian market, and found no volatility asymmetric impact in the Greece market.

The results in Table **3.5** show that there is an asymmetric relationship between CSAD and market returns, conditioning herding upon market volatility for Botswana, BRVM, and Uganda (see Panel A and B). More specifically, herding seems to be present during both days of high and low volatility (as both γ_3 and γ_4 are significantly negative) in both equal- and value-weighted measures for Botswana and Uganda. In the case of BRVM herding appears significant during increasing and decreasing volatility in Panel A, while in Panel B it is significant only on low volatile days. Moreover, in all cases the coefficient γ_4 is less than γ_3. In other words, there is robust evidence that herd formation is found in the above mentioned countries on days with low volatility. The tests for the equality of the coefficients reported in Panels B and D of Table **3.5** further confirms the statistical significance of these findings. The findings do not confirm H_{3-0}.

In the case of the Kenyan market, the results show significant herding during increasing volatility in both equal- and value-weighted measures. The coefficient for periods of decreasing volatility is negative in Panel A and positive in Panel B, but insignificant in all cases. Consistent with H_{3-0}, the results, therefore, present robust evidence that returns volatility asymmetrically affects CSAD in the Kenyan market. The Ward test results in Panels B and D, confirms this conclusion.

The results for Ghana, Namibia, Nigeria, Zambia and Zimbabwe seem to be sensitive to the way the portfolio return is calculated. In Panel A, we find that herding appears to be significant during both rising and falling volatility days (i.e. both herding coefficients are significantly negative) in Ghana, Nigeria, and Zimbabwe. The increasing volatility coefficients (γ_3) are greater than the decreasing (γ_4) equivalents. Furthermore, the tests of equality of the coefficients reported in Panel B of Table **3.5** confirm presence of herding asymmetry on days of low volatility in these markets. The results however, are contrary to H_{3-0}. The value-weighted model in Panel C reveals that the rising volatility estimate for Ghana is insignificant and positive while the falling equivalent is significantly negative. In the case of Zimbabwe, on the other hand, the increasing volatility coefficient is significantly positive while the decreasing coefficient is not significant. For Nigeria both coefficients are significantly negative. In addition, Panel D shows that there is no statistically significant difference between the coefficients for these countries. The findings imply that there is no asymmetric behaviour for CSAD conditional upon volatility of stock returns on the Nigerian market. In other words, herding effects for Nigeria are equally likely to be found regardless of the magnitude of volatility in market returns as measured by market capitalization. For Zimbabwe, we find no evidence of the existence of herding behaviour. Likewise for Ghana, the asymmetry is not significant when value-weighted returns are used.

Table 3.5: Estimates of herding behaviour on days of high and low volatility

	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Panel A: Equally weighted market returns						
Botswana	0.0511 (0.0064)***	1.3413 (0.0502)***	2.0877 (0.0641)***	-0.1034 (0.0171)***	-0.2272 (0.0568)***	0.8803
BRVM	0.2709 (0.0082)***	1.7514 (0.0300)***	1.9066 (0.0414)***	-0.3938 (0.0168)***	-0.5059 (0.0300)***	0.6325
Ghana	0.3536 (0.0159)***	0.8494 (0.0609)***	1.2354 (0.0788)***	-0.0998 (0.0129)***	-0.4051 (0.0308)***	0.3436
Kenya	0.9368 (0.0120)***	0.9865 (0.0221)***	1.0572 (0.0694)***	-0.1482 (0.0066)***	-0.0163 (0.0693)	0.4870
Namibia	0.4661 (0.0118)***	1.1236 (0.0217)***	1.2979 (0.0540)***	-0.1552 (0.0069)***	-0.1903 (0.0426)***	0.6188
Nigeria	0.8103 (0.0154)***	1.4787 (0.0513)***	2.4239 (0.1036)***	-0.2682 (0.0297)***	-0.8677 (0.1008)***	0.5293
Tanzania	0.1613 (0.0124)***	1.6030 (0.0360)***	1.5290 (0.0618)***	-0.2559 (0.0141)***	-0.2339 (0.0305)***	0.8020
Uganda	0.0765 (0.0272)***	2.0482 (0.0405)***	1.8645 (0.1161)***	-0.2105 (0.0099)***	-0.1308 (0.0711)*	0.8936
Zambia	0.1566 (0.0151)***	2.1206 (0.0290)***	2.1212 (0.0602)***	-0.3069 (0.0096)***	-0.3207 (0.0289)***	0.8393
Zimbabwe	0.8356 (0.0433)***	2.0916 (0.0512)***	2.6233 (0.0989)***	-0.1966 (0.0090)***	-0.3103 (0.0213)***	0.6453

Panel B: Wald tests for equality of herding coefficients

	Botswana	BRVM	Ghana	Kenya	Namibia	Nigeria	Tanzania	Uganda	Zambia	Zimbabwe
Chi-square ($\gamma_1 - \gamma_2$); H_0: $\gamma_1 = \gamma_2$	(9.47)***	(16.88)***	(33.95)***	(1.43)	(14.37)***	(122.27)***	(2.12)	(3.01)*	(0.00)	(40.01)***
Chi-square ($\gamma_3 - \gamma_4$); H_0: $\gamma_3 = \gamma_4$	(4.79)**	(12.78)***	(122.84)***	(3.85)**	(0.73)	(41.06)***	(0.59)	(1.31)***	(0.23)	(33.49)***

Panel C: Value weighted market returns

	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Botswana	0.1606 (0.0101)***	1.3634 (0.0447)***	2.0970 (0.1168)***	-0.0628 (0.0157)***	-0.7268 (0.1447)***	0.6117
BRVM	0.3102 (0.0090)***	1.4580 (0.1052)***	1.9623 (0.0671)***	0.0246 (0.0975)	-0.7881 (0.0750)***	0.6918
Ghana	0.5264 (0.0465)***	0.7253 (0.0791)***	0.8062 (0.0388)***	0.0085 (0.0241)	-0.0201 (0.0032)***	0.7590
Kenya	1.0124 (0.0125)***	0.7668 (0.0184)***	0.7603 (0.0527)***	-0.0829 (0.0048)***	0.0151 (0.0388)	0.4796
Namibia	0.5795 (0.0153)***	0.7099 (0.0220)***	0.9136 (0.0438)***	-0.0407 (0.0052)***	-0.1080 (0.0236)***	0.6213
Nigeria	0.9929 (0.0204)***	0.8459 (0.0291)***	1.0433 (0.0663)***	-0.0571 (0.0092)***	-0.1056 (0.0407)***	0.5533
Tanzania	0.0034 (0.0002)***	0.0076 (0.0007)***	0.0123 (0.0011)***	0.0020 (0.0004)***	-0.0016 (0.0011)	0.5593
Uganda	0.6986 (0.0484)***	1.0063 (0.0457)***	1.2483 (0.1386)***	-0.0267 (0.0048)***	-0.1233 (0.0496)***	0.7814
Zambia	0.5377 (0.0148)***	1.3413 (0.0395)***	1.7941 (0.0660)***	-0.1142 (0.0071)***	-0.2346 (0.0240)***	0.6269
Zimbabwe	1.3499 (0.0523)***	0.4377 (0.2050)***	2.0579 (0.2250)***	0.6063 (0.1155)***	0.0521 (0.1221)	0.4461

Panel D: Value weighted market returns

	Botswana	BRVM	Ghana	Kenya	Namibia	Nigeria	Tanzania	Uganda	Zambia	Zimbabwe
Chi-square ($\gamma_1 - \gamma_2$); H_0: $\gamma_1 = \gamma_2$	(43.82)***	(17.99)***	(0.61)	(0.02)	(31.53)***	(13.73)***	(19.76)***	(3.24)*	(40.97)***	(40.82)***
Chi-square ($\gamma_3 - \gamma_4$); H_0: $\gamma_3 = \gamma_4$	(21.44)***	(45.20)***	(1.14)	(6.78)***	(8.98)***	(1.60)	(12.03)***	(3.87)**	(24.14)***	(12.97)***

Notes: This table presents the regression results of the model: $CSAD_{i,t} = \propto +\gamma_1 D^{H\sigma}\left|R_{m,t}\right| + \gamma_2(1 - D^{H\sigma})\left|R_{m,t}\right| + \gamma_3 D^{H\sigma} R_{m,t}^2 + \gamma_4(1 - D^{H\sigma})R_{m,t}^2 + \varepsilon_t$, for ten frontier stock markets (see also, Economou et al., 2011). $CSAD_{i,t}$ is the cross-sectional absolute deviation of the stock returns with respect to the daily market portfolio return $R_{m,t}$ for each market *i* and $D^{H\sigma}$ is the dummy variable that that is equated to 1 on high volatile days, as compared to a 30-day moving average, and the value 0 otherwise. The sample period is January 2000 to mid-July 2015 for Botswana, BRVM, Ghana, Kenya, Namibia, Tanzania and Zambia. The data range for the markets in Nigeria, Uganda and Zimbabwe is from January 2002, January 2009, and February 2009 to mid- July 2015 respectively. We report the estimated coefficients of the equal and value weighted market portfolio return in panel A and panel C respectively. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively. The Wald tests for the null hypothesis $\gamma_1 = \gamma_2$ and $\gamma_3 = \gamma_4$ of the estimated models are presented in panel B and D respectively.

The results for Tanzania also seem to be sensitive to whether the equal- or value weighted model is used for estimations. Estimates of herding behaviour appear significant on days of high and low volatility as reflected by their respective negative signs when we use equal-weighted market portfolio return (see Panel A). Coefficient γ_3 is less than γ_4, denoting that herding behaviour is more likely to be encountered on days of high volatility. The Wald test result reported in Panel B, however, fails to substantiate that herding effects are stronger in the less volatile markets. Thus the prediction of H_{3-0} is not supported. Similarly, volatility is not found to have an asymmetric impact of the CSAD in Tanzania when value-weighted market returns are employed. The reason is that the coefficient γ_3 is significantly positive, while γ_4 is negative but not significant. For herding effects to prevail, these estimates are supposed to be less than zero, implying a reduced CSAD with market portfolio returns on days with high volatility

3.5.3 The Impact of the South African Market (the JSE)

In the context of African FMs, the JSE has always been a benchmark, since it is more advanced compared to all exchanges and many other world and emerging markets. Moreover, as part of facilitating the integration of African stock exchanges, a number of listed South African companies have been dual-listed in other African FMs such as in Botswana, Namibia, and Uganda (UNDP, 2003). Furthermore, the JSE has partnered with ASEA and the Committee of Southern African Development Community Stock Exchanges (CoSSE) in improving the functioning of the African markets in terms of capacity-building programmes and technical and regulatory issues. The fact that the JSE is from the same continent has motivated this study to examine whether extreme market conditions in this market may exert contagious effects on other ASEA members' markets. We use the approach by Economou et al. (2011) and Chiang and Zheng (2010) to estimate the following equation for each country included in the study:

$$\mathrm{CSAD}_{i,t} = \propto + \gamma_1 \left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \gamma_3 \mathrm{CSAD}_{\mathrm{JSE,t}} + \gamma_4 \mathrm{R}^2_{\mathrm{JSE,m,t}} + \varepsilon_t \qquad (3.8)$$

where the variables $\mathrm{CSAD}_{\mathrm{JSE,t}}$ and $\mathrm{R}^2_{\mathrm{JSE,m,t}}$ added to the equation (3.5), represent the daily stock return dispersion and market return squared for the JSE. The estimated coefficients of equation (3.8) are summarized in Table **3.6**.

It is observed that the herding coefficients (γ_2) for each market are consistent with the findings reported earlier in Table 3.3. That is, results from estimation of equation (3.5) confirm the presence of domestic herding in those markets where herding was found to be significant (see Table 3.3).

Table 3.6: Estimates of herding behaviour by incorporating the JSE Exchange factor

	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Panel A: Equally weighted market returns						
Botswana	0.0232 (0.0142)***	1.9099 (0.0297)***	-0.1105 (0.0154)***	0.0349 (0.0110)***	-0.0066 (0.0032)***	0.8809
BRVM	0.3579 (0.0161)***	1.7654 (0.0299)***	-0.4014 (0.0173)***	-0.0581 (0.0111)***	0.0001 (0.0024)	0.6351
Ghana	0.5447 (0.0348)***	0.7968 (0.0586)***	-0.0965 (0.0116)***	-0.1146 (0.0237)***	0.0181 (0.0070)***	0.3235
Kenya	1.0603 (0.0196)***	1.0447 (0.0220)***	-0.1654 (0.0076)***	-0.0976 (0.0143)***	0.0177 (0.0052)***	0.4872
Namibia	0.1752 (0.0237)***	1.0953 (0.0223)***	-0.1594 (0.0073)***	0.2672 (0.0208)***	-0.0329 (0.0067)***	0.6377
Nigeria	0.7263 (0.0293)***	1.6424 (0.0475)***	-0.4161 (0.0270)***	0.1385 (0.0247)***	-0.0177 (0.0097)*	0.5043
Tanzania	0.1602 (0.0197)***	1.5830 (0.0338)***	-0.2471 (0.0121)***	-0.0042 (0.0154)	0.0013 (0.0045)	0.7970
Uganda	-0.0055 (0.0537)	2.0508 (0.0380)***	-0.2091 (0.0090)***	0.0416 (0.0488)	-0.0243 (0.0278)	0.8908
Zambia	0.2462 (0.0355)***	1.8797 (0.0742)***	-0.2047 (0.0308)***	-0.0193 (0.0234)	-0.0037 (0.0061)	0.8334
Zimbabwe	0.7902 (0.1059)***	2.1675 (0.0552)***	-0.2178 (0.0107)***	0.1241 (0.0987)	0.0502 (0.0460)	0.6380
Panel B: Value weighted market returns						
Botswana	0.2051 (0.0198)***	1.3637 (0.0436)***	-0.0692 (0.0158)***	0.0072 (0.0126)	0.0002 (0.0055)	0.6037
BRVM	0.3607 (0.0187)***	1.6115 (0.0568)***	-0.2075 (0.0523)***	-0.0230 (0.0106)**	-0.0012 (0.0046)	0.6815
Ghana	0.6874 (0.0510)***	0.8005 (0.0377)***	-0.0197 (0.0029)***	-0.1130 (0.0271)***	-0.0160 (0.0113)	0.7391
Kenya	1.0762 (0.0172)***	0.8063 (0.0194)***	-0.0900 (0.0058)***	-0.0478 (0.0103)***	0.0020 (0.0047)	0.4798
Namibia	0.3511 (0.0249)***	0.6698 (0.0242)***	-0.0397 (0.0059)***	0.2087 (0.0164)***	0.0041 (0.0061)	0.6432
Nigeria	0.8892 (0.0274)***	0.8743 (0.0281)***	-0.0755 (0.0095)***	0.1058 (0.0190)***	0.0019 (0.0082)	0.5568
Tanzania	0.0029 (0.0003)***	0.0086 (0.0007)***	0.0012 (0.0004)***	0.0005 (0.0002)***	0.0000 (0.0001)	0.5537
Uganda	0.6695 (0.1145)***	0.9890 (0.0422)***	-0.0256 (0.0044)***	0.0603 (0.0828)	0.0373 (0.0340)	0.7788
Zambia	0.5287 (0.0354)***	1.3636 (0.0383)***	-0.1169 (0.0069)***	0.0397 (0.0243)	-0.0041 (0.0112)	0.6193
Zimbabwe	0.9103 (0.1141)***	1.4069 (0.1844)***	0.1062 (0.0956)	0.4264 (0.0868)***	-0.0274 (0.0328)	0.4237

Notes: This table presents the results of the model; $CSAD_{i,t} = \propto + \gamma_1 |R_{m,t}| + \gamma_2 R^2_{m,t} + \gamma_3 CSAD_{JSE,t} + \gamma_4 R^2_{JSE,m,t} + \varepsilon_t$, where $CSAD_{i,t}$ stands for the cross-sectional absolute deviation of stock returns with respect to the corresponding return on the market portfolio on day *t* for each market. The variables $CSAD_{JSE,t}$ *and* $R^2_{JSE,m,t}$ are the respective daily stock return dispersion and market return squared of the Johannesburg Stock Exchange, the South African market. The sample period is January 2000 to Mid July 2015 for Botswana, BRVM, Ghana, Kenya, Namibia, Tanzania and Zambia. The data range for the markets in Nigeria, Uganda and Zimbabwe is from January 2002, January 2009, and February 2009 to Mid July 2015 respectively. Panel A reports the estimated coefficients obtained from using an equally weighted market return, while in Panel B are the corresponding coefficients obtained when using a value weighted market portfolio return. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively.

Focusing on the estimated herding coefficients of $R^2_{JSE,m,t}$ we find robust evidence in Panel A of Table 3.6, suggesting that the Botswana and Namibia markets herd with the JSE, as shown by the negative and highly significant coefficients (γ_4). A possible explanation for why the South African market is found to motivate herding in these countries is that most of the trading is accounted for by large companies that have cross-listed in the domestic exchanges and the JSE. Another reason is that there are strong cultural, institutional and economic linkages between these countries than in the rest of the countries in the sample (IMF, 2012). Inclusion of the $R^2_{JSE,m,t}$ in the model, has moderate (significant at the 10% level) herding motivation on Nigeria. On the other hand, the study finds no effects of the return dynamics of the JSE on our sample market's herding when the market portfolio return is calculated based on value-weighted measure (see Panel B of Table **3.6**).

A further inspection of Table **3.6** reveals that the coefficients of $CSAD_{JSE,t}$ provide rather mixed results. The results for Botswana (equal-weighted estimation), Namibia (both equal-and value-weighted estimation), Nigeria (both equal-and value-weighted estimation), Tanzania (value-weighted estimation) and Zimbabwe (value-weighted estimation) are positive and strongly

significant. This serves as an indication of the possible contagious effects of the JSE return dispersions on these African markets. The results for BRVM, Ghana, and Kenya on the other hand, are negative and highly significant in both Panels. The robust negative correlation between return dispersions in these markets in our sample and JSE implies that portfolio diversification may be beneficial. It is also important to note that the coefficients for the Ugandan and Zambian markets are insignificant.

Overall, we find no significant evidence on the dominance of the JSE in influencing herd formation in the countries involved in the study. Moreover, the tests on the possible prevalence of co-movement of the CSADs demonstrate that portfolio diversification benefits between the South African market and the studied ASEA members is non-existent, with exception of the BRVM, Ghana, and Kenya markets.

3.5.4 Robustness Checks

In the recent finance literature, empirical analyses have shown that herd formation is likely to be more pronounced during periods of extreme shocks like crises (Christie and Huang, 1995, Chang et al., 2000, Gleason et al., 2004, Tan et al., 2008, Chiang and Zheng, 2010, Economou et al., 2011). The reason is that, when there are large swings in asset prices, as is the latest case of China's main stock market crisis (Duggan, 2015a, Sudworth, 2015b, Shen and Goh, 2015), the chances of investors believing that their own judgements are fallible increases. They, thus, end up forming collective decisions by following the actions of others. When this happens, the markets experience increased trade correlations (hence reduced dispersions), asset prices plunge, and market volatility increases.

As stated earlier, this is the pioneering study in the context of African FMs. It also offers a platform for investigating whether these markets demonstrated herding behaviour due to the instability in financial markets during the recent global financial crisis of 2007 – 2008. Since there is no consensus in the literature as to when exactly the financial crises set-on and finished (Lukanima and Swaray, 2013), we use the popular U.S. stock market indices to decide the cut-off dates. To this end, we divide our sample into three groups. The first sub-sample is the period before the onset of the global crisis, which given our sample period starts from 2000 to the end of October 2007 when the Dow Jones Industrial Average index (DJIA) hit the peak (Stanton, 2008). We define the second sub-sample as the crisis period. This begins from October 2007 when the DJIA started plummeting to March 2009, when it reached its turning point after crashing to around 6,600 points. The third sub-sample period, the post crisis, starts from April 2009 to the end of our sample period

on 15 July 2015. To examine the possible effects of the financial crisis, we use the following approaches.

3.5.4.1 The Dummy Variable Approach

We extend equation (3.5) by including a dummy variable to the market return squared term (see also; Economou et al., 2011, Tan et al., 2008, Philippas et al., 2013), to examine the influence of the global financial crisis. The dummy variable has three categories, that is; pre-, during and post-financial crisis days respectively. We therefore, use two dummies to represent the 3 categories. Our benchmark (excluded) category is the pre-financial crisis period. We defined the following dummies: Crisis = 1 if the observation falls within the financial crisis period, 0 otherwise; after = 1 if the observation is post financial crisis, 0 otherwise. The estimates are therefore based on the following equation:

$$\text{CSAD}_{i,t} = \propto + \gamma_1 \left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \gamma_3 \text{Dum}^{\text{Crisis}} \text{R}_{\text{m,t}}^2 + \gamma_4 \text{Dum}^{\text{After}} \text{R}_{\text{m,t}}^2 + \varepsilon_t \qquad (3.9)$$

where the superscripts *"crisis"* and *"after"* to the dummy variable represent the during and post-financial crisis days respectively. The estimated coefficients for the model above are reported in Table 3.7.

The results for the $R_{m,t}^2$ coefficient are consistent with the ones reported for equation (3.5). It is observed that the herding coefficients (γ_2) for each market are consistent with the findings reported earlier in Table 3.3 except for value-weighted estimations for BRVM and Tanzania (see Panel B). Focusing on the coefficients of $\text{Dum}^{\text{Crisis}} \text{R}_{\text{m,t}}^2$, we find robust evidence in the cases of the Botswana (in both equal- and value-weighted estimations) and Tanzanian (value-weighted estimation only) markets in support of the conjecture that the CSADs actually reduced further as compared to the days before the financial crisis. The effect on Botswana resulting from the instability in financial markets around the world could possibly be due to the country's economy being heavily dependent on the mining sector which was adversely affected by the global downturn. The findings for Tanzania reveal that the crisis triggered herding in large capitalization stocks only (see Panel B). The reason is that these are most actively traded since most of the investors are more familiar with them. The coefficients of all the remaining countries are positive and highly significant at the 5% level except for Kenya[8] (in Panel A and B) and Zambia which is

[8] The significance of herding in Kenya during the financial crisis for the value-weighted specification is at the 10% level.

negative and insignificant (in Panel B). This means that, the cross-sectional return dispersion for these markets tended to increase with the portfolio return, thus no evidence of herding.

Table 3.7: Estimates of herding behaviour during the financial crisis period

	Constant	γ_1	γ_2	γ_3	γ_4	R^2 adj.
Panel A: Equally weighted market returns						
Botswana	0.0830 (0.0109)***	1.9000 (0.0308)***	-0.1090 (0.0155)***	-0.0387 (0.0131)***	-0.0237 (0.0102)**	0.8809
BRVM	0.1623 (0.0062)***	1.6959 (0.0273)***	-0.3700 (0.0151)***	0.1248 (0.0148)***	0.2758 (0.0089)***	0.7145
Ghana	0.1938 (0.0156)***	0.8253 (0.0560)***	-0.0970 (0.0113)***	0.1614 (0.0196)***	0.3838 (0.0152)***	0.4127
Kenya	0.8934 (0.0117)***	1.0507 (0.0221)***	-0.1663 (0.0072)***	0.0270 (0.0181)	0.1022 (0.0116)***	0.4909
Namibia	0.4482 (0.0100)***	1.1118 (0.0222)***	-0.1649 (0.0075)***	0.3190 (0.0264)***	0.0804 (0.0112)***	0.6362
Nigeria	1.0517 (0.0154)***	1.5231 (0.0458)***	-0.4044 (0.0275)***	0.2210 (0.0370)***	0.2210 (0.0370)***	0.5853
Tanzania	0.1091 (0.0177)***	1.6076 (0.0352)***	-0.2511 (0.0125)***	0.0182 (0.0184)	0.0677 (0.0151)***	0.7996
Uganda	- -	- -	- -	- -	- -	-
Zambia	0.1342 (0.0285)***	1.9077 (0.0763)***	-0.2078 (0.0314)***	0.1266 (0.0311)***	0.1014 (0.0189)***	0.8355
Zimbabwe	- -	- -	- -	- -	- -	-
Panel B: Value weighted market returns						
Botswana	0.3393 (0.0148)***	1.3161 (0.0429)***	-0.0611 (0.0166)***	-0.2259 (0.0213)***	-0.1976 (0.0155)***	0.6263
BRVM	0.2977 (0.0092)***	1.3251 (0.0657)***	0.0072 (0.0576)	0.0861 (0.0248)***	0.1441 (0.0149)***	0.6903
Ghana	0.2265 (0.0333)***	0.8084 (0.0192)***	-0.0186 (0.0026)***	0.4391 (0.0522)***	0.6331 (0.0364)***	0.7714
Kenya	0.9698 (0.0125)***	0.8084 (0.0192)***	-0.0907 (0.0055)***	0.0331 (0.0194)*	0.0781 (0.0123)***	0.4820
Namibia	0.6014 (0.0154)***	0.6916 (0.0230)***	-0.0404 (0.0056)***	0.3502 (0.0298)***	0.0279 (0.0135)**	0.6381
Nigeria	1.1631 (0.0170)***	0.8273 (0.0267)***	-0.0620 (0.0098)***	0.3291 (0.0357)***	-0.2864 (0.0137)***	0.6427
Tanzania	0.0044 (0.0002)***	0.0087 (0.0007)***	0.0010 (0.0004)**	-0.0011 (0.0003)***	-0.0010 (0.0002)***	0.5571
Uganda	- -	- -	- -	- -	- -	-
Zambia	0.6487 (0.0294)***	1.3401 (0.0391)***	-0.1143 (0.0068)***	-0.0009 (0.0467)	-0.1022 (0.0308)***	0.6211
Zimbabwe	- -	- -	- -	- -	- -	-

Notes: This table presents the results of the augmented model; $\text{CSAD}_{i,t} = \propto + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \gamma_3 \text{Dum}^{\text{Crisis}} \text{R}_{\text{m,t}}^2 + \gamma_4 \text{Dum}^{\text{After}} \text{R}_{\text{m,t}}^2 + \varepsilon_t$, where $\text{CSAD}_{i,t}$ stands for the cross-sectional absolute deviation of stock returns with respect to the corresponding return on the market portfolio on day *t* for each market and $\text{Dum}^{\text{Crisis}}$ is a dummy variable that takes the value 1 before the period of financial crisis (the base category), the value 2 during the period of financial crisis and the value 3 after the period of financial crisis. The sample period is January 2000 to mid-July 2015 for Botswana, BRVM, Ghana, Kenya, Namibia, Tanzania and Zambia. The data range for the markets in Nigeria, Uganda and Zimbabwe is from January 2002, January 2009, and February 2009 to mid-July 2015 respectively. We consider the period of financial crisis as the period from October, 2007 when the U.S. stock market peaked, to the end of March 2009, when the Dow Jones Industrial Average Index (DJIA) reached a trough. Reported in Panel A are the estimated coefficients obtained from using an equally weighted market return, while in Panel B are the corresponding coefficients obtained when using a value weighted market portfolio return. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively.

The estimated post-financial crisis coefficients (γ_4) indicate there is significant evidence of herding behaviour for Botswana only in both Panels. The results in Table 3.7 further show evidence in favour of significant herding reflected by negative coefficients for value-weighted specifications in Nigeria, Tanzania and Zambia markets[9]. The coefficients for all other markets (BRVM, Ghana, Kenya, and Namibia) are significantly positive. The fact that the coefficients (γ_4) are positive means that the portfolio returns' dispersion in these markets increased relative to the market return after the financial crisis when compared to the situation before the global crisis. In other words, the findings support the notion that when there are no markets stresses; investors tend to rely on their own beliefs when making investments decisions as evidence by the increased CSADs.

[9] The equivalent equal-weighted coefficients for these markets are significantly positive.

3.5.4.2 Separating the Sample into Sub-periods

In this section, we further examine investors herding behaviour by distinguishing stable and turbulent periods. In particular, we divide our entire sample into the pre-, during and post-financial crisis periods as defined in the preceding section. We then estimate the benchmark model (3.5) for each sub-period separately. Table 3.8 contains the pre-financial crisis regression estimates.

Table 3.8: Estimates of herding behaviour before the financial crisis period

	Constant	γ_1	γ_2	R^2 adj.
Panel A: Equally weighted market returns				
Botswana	0.0823 (0.0130)***	1.9108 (0.0417)***	-0.1175 (0.0169)***	0.8623
BRVM	0.1287 (0.0073)***	1.8623 (0.0376)***	-0.4089 (0.0192)***	0.8367
Ghana	0.3397 (0.0162)***	0.4598 (0.0516)***	-0.0554 (0.0082)***	0.1838
Kenya	0.8009 (0.0143)***	1.3391 (0.0335)***	-0.2464 (0.0122)***	0.5324
Namibia	0.3886 (0.0115)***	1.2745 (0.0298)***	-0.1980 (0.0097)***	0.6891
Nigeria	1.0741 (0.0216)***	1.3571 (0.0939)***	-0.2455 (0.0687)***	0.4072
Tanzania	0.2268 (0.0230)***	1.3302 (0.0480)***	-0.1845 (0.0117)***	0.7582
Uganda	- -	- -	- -	-
Zambia	0.1732 (0.0320)***	1.828 (0.0676)***	-0.186 (0.0236)***	0.8715
Zimbabwe	- -	- -	- -	-
Panel B: Value weighted market returns				
Botswana	0.3155 (0.0181)***	1.4319 (0.0683)***	-0.1031 (0.0204)***	0.5448
BRVM	0.2652 (0.0099)***	1.6811 (0.1160)***	-0.2414 (0.1097)**	0.6267
Ghana	0.3999 (0.0345)***	0.6614 (0.0335)***	-0.0165 (0.0013)***	0.6001
Kenya	0.8808 (0.0155)***	1.0212 (0.0294)***	-0.1383 (0.0086)***	0.5154
Namibia	0.5637 (0.0175)***	0.7348 (0.0251)***	-0.0417 (0.0053)***	0.6749
Nigeria	1.1617 (0.0233)***	0.8165 (0.0404)***	-0.0528 (0.0134)***	0.5653
Tanzania	0.0057 (0.0003)***	0.0064 (0.0012)***	0.0011 (0.0008)	0.3576
Uganda	- -	- -	- -	-
Zambia	0.6703 (0.0342)***	1.2981 (0.0577)***	-0.1092 (0.0103)***	0.6095
Zimbabwe	- -	- -	- -	-

Notes: This table presents the results of the benchmark model; $CSAD_{i,t} = \propto + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for the cross-sectional absolute deviation of stock returns with respect to the corresponding return on the market portfolio on day *t* for each market. The sample period is January 2000 to September 2007. The table does not report the findings for the markets in Uganda and Zimbabwe, due to data availability problems. The data range for these markets starts from January 2009, and February 2009 to mid-July 2015 respectively. We consider the period of financial crisis as the period from October, 2007 when the U.S. stock market peaked, to the end of March 2009, when the Dow Jones Industrial Average Index (DJIA) reached a trough. Reported in Panel A are the estimated coefficients obtained from using an equally weighted market return, while in Panel B are the corresponding coefficients obtained when using a value weighted market portfolio return. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively.

Note that, for all our 8 (Uganda and Zimbabwe are excluded because of lack of data) sample markets, the estimate γ_2 is similar to the results in the aggregate model (see Table 3.3). That is, there is robust evidence in support of the herding notion for all our sample market for both equal- and value-weighted estimations (see Panels A and B) except for Tanzania in Panel B. This implies that we do not find evidence in favour of herding before the financial crisis for Tanzania using value-weighted specification.

Next we evaluate the estimates during the 2007-2009 global financial crisis period presented in Table 3.9. The results are, to a great extent, not consistent with those estimated using equation

(3.9), presented in Table 3.8. We find robust herding evidence in Ghana, Kenya, Namibia and Zambia (both equal- and value-weighted tests); BRVM, Nigeria and Tanzania (equal-weighted estimation). A comparison of coefficient γ_2 in Table 3.8 and Table 3.9 reveals that the effects of herd formation during the financial crisis appear stronger[10] (CSAD is further reduced) in the Ghanaian and Zambia markets only, in both equal- and value-weighted estimations.

Table 3.9: Estimates of herding behaviour during the financial crisis

	Constant	γ_1	γ_2	R^2 adj.
Panel A: Equally weighted market returns				
Botswana	0.0727 (0.0125)***	1.6907 (0.0685)***	0.0409 (0.0512)	0.9028
BRVM	0.2641 (0.0248)***	1.8176 (0.0899)***	-0.4299 (0.0468)***	0.7205
Ghana	0.0691 (0.0164)***	2.0973 (0.0819)***	-0.4392 (0.0558)***	0.8502
Kenya	1.0504 (0.0282)***	0.7889 (0.0414)***	-0.1057 (0.0095)***	0.6201
Namibia	0.9946 (0.0475)***	0.7455 (0.0536)***	-0.0979 (0.0109)***	0.4718
Nigeria	1.5572 (0.0942)***	1.0104 (0.1723)***	-0.2816 (0.0702)***	0.2053
Tanzania	0.0883 (0.0289)***	1.6887 (0.1116)***	-0.2361 (0.0590)***	0.8929
Uganda	- -	- -	- -	-
Zambia	0.1990 (0.0422)***	2.1583 (0.0913)***	-0.3197 (0.0262)***	0.7870
Zimbabwe	- -	- -	- -	-
Panel B: Value weighted market returns				
Botswana	0.1684 (0.0161)***	1.0805 (0.0666)***	0.0111 (0.0175)	0.8439
BRVM	0.3880 (0.0408)***	1.1593 (0.2277)***	0.1988 (0.1959)	0.6626
Ghana	0.1989 (0.0727)***	1.0418 (0.0517)***	-0.0380 (0.0049)***	0.9473
Kenya	1.1386 (0.0280)***	0.5945 (0.0291)***	-0.0553 (0.0047)***	0.6126
Namibia	1.0967 (0.0540)***	0.6105 (0.0463)***	-0.0540 (0.0069)***	0.4856
Nigeria	1.8354 (0.0639)***	0.4112 (0.0957)***	-0.0334 (0.0304)	0.1600
Tanzania	0.0028 (0.0004)***	0.0078 (0.0017)***	0.0032 (0.0011)***	0.7521
Uganda	- -	- -	- -	-
Zambia	0.6066 (0.0520)***	1.4525 (0.1076)***	-0.1267 (0.0182)***	0.5168
Zimbabwe	- -	- -	- -	-

Notes: This table presents the results of the benchmark model; $CSAD_{i,t} = \propto + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for the cross-sectional absolute deviation of stock returns with respect to the corresponding return on the market portfolio on day *t* for each market. The sample period is October 2000 to March 2009. The table does not report the findings for the markets in Uganda and Zimbabwe, due to data availability problems. The data range for these markets starts from January 2009, and February 2009 to mid-July 2015 respectively. We consider the period of financial crisis as the period from October, 2007 when the U.S. stock market peaked, to the end of March 2009, when the Dow Jones Industrial Average Index (DJIA) reached a trough. Reported in Panel A are the estimated coefficients obtained from using an equally weighted market return, while in Panel B are the corresponding coefficients obtained when using a value weighted market portfolio return. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stands for the 1%, 5% and 10% statistical significance levels respectively.

In Namibia, on the other hand, we find evidence of decreased cross-sectional dispersion when the market returns are calculated using the value-weighted model only (Panel B). For the case of BRVM, Nigeria and Tanzania, evidence of decreasing cross-sectional returns dispersion is found when equal-weighted returns are employed. Contrary to the hypothesis that CSAD is further reduced during a crisis period, the results for Kenya provide strong evidence indicating less herding (increased CSAD) during the global financial crisis. On the other hand, the results in Table 3.9, indicate that γ_2 is insignificant and positive for Botswana (in Panels A and B) and BRVM (in Panel B). Furthermore, the coefficient is significantly positive in Tanzania (Panel B) and

[10] By definition, for herd formation to be more pronounced during the financial crisis period, it is expected that the estimate γ_2, that captures the presence of herding, to be greater (in absolute terms) than that of before the onset of the crisis (see; Economou et al., 2011). For the markets in our sample, the coefficients for the before crisis period are either great than, or insignificant.

insignificant and negative for Nigeria (Panel B). Accordingly, these findings rule out the possibility of increased herding behaviour in the respective markets during the global financial crisis.

We further examine whether the effects of herding are stronger after the financial crisis period compared to before. Results in Panels A and B of Table 3.10 show that the coefficients γ_2 for Ghana, Kenya, Namibia, Nigeria and Zambia are consistently negative and strongly significant. The negative values of the coefficients suggest that herding behaviour exists in these markets following the financial crisis period. Note that the results for the Nigerian market are not corresponding with those reported in Table 3.9. The findings in Table 3.10 further reveal evidence in favour of significant herding for equal-weighted estimations (Panel A) in BRVM[11] and Tanzania[12], whereas no evidence of herding is reported for Botswana in both equal- and value-weighted specifications (Panels A and B).

Table 3.10: Estimates of herding behaviour after the financial crisis

	Constant	γ_1	γ_2	R^2 adj.
Panel A: Equally weighted market returns				
Botswana	0.0695 (0.0049)***	1.7662 (0.0369)***	0.0475 (0.0209)**	0.8970
BRVM	0.4800 (0.0141)***	1.5587 (0.0568)***	-0.4254 (0.0427)***	0.4820
Ghana	0.2621 (0.0117)***	2.0786 (0.0424)***	-0.5145 (0.0193)***	0.7657
Kenya	1.0849 (0.0124)***	0.7360 (0.0413)***	-0.0754 (0.0215)***	0.3710
Namibia	0.5624 (0.0162)***	0.9936 (0.0440)***	-0.1144 (0.0219)***	0.5145
Nigeria	0.7479 (0.0128)***	1.4284 (0.0603)***	-0.1899 (0.0401)***	0.6302
Tanzania	0.1022 (0.0113)***	1.8944 (0.0476)***	-0.3414 (0.0222)***	0.8270
Uganda	- -	- -	- -	-
Zambia	0.1812 (0.0170)***	2.1245 (0.0435)***	-0.3021 (0.0163)***	0.7839
Zimbabwe	- -	- -	- -	-
Panel B: Value weighted market returns				
Botswana	0.1576 (0.0083)***	1.1884 (0.0421)***	0.0181 (0.0221)	0.6803
BRVM	0.5254 (0.0188)***	0.9820 (0.0865)***	0.2193 (0.0725)***	0.6508
Ghana	0.6865 (0.0382)***	0.8495 (0.0241)***	-0.0177 (0.0018)***	0.8549
Kenya	1.1249 (0.0133)***	0.6062 (0.0316)***	-0.0487 (0.0108)***	0.3747
Namibia	0.6179 (0.0167)***	0.7280 (0.0269)***	-0.0546 (0.0075)***	0.5621
Nigeria	0.8051 (0.0137)***	0.9383 (0.0271)***	-0.0701 (0.0096)***	0.7694
Tanzania	0.0024 (0.0002)***	0.0110 (0.0008)***	0.0008 (0.0005)	0.7294
Uganda	- -	- -	- -	-
Zambia	0.5422 (0.0164)***	1.3669 (0.0519)***	-0.1181 (0.0087)***	0.5861
Zimbabwe	- -	- -	- -	-

Notes: This table presents the results of the benchmark model; $CSAD_{i,t} = \propto + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$, where $CSAD_{i,t}$ stands for the cross-sectional absolute deviation of stock returns with respect to the corresponding return on the market portfolio on day *t* for each market. The sample period is April 2009 to mid-July 2015. Reported in Panel A are the estimated coefficients obtained from using an equally weighted market return, while in Panel B are the corresponding coefficients obtained when using a value weighted market portfolio return. Figures in parentheses are the Newey-West heteroskedasticity and autocorrelation consistent standard errors. ***, ** and * stand for the 1%, 5% and 10% statistical significance levels respectively.

As before, we compare the estimates presented in Table 3.8 and Table 3.10 to determine whether herding is stronger after, than before the global financial crisis. We find robust evidence for Ghana and Zambia that the CSAD actually further decreased after the global crisis in Panel A and B. In the case of Namibia and Nigeria, it is observed that the cross-sectional dispersion reduced after

[11] The value-weighted coefficient (in Panel B) for BRVM is significantly positive indicating increasing cross-sectional absolute dispersions relative to the market returns. This means that there was no herding after the financial crisis.
[12] The value-weighted coefficient (in Panel B) for Tanzania is insignificant and positive.

the crisis when value weights are used to calculate the market return, but the results are reversed when equal weights are used. Likewise, the findings indicate the presence of strong herding after the crisis for equal-weighted estimations for BRVM and Tanzania (see Panel A in Table 3.10). The herding coefficients for the Kenyan market after the global crisis are significantly negative in both equal- and value-weighted specifications. The comparison of the coefficients, however, indicates that the CSAD increased after the crisis. This implies that the herding effects were stronger before the crisis.

3.6 Summary of the Results and Conclusion

This is the pioneering study that examines the existence of herding behaviour for 10 African FMs: namely: Botswana, BRVM, Ghana, Kenya and Namibia. Others are Nigeria, Tanzania, Uganda, Zambia and Zimbabwe. The main objectives are to establish whether investors in African FMs tend to exhibit herding behaviour; and to establish whether the same behavioural tendency is more likely to be strong during extreme market conditions. To achieve this, we compiled the available data mainly from the Bloomberg database covering from January 2000 to July 2015.

We conducted our analysis by following the approach used in two seminal papers by Christie and Huang (1995) and Chang et al. (2000). As stated earlier, these methods detect herd behaviour by focusing on the degree of trade correlation. That is, when the dispersion of returns around their cross-sectional average is low, it implies that investors tend to mimic the actions of others, a phenomenon which is described as herding in the behavioural finance literature. Table 3.11 presents the summary of our findings.

Table 3.11: Summary of Evidence of Herding Behaviour

Country	Measure of Returns	Benchmark Model	Rising and Falling Returns	Returns Volatiliy	Impact of the JSE	Financial Crisis: Dummy Approch		Financial Crisis: Sub-Sample		
						During	After	Before	During	After
Botswana	Equal-weighted	Robust	Robust	No[e]	Robust	Robust	Robust	Robust	No	No
	Value-weighted	Robust	No[a]	No[e]	No	Robust	Robust	Robust	No	No
BRVM	Equal-weighted	Robust	No[c]	No[e]	No	No	No	Robust	Robust	Robust
	Value-weighted	Robust	No[c]	No[e]	No	No	No	Robust	No	No
Ghana	Equal-weighted	Robust	No[a]	No[e]	No	No	No	Robust	Robust	Robust
	Value-weighted	Robust	No[c]	No[f]	No	No	No	Robust	Robust	Robust
Kenya	Equal-weighted	Robust	No[b]	Robust	No	No	No	Robust	No	No
	Value-weighted	Robust	No[c]	Robust	No	No	No	Robust	No	No
Namibia	Equal-weighted	Robust	No[c]	No[f]	Robust	No	No	Robust	No	No
	Value-weighted	Robust	No[b]	No[e]	No	No	No	Robust	Robust	Robust
Nigeria	Equal-weighted	Robust	No[b]	No[e]	No	No	No	Robust	Robust	No
	Value-weighted	Robust	No[c]	No[f]	No	No	Robust	Robust	No	Robust
Tanzania	Equal-weighted	Robust	No[a]	No[g]	No	No	No	Robust	Robust	Robust
	Value-weighted	No	No[d]	No[h]	No	Robust	Robust	No	No	No
Uganda	Equal-weighted	Robust	No[c]	Robust	No	-	-	-	-	-
	Value-weighted	Robust	No[c]	No[e]	No	-	-	-	-	-
Zambia	Equal-weighted	Robust	No[b]	No[e]	No	No	No	Robust	Robust	Robust
	Value-weighted	Robust	No[a]	No[e]	No	No	Robust	Robust	Robust	Robust
Zimbabwe	Equal-weighted	Robust	No[c]	No[e]	No	-	-	-	-	-
	Value-weighted	No	No[d]	No[h]	No	-	-	-	-	-

Note: [a] Herding appears to be stronger during falling market returns days, the Wald test however, fails to reject the equality of the coefficients hypothesis; [b] Contrary to H_{2-0}, there is robust evidence in favour of herding behaviour being much stronger on days with rising market prices; [c] Herding appears to be stronger on days with rising market returns, the Wald test however, fails to reject the equality of the coefficients hypothesis; [d] No evidence of herd formation conditional upon market returns; [e] Contrary to H_{3-0}, there is robust evidence in favour of herding behaviour being much stronger on days with low market volatility; [f] Herding appears to be stronger during low volatility days, the Wald test however, fails to reject the equality of the coefficients hypothesis; [g] Herding appears to be stronger during high volatility days, the Wald test however, fails to reject the equality of the coefficients hypothesis; [h] No evidence of herd formation conditional upon market return volatility.

Regarding the question, whether African FMs exhibit herding tendency, our summary in Table 3.11 furnishes us with evidence indicating the presence of such behaviour in each of our 10 sample markets for the entire sample period. However, the information in the column labelled benchmark model shows no evidence is found for Tanzania and Zimbabwe for the value-weighted specifications. These findings are in agreement with the significant body of evidence stating that herding is most existent in emerging markets or rather less-developed markets (Chang et al., 2000, Boyer et al., 2006, Demirer and Kutan, 2006, Demirer et al., 2010). It is asserted that these markets are dominated by individual domestic investors who appear to be homogenous, have limited access to information and are not sophisticated enough to be able to analyse and compare stock performance (Chiang et al., 2010). Because of this information asymmetry, they are more likely to mimic others such as institutional or foreign investors. A vivid example is described by Tan et al. (2008) who attributed the existence of herding behaviour on the Shanghai and Shenzhen stock exchanges to shares being held by individual Chinese (domestic) investors because they possess characteristics of emerging markets' investors.

Next, we turn to the second objective, to examine whether investors in the African FMs display herding behaviour during extreme market conditions (falling market returns). The summary presented in the column labelled "rising and falling returns" of Table 3.11 generally shows there is indeed a tendency to herd during both up- and down-market returns in the sample markets. In contrast to our expectations as provided by the earlier literature from emerging and developed markets, the results do not support the proposition that herding behaviour should be much stronger during days with declining market prices. In general, the evidence for asymmetric herding during periods rising and falling market returns is limited. The reported asymmetries appear to be sensitive to the estimation approach employed. We find robust evidence only for Botswana (equal-weighted estimations). No evidence of herding significance is detected for value-weighted estimations in Tanzania and Zimbabwe. These results suggest that market performance is not the main determinant of herding in African FMs. This observation can be attributed to a number of factors. The main factor being the lack of derivatives trading, which could serve as a benchmark for trading strategies against market performance indicators (e.g. market indices). Thin trading which is mainly caused by limited stock selection options in these markets is another possible reason. Herding in markets with a small fraction of listed companies' trading is a result of predicted (or observed) trading activity of individual stocks in contrast to the performance of the market as a whole.

The other objective was to examine the relationship between herding and market returns, distinguishing between days with high- and days with low-volatility. The summary in Table 3.11

reveals that there is indeed a differential behaviour of CSAD in most of the sample markets. We find robust evidence consistent with our proposition that market volatility asymmetrically affects the cross-sectional dispersion of stock returns only in the Kenyan market (i.e. in both ways of calculating market portfolio returns). The result for the Ugandan market, on the other hand, reveals the presence of this asymmetry when equal-weighted returns are used. For cases of Botswana, BRVM, and Zambia, the evidence contradicts our hypothesis and expectation of the theory. It shows that herding is much stronger on days with low-volatility[13]. It is argued that when the market is less volatile, it becomes easy for participants to observe or learn from the trades of their peers and imitate them (Holmes et al., 2013). Informational inefficiencies are also linked to lack of volatility in FMs. The reduced transparency and poor quality of information disclosure, therefore, may be attributed to influencing investors' decision to free-ride on their information and imitate others.

As documented in previous studies (e.g. Bekaert and Harvey, 1997), understanding how cross-sectional dispersions and expected returns in one country influence the same in other countries, is important for determining the cost of capital and optimal allocation of resources. Studies such as those by Economou et al. (2011) and Chiang and Zheng (2010) have confirmed that financial shocks in the US market have had contagious effects across global markets (see also; Forbes and Rigobon, 2002, Chiang et al., 2007). This empirical evidence, therefore, underpinned the investigation into the influence of the South African market on the variability of cross-sectional returns and the price movements in the other African markets. As summarised in Table 3.11, and contrary to our expectations, we find no indication that the JSE plays any influential role in explaining herding behaviour in African FMs, expect for Botswana and Namibia. This observation may confirm one distinguishing feature of emerging markets, and for that matter, FMs: that they have low correlations among themselves and with developed markets. It was expected there would be a correlation between these African exchanges and the JSE because, as noted earlier, the latter is regarded as a benchmark in the region.

As a robustness check, we investigated the impact of the global financial crisis (2007-2008) on herding behaviour in the 10 countries considered in this study. Theoretically, herding is expected to be more prevalent during the crisis period. Using the dummy variable approach, we find robust evidence (in both equal- and value-weighted estimations) of further reduction in the cross-sectional dispersion in the Botswana market only, during- and after the crisis period. However, we do not find such evidence for Botswana when the data is divided in sub-samples. On the contrary,

[13] Other researchers like Economou et al., 2011 and Holmes et al., 2013 have also reported presence of significant herding during periods of decreasing volatility.

it is the Ghanaian and Zambian markets that furnish us with evidence of further reduction in CSAD during and after the crisis. Overall, our results from 10 African FMs contrast the findings reported in previous studies on emerging and mature markets. This is mainly because African FMs are still small, in many aspects stock market development and investors are not sophisticated, and there are also few institutional investors. Moreover, these FMs are illiquid as a result of low free-float and trading activity being highly concentrated among a few large stocks. The lack of liquidity has deterred their attractiveness to international investors[14] and thus less exposure to the global macroeconomic fundamentals. As a result of the underdeveloped nature of the stock markets and lack of integration with mature markets, the global financial crisis has had little effects on investors' herding behaviour in the African FMs as evidenced by our analyses and summarized in Table 3.11.

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[14] Global investors have started paying closer attention to the stock exchanges in sub-Saharan African FMs in recent years as many of these markets have lessened or lifted trading restrictions for global investors. Moreover, the markets have recorded strong and impressive growth; and offer potentially higher returns than what most of the mature markets offer (FTSE, 2014; IMF, 2012).

CHAPTER 4: CORPORATE GOVERNANCE MECHANISMS AND FIRM PERFOMANCE

4.1 Introduction

A growing body of literature acknowledges that firm-level corporate governance practices are important determinants of how resources are allocated among competing companies (see, for example; Balasubramanian et al., 2010, Black, 2001, Black et al., 2006a, Klock et al., 2005). Providers of finance need to know how companies in which their monies are invested are governed. A systematic review of a company's corporate governance practices nowadays is an integral part of the investment decision making process. Investors need assurances on the viability of chosen projects, commitment to exert sufficient efforts, and adequate disclosure of information concerning the safety of their investments. Good systems of corporate governance, built on the principles of; responsibility, accountability, transparency, and fairness to mention a few, provide such assurance. Past research has also highlighted that the quality of laws protecting investors, and their extent of enforcement are key elements to corporate governance structures that build investors' trust and confidence in the companies they have invested in, and the capital markets, in general (e.g. La Porta et al., 1998, La Porta et al., 1999, La Porta et al., 2000, La Porta et al., 2002).

Although corporate governance systems have been in place since when incorporation of entities began, the recent waves of financial crises - e.g. in 2008 and that of 1998 in Russia, Asia, and Brazil; the high profile corporate scandals like the Enron and WorldCom in the United States of America (USA); and governance related problems in continental Europe and other parts of the world - have drawn more attention to how companies are governed. These events have also heightened the need for effective and efficient practices. Other motivating factors that have ignited and accelerated the campaigns for instituting best governance practices include globalisation of capital markets, privatization of state-owned enterprises (SOEs) and adoption of market-based investment processes; programs of structural reforms and deregulation, to mention a few. In response to these, governments, international organizations, and various regulatory authorities across the globe have established, and continue to develop measures to restore public confidence and ensure adherence to principles of good corporate governance. Examples include the Cadbury Report of 1992 in the United Kingdom (UK), the King's Report of 1994 (South Africa), and the Sarbanes-Oxley Act of 2002 in the United States (US).

Following the structural adjustment programs, and the resulting financial liberalization and privatisation processes in the 1990s, many African countries established stock exchanges. Most of these exchanges fall under the category of frontier equity markets or underdeveloped markets.

Evidence from the literature suggests that corporate governance should matter more in underdeveloped markets (La Porta et al., 1999, La Porta et al., 2000, Black, 2001, Klapper and Love, 2004, Morey et al., 2009, Peters et al., 2011). However, as Table 4.1 reveals, the Global Competitive Index (GCI)[15] ranking for East African (EA) countries (i.e. Kenya, Tanzania and Uganda) is consistently very low (World Economic Forum, 2012, World Economic Forum, 2013). This is due to poor scores in key areas of corporate governance as compared to other countries. As a result of weak legal and regulatory systems in these developing countries, a wide inter-firm variation in governance behaviour is more likely to be observed.

Table 4.1: Rankings on the Global Competitiveness Index in a Survey of 144 Countries

Country	2012-13							2013-14						
	PR	**EBF**	**SARS**	**ECB**	**PMSI**	**SIP**	**GCI**	**PR**	**EBF**	**SARS**	**ECB**	**PMSI**	**SIP**	**GCI**
USA	42	29	37	23	33	5	7	33	32	36	15	27	6	5
UK	5	12	13	15	16	10	8	4	12	16	21	15	10	10
South Africa	26	48	1	1	2	10	52	20	37	1	1	1	10	53
Botswana	46	37	50	42	44	39	79	41	39	48	50	50	41	74
Kenya	110	102	81	79	87	80	106	86	78	86	74	82	84	96
Tanzania	106	109	114	78	94	80	120	97	122	127	102	110	84	125
Uganda	80	89	105	48	97	110	123	107	98	118	67	117	116	129

Source: *World Economic Forum: The Global Competitiveness Report*
Note: PR = Property rights; EBF = Ethical behaviour of firms; SARS = Strength of auditing and reporting standards; ECB = Efficacy of corporate boards; PMSI = Protection of minority shareholders' interests; SIP = Strength of investor protection, 1 - 10 (Best); and GCI = Global Competitiveness Index

4.1.1 The Aim of the Study

Kratz (1999) points out that during the 1990s, investment professionals unprecedentedly invaded frontier markets (FMs) and invested heavily using untested investment approaches. This was the time when pre-emerging markets offered even better returns than those that mutual funds used to get from the well-developed markets. Citing the cases of Russia and China, Kratz (1999) further shows that the failure to understand the dynamics of investing in these markets led many big investors into losses between 1998 and 1999. This was a clear indication that the analysis of FMs required a formal admission into the conventional academic thinking and research on their stock markets.

[15] Since 2005, the World Economic Forum has been publishing, on yearly basis, the Global Competitive Report (GCR) which ranks countries based on the Global Competitive Index (GCI). The GCI is a comprehensive tool that measures the microeconomic and macroeconomic foundations of national competitiveness.
The World Economic Forum (2012) describes "competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the level of prosperity that can be reached by an economy. The productivity level also determines the rates of return obtained by investments in an economy, which in turn are the fundamental drivers of its growth rates".

Nevertheless, research in the field of corporate governance is still dominated by extensive studies focused on the US and other advanced markets like the UK. A few studies have recently been conducted in emerging markets. These include Black et al. (2010) and Black et al. (2012) in Brazil; Klapper and Love (2004) in 14 emerging markets; Balasubramanian et al. (2010) in India; Black (2001) and Black et al. (2006b) in Russia. To the best of my knowledge, studies on corporate governance issues in African FMs, and the EA countries, in particular, are very scant despite the impressive performance that these markets have recorded over the past decades. The major aim of this essay, therefore, is to examine the influence of corporate governance mechanisms of firms listed in the EA markets on firm performance.

4.1.2 The East African Community

The EA countries are members of the *East African Community* (EAC) which is composed of five member countries of Burundi, Kenya, Rwanda, Tanzania and Uganda. The EAC established a body for cooperation among securities exchanges in EA known as the *East African Securities Exchanges Association* (EASEA). The main aim of EASEA, is to integrate and develop capital markets in EA (ASEA, 2015a). Currently, the members of the EASEA include Kenya, Tanzania, Uganda and Rwanda. Following its establishment, the EASEA working group decision on mass cross-listings of stock was announced in 2005. Moreover, in 2006 the pioneering three member states (Kenya, Tanzania and Uganda) announced discussions to merge their stock markets into one regional stock exchange and set up a single depository system corporation. According to EASEA (2015) another development for boosting the regional integration of capital markets is the establishment of a technical working group (TWG), which has a member from each state. This is tasked with reviewing the best infrastructure and legal framework to facilitate seamless cross-border movement of capital. As part of the capital markets infrastructure (CMI) project, the EASEA joint communiqué pointed out that a regional inter-depository transfer mechanism had been instituted to facilitate movement of cross-listed securities and cross-border trading.

4.1.3 Motivation for the Study

Since the debate about corporate governance is increasingly extending beyond a company's own shareholders, and the fact that EA countries envisage to attract investors from around the globe, there is a need for further research to be carried out in this region on various aspects of corporate governance. The objective is to help shareholders, and the wider range of other interested stakeholders to objectively assess and compare the effects of corporate governance practices on firm performance from one geographical setting to another. This is even more important because

dissimilarities in the socio-cultural, economic trends, and structural characteristics, between the developed and underdeveloped markets, dictate different corporate governance arrangements.

In the context of EA markets; the researcher is aware of a limited number of individual-country studies. One of the studies was conducted by Melyoki (2005). The author qualitatively assessed the determinants of effective corporate governance in Tanzania using four of the listed companies as cases. Consistent with prior findings from emerging markets and around the world (e.g. La Porta et al., 1999, Rabelo and Vasconcelos, 2002), Melyoki (2005) observed that there was dominant control by the large shareholders. He also reported that the boards of directors of the companies considered, appointed senior civil servants or politicians to represent the majority shareholders as board members. This could present a conflict of interest when it comes to discharging the role of the board in safeguarding the interests of small shareholders, against expropriation by large shareholders.

In a recent study, Waweru (2014a) examined the factors that influence the quality of corporate governance in South Africa (SA) and Kenya. While acknowledging that there are some differences in the quality of corporate governance between SA and Kenya, the author found that audit quality and firm performance were the main influencing factors in both countries. Similarly, there are two recent studies conducted by Wanyama et al. (2009) and Wanyama et al. (2013) on corporate governance in Uganda. In the former study, the authors found that efforts to improve corporate governance practices in Uganda were hampered by pervasive corruption and weaknesses in underlying frameworks. They highlighted the laxity problem that developing countries are known to have on implementing or enforcing regulations (see, also; Rossouw, 2005). That is, their findings indicated that in spite of having detailed codes, corporate governance practices in Uganda have not improved.

In the later study, Wanyama et al. (2013) used interviews and questionnaires to examine the link between theory and practice of corporate governance in Uganda. By placing emphasis on accountability within a stakeholder framework, the authors examined the perceptions of key players on how firms are governed. Their findings reveal that there was noticeable difference between what is understood to be best practices of corporate governance and what actually is taking place. They attributed this observation to the endemic corruption and existing weaknesses in the legal framework of Uganda.

The fact that the above-mentioned studies have made a contribution to the literature on corporate governance by focusing on the individual-country basis has motivated us to undertake this study.

The current study differs from earlier ones in the following respects. It provides additional understanding of the practice of corporate governance in the context of frontier-equity markets beyond national-borders – the EAC block has comparatively similar institutional settings. The empirical evidence obtained from a single market, in effect, portrays the local behaviour, and hence cannot be taken to reflect a broader test of the phenomenon for generalization to the entire region.

Ownership structure of the listed companies in this region is another motivating factor. The ownership of both privatized SOEs and non-privatized companies listed on the EA exchanges is concentrated and dominated by few large shareholders. The EA governments privatized several SOEs through *"strategic-investors"* and public issue of shares. Examples of strategic investors include: in Kenya, KLM (Koninklijke Luchtvaart Maatschappij) who hold more than 26% of Kenya Airways, since 2000; Swissport International Limited in Tanzania, own around 51% of the shares of Swissport Tanzania since 2000 when the company was privatized. In Uganda, British American Tobacco Investments Limited holds 70% of the shares of British American Tobacco Uganda. Unlike other forms of concentrated ownership, a strategic-investor has both control and cash flow interests in the investee company. Usually, a strategic-investor in this context is a large multinational company that decided to invest in another company by acquiring a significant number of shares with long-term strategic views rather than simple profit. In addition to the supply of funding, the strategic-investor takes on other important roles to increase the value of the firm. Such roles include the provision of quality management, workforce capacity development in terms of education and skills, technology, vision, customer service, to mention a few. In general, this kind of ownership dominance makes the implementation of best corporate governance practices questionable. It may give rise to problems like; expropriation of minority shareholders, improper functioning of the boards, difficulty in implementing the roles of audit committees and inadequate disclosure. Furthermore, when firms are controlled by larger shareholders, only a few of the issued shares are freely traded.

Another motivating factor is the fact that FMs have in the recent past been regarded as promising investment destinations. The same financial developments that attracted institutional investors in emerging markets in the 1980s are now taking place in African FMs, and hence making them potential second generation emerging markets (Nellor, 2008). Among other things, the economic reforms of the 1990s aimed at improving the effectiveness of corporate governance practices, firm performance and to attract capital flows from within the region and abroad. To the best knowledge of the researcher, there is no single study that has investigated whether these reform objectives

have been met. This research, therefore, employs a long span dataset of listed companies from three EA countries[16] to address the following question:

- Does corporate governance mechanisms of firms listed in the EA frontier markets affect firm performance?

Briefly, the results based on various estimations of internal corporate governance mechanisms against firm performance provide different results based on the dependent variable used. The study finds that the size of the board has positive effects on performance as measured by the Tobin's Q. Likewise; the result indicates that the proportion of ownership by the largest shareholder has negative effects on the market values of the listed stocks.

The results based on return of assets (ROA) show that board size negatively affects the operating performance of listed companies. The findings further indicate that the presence of foreigners and civil servants (or politicians) on the board of directors has a significant and positive association with firm performance. Academic qualification, on the other hand, has little or no impact on ROA. The study also finds that there is little or no association between ROA and ownership by institutional investors and the largest shareholder. Moreover, foreign ownership has no significant relationship with ROA.

The remainder of the chapter is structured as follows. Sections 4.2 and 4.3 present a review of the main governance models and theories respectively. Section 4.4 sets out a brief overview of the corporate governance legislations of the three EA countries included in the study. Section 4.5 presents the empirical literature review on how corporate governance characteristics relate to firm performance. Section 4.6 focuses on the determinants of corporate performance and development of the research hypotheses. Section 4.7 describes the data sources and the methodology. Section 4.8 reports the empirical results and discussion of the findings. And finally, section 4.9 contains the summary and conclusions.

4.2 Models of Corporate Governance

Traditions, cultural backgrounds, and national differences influence the way corporations are governed. As such, there are many different models of corporate governance around the world, each differently addressing the mitigation of the agency problem. The early literatures on corporate

[16] The EA countries include; Kenya, Tanzania and Uganda. As stated earlier, the motive for selecting these countries for this research is that they are in the process of establishing a regional stock exchange with operations in each of the partner states.

governance, describes two contrasting main models of corporate governance, that is, the "market-based" and the "relationship-based" approaches (La Porta et al., 1999, Aguilera and Jackson, 2003, Tricker, 2009). According to Rajan and Zingales (1998), the approaches differ significantly in a number of ways. First, while in the former investors are protected by explicit contracts, in the latter the return to the investor is ensured by granting some form of power over the financed firm. Second, the two are differentiated in terms of the degree of reliance on legal enforcement. The authors also show that the laws are poorly drafted, and there is ineffective enforcement of contracts in the relationship-based environment. On the other hand, the level of enforcement contracts in the market-based systems is higher. The ensuing sections provide a further discussion of the models.

4.2.1 The Market-Based Model

The US and UK corporate governance systems share similar foundations following the market-based (Anglo-American or Anglo-Saxon) unitary (or a single-tiered) board model. The model puts emphasis on shareholders' interests. That is, with the objective of shareholder wealth maximization in mind, the firm should ensure that the returns to shareholders in terms of capital gains and dividends are maximized. Alternatively, the firm should minimize the risk to the owners, for a given level of return. In this model, non-executive directors dominate the board and also hold key posts for example on the compensation, and audit committees. The systems also permit some executives, as ex-officio members of the board. It is also characterised by dispersed ownership, active markets for control, flexible labour markets, and financing through equity. The main distinguishing feature is that the company laws of these countries are based on common laws.

It is interesting to note that the two influential nations, responded differently to the recent high-profile scandals on corporate governance. As a result, the US and the UK are now pursuing fundamentally different philosophies. The governance systems of the US for instance are built on a prescriptive rules-based legal approach. The rules are mandatory, underpinned by law, and punishable in cases of transgression. All companies are required to comply fully at all times. The state laws govern companies, while stock exchange requirements are governed by the federal legislations through the Securities and Exchange Commission (SEC). Moreover, the influence of shareholders on board membership is limited. More important is that, the same person can serve the dual role, that is, the board chair and the chief executive officer (CEO).

On the other hand, the UK (and Commonwealth) model follows a principle based, self-regulatory approach. The approach advocates for voluntary compliance to codes of corporate governance

principles or best practices by boards in discharging their responsibilities. In cases of non-compliance with the codes, companies are required to provide explanations of the circumstances that led to the same (commonly known as "comply or explain" approach). In this model, a dual role is not the norm; the codes require splitting the CEO and Board Chair roles between two different individuals. Commonwealth countries whose company law is influenced by UK law, have adopted a similar model as seen in Australia, Canada, South Africa, Hong Kong, to mention a few.

4.2.2 The Relationship-Based Model

This model is also labelled as the continental Europe, stakeholder-centred, civil law, block holder, etc. The philosophy behind this model is that the objective of the firm is to maximize firm wealth. It recognizes the interests of a broad range of stakeholders, including workers, suppliers, customers, and the community at large, beyond the principals and the agents. The model is derived from rule-based company law. Other features include smaller and less-liquid financial markets, weak market for corporate control, financing through long-term debt, concentrated ownership, and inflexible labour markets (Aguilera and Jackson, 2003, Tricker, 2009). The model requires two-tiers comprising of Management and Supervisory Boards. The Management Board is comprised of company executives and is responsible for running the day-to-day operations of the company. The Chairman coordinates the work of the Management Board.

The Supervisory Board on the other hand, is comprised entirely of non-executive directors. They represent both the shareholders and employees. Their duties are to advise and supervise the management board, and to determine and review compensation for individual members. This board is also required to directly participate in the strategic decisions of the enterprise.

In Germany, for example, the social relationship between the workers and the company, and informal partnership between labour and capital is a statutory regulation. In firms with more than 500 to 2000 employees, the supervisory boards are composed of employee representatives up to one third to one half respectively (The Code, 2012). Both shareholders and employees' representatives are obliged to protect the interests of the enterprise. Examples of other countries that have adopted a similar model include Holland, France, and Italy.

4.3 Theories of Corporate Governance

Several theories are proposed by researchers to explain the complexity of the agency relationship and hence corporate governance. Some of these theories, relevant to this study are discussed hereunder.

4.3.1 The Agency Theory

The discussion for the need for effective and efficient corporate governance are centred on the assumption that the ownership of a modern firm is widely dispersed leading to the separation of ownership and control (Jensen and Meckling, 1976). The agency theory describes this aspect as the agency relationship. That is, a contract whereby owners (the principals) engage the management (as agents) to manage the affairs of their enterprise (wealth). Accordingly, it is argued that this relationship involves risks and conflicts of interest particularly when managers take actions that are believed to maximize their own utility at the expense of the owners and other stakeholders (Jensen and Meckling, 1976). It is important to note that within corporate governance frameworks, agency-problems vary depending on the nature of the ownership structure (Claessens et al., 2000, Claessens, 2006). The principal-agent problem manifests more with dispersed ownership structure, but when ownership is concentrated, the nature of the problem shifts away. The reason is that when there are few owners, it is possible that some of them will form part of the management (owner-managers) and hence more able to exercise close monitoring. Although, Jensen and Meckling (1976) argue that minority shareholders may be required to spend more resources to monitor the owner-managers' behaviour as they are likely to provide appropriate perquisites out of the firm's resources. In addition, information asymmetry is reduced, as the owners can put in place the mechanisms to acquire the necessary information about their enterprise. With dispersed ownership, the shareholders rely on the board of directors to exert effective monitoring and control over the firm in order to ameliorate the agency costs and resolve the conflicts of interest. Effective corporate governance mechanisms, therefore, are expected to reduce agency problems.

4.3.2 The Stewardship Theory

The stewardship theory contrasts the notion that agents behave in a manner that fulfils their self-interests as suggested by the agency theory. The theory assumes that owners and managers have similar interests (Daily et al., 2003). It reflects the legal foundation of the joint stock and limited liability corporation (Tricker, 2009). Under this setting, the principals nominate and elect agents to act as stewards for their interests. Agents, on the other hand, accept this fiduciary duty. They are expected to act responsibly and with a high degree of integrity. Although trust is inherent in this theory, the independent auditor's report provides owners with assurance concerning the truth and fairness of the results of the stewardship. While serving the interests of the owners as their first responsibility, Muth and Donaldson (2002) and Okpara (2011) argue that agents also serve their own interests, which go beyond monetary considerations. This is because agents recognize

that in order to be effective stewards of the company; they also need to protect their careers and reputations as strategic decision-makers. For example they may work to ensure that financial performance indicators, such as profit growth, are good, since these indicators would impact on perceptions about their individual performance.

4.3.3 The Resource Dependence Theory

The resource dependence theory views the function of the board of directors chiefly being to provide strategic linkages with various external resources. The theory regards board members as supporters – chosen for their influence or resources they may bring to the firm (Pfeffer, 1972). Their role is to perform boundary spanning (see; Daily et al., 2003). This includes processing of information and external representation (Aldrich and Herker, 1977). As boundary personnel, members have access to huge amounts of information relevant to the undertakings of the organization. They are also required to possess the expertise needed to select, summarize, transmit, and interpret this information. This expertise places the members in a better position to link the company and its strategic environment. Boundary roles also involve representation of the company to the environment. Through their social networks, interaction, and linkages with the external environment, directors have the role of facilitating access to crucial resources that the firm needs to enhance its operations and performance. For example, outside directors who are lawyers may provide legal advice and counselling to the management of the firm. Also, board members can help the firm maintain or improve main stakeholder relations, and the political legitimacy and public image of the company; provide technological know-how; or participate in strategic decision-making to overcome certain environmental constraints (Hillman and Dalziel, 2003, Minichilli et al., 2009).

4.3.4 Managerial and Class Hegemony Theory

Managerial and class hegemony theory assumes there is a conflict of interest between owners and managers, but managers control the main levers of power. Managers have enormous discretion on how to use owners' money, and in some companies, they place themselves as an elite group and behave in that way (see;Shleifer and Vishny, 1997, Tricker, 2009). Given their information advantage, knowledge of the business, and decision-making power, management can sometimes adversely influence the nomination and appointment of new directors. When this occurs, the management dominates the board's decisions. Consequently, the boards fail to exercise their strategy formulation, monitoring, and controlling functions effectively. Even sometimes the board may end-up unquestioningly supporting and ratifying the decisions of the management.

4.3.5 The Stakeholders Theory

The Stakeholders theory views corporate governance perspectives from a societal level. It recognizes that there is a wide range of stakeholders[17] who have different legitimate interests in the organization (Freeman, 1984). In addition to maximization of shareholders' wealth, exponents of this theory argue that organizations owe a duty to all those affected by their actions despite the diversity of their stakeholders (Sternberg, 1997, Jensen, 2001). The main function of the board is therefore, political, where the focus is on representing and balancing the competing stakeholders' interests (Johnson et al., 1996, Dalton et al., 1998); making policies and controlling the management. Accordingly, corporate success depends on its ability to add value to all stakeholders, including the natural environment.

4.3.6 A Summary Comparison of the Theories

An extensive body of corporate governance research, at least in the past few decades, has overwhelmingly focused on the manager–shareholder relationship. As such, the emphasis has always been on the efficacy of the various governance mechanisms available to ensure that companies can maximize shareholder's wealth while controlling managers' self-interests. The agency theory has dominantly been applied in corporate governance studies to explain how corporations can exist given the assumption of separation of powers (Daily et al., 2003). Prescriptive uses of the agency perspective have seen companies incurring agency costs. The costs include: sharing of wealth between the owners and the agents as a means of aligning their interests; and the need for stronger boards with emphasis on independent outside directors to act as controllers of the managers. However, these controlling costs have not helped to solve the agency problem.

This has led some scholars to question the premise implicit in the normative use of the principal-agent framework; that is, whether it is possible for companies to maximize shareholder wealth and at the same time satisfy a wide range of other stakeholders (Donaldson and Davis, 1991, Shleifer and Vishny, 1997). Academics and practitioners alike argue that corporate governance mechanism models in the modern business world need to depict not only economic outcomes, but also managerial motivations, ethical dimensions of decision-making, and different parties to the relationship. In other words, corporate governance mechanisms and structures need to be looked from different theoretical perspectives acting as complements to agency theory to enhance

[17] According to Freeman (1984), a stakeholder in an organisation is any group or individual who can affect or is affected by the achievement of the organization's objectives.

organizational functioning. For example, while the agency theory views the role of the board of directors from the control/monitoring lens; the resource dependency theory perspective perceives board members as boundary spanners of the organization and its environment.

4.4 Corporate Governance Laws and Codes in the EA Frontier Markets

The EA markets have opened up to the international investment community. Consequently, improvement of the corporate governance practices to be compatible with those in developed economies has been directly or indirectly high in the agenda. However, it is well known that there are many hindrances in Africa that frustrate the efforts to improve governance mechanisms. By western economies' standards, the financial markets are considered as being underdeveloped. Rossouw (2005) points out that the legal and regulatory systems in many African countries are not properly functioning. For example, there is weak protection of shareholder and creditor rights, and lack of enforcement of legal rights by the judicial systems in the EA markets (Claessens and Yurtoglu, 2013, Wanyama et al., 2009). Moreover, these countries lack overall disclosure, transparency and market discipline related to better governance practices to the extent of deterring more private companies to list in the stock exchanges. Furthermore, the governments are perceived to be highly bureaucratic and corrupt (Kaufmann et al., 2011).

The three EA countries are former colonies of the United Kingdom and are members of the Commonwealth. This means that their legal and judicial systems are based on British common law. Kenya's capital market development is more advanced compared with her counterparts. In order to facilitate the regional integration agenda therefore, the legal and regulatory frameworks in Tanzania and Uganda, do not deviate too much from that of Kenyan securities law (Dmitry et al., 2008). Moreover, like other African countries, the EAC member states governance approaches heavily relies on the OECD principles, the South African King's report, and the Commonwealth Association for corporate governance pronouncements (Rossouw, 2005, Wanyama et al., 2009, Waweru, 2014a). The subsequent subsections discuss the institutional setting of each of the three countries in relation to corporate governance.

4.4.1 Corporate governance in Kenya

The revised Companies Act, 2009 is the main source of law on corporate governance in Kenya. The Act stipulates the basic structure and primary rules of running companies. It also contains provisions that establish the positions of directors, duties, and matters-related to shareholders' protection. Apart from the companies Act, Waweru (2014a) and Barako et al. (2006) point out that Kenya produced and published her first national code, the Private Sector Corporate

Governance Trust (PSCGT) in 2000. These guidelines were to be adopted voluntarily, by implementing the "comply or explain" enforcement concept. The key recommendations of the PSCGT among others, included; companies to establish audit committees composed of non-executive directors, improvement of the quality of financial reporting, and extending the scope and duties of external auditors.

According to Barako et al. (2006), the PSCGT contributed substantially to the development of the guidelines on good corporate governance practices by public companies that were issued by the Capital Market Authority (CMA) in 2002. Implementation of these guidelines was mandatory for all listed companies in Kenya. The guidelines mainly deal with issues related to the board and the role of good corporate governance on performance, and shareholders value maximization and rights (Barako et al., 2006, Gakeri, 2013, Waweru, 2014a). In addition, statutes dealing with professional bodies like lawyers, accountants, and public secretaries also have an impact on standards of good corporate governance (Musikali, 2008). The Nairobi Stock Exchange provides and maintains the listing requirements for all listed companies.

4.4.2 Corporate governance in Tanzania

There are two main legislations that deal with corporate governance issues in Tanzania- the Capital Market and Securities Act, 1994, and the Companies Act, 2002. The Capital Market and Securities (CMS) Act, 1994 (as amended by Act No. 4 of 1997), read together with its regulations and rules; provides the foundations for corporate governance practices. The CMS Act, 1994 among other things, regulates access to business, conduct of business, and disclosure by both investee companies and market operators. The regulations are designed to ensure transparency, stability, and integrity as well as investor protection. The Companies Act, 2002 contains several provisions on the statutory duties and responsibilities of directors. The provisions are in line with the duties prescribed under common law.

The corporate governance system of Tanzania can be seen as a hybrid version of the market-based approach. In addition to the statutory rules of corporate behaviour contained in the company law, Tanzania developed her own national code on corporate governance in 2002 (Kibola, 2002, The Committee, 2001, Kaduma, 2002). The recommended "Guidelines on corporate governance practices by public listed companies in Tanzania" among other things, emphasize the need for boards to ensure that their entities comply with all good governance practices, relevant laws and regulations, and auditing and financial reporting standards (Kibola, 2002). The Bank of Tanzania (BOT) issued guidelines for boards of directors of banks and financial institutions in 2008. The

guidelines stipulate the duties and responsibilities, composition and conduct, and the committees of the board.

4.4.3 Corporate governance in Uganda

Unethical business behaviour, extensive corruption and several incidences of corporate scandals (e.g. the collapse of the Greenland Bank) made the need for effective monitoring of business organizations and promoting best practices a must in Uganda (Wanyama et al., 2009, Musaali, 2010). Like other EA markets, after embracing the Economic Recovery Programmes (ERP) during the 1980s Uganda aggressively adopted policies aimed at reducing the direct role of government in the economy and encouraging the participation of the private sector in transforming into a new economy (Otweyo, 2001).

The corporate governance reforms have gone through a number of steps. In 1993, the Government of Uganda enacted the Public Enterprises Reform and Divestiture (PERD) Statute to operationalise the government's PERD Statute (1991) and its Action plan. PERD targeted to privatize more than 100 SOEs (Wanyama et al., 2013). In 1996, the Capital Markets Authority (CMA) of Uganda was established following the enactment of the Capital Markets Authority Act, 2000 (revised). In exercising its powers, the CMA issued the Capital Markets Corporate Governance Guidelines, 2003. In section 2 of Part I of the guidelines, it is stipulated that the CMA developed the guidelines as a minimum standard for good corporate governance practices by public companies and issuers of corporate debt in Uganda. Among other relevant issues, the guidelines cover best practices related to board composition, separation of roles and responsibilities of the chairperson and the Chief Executive, rights of shareholders and the roles of audit committees. These guidelines, however, are not mandatory.

Moreover, the Institute of Corporate Governance of Uganda (ICGU) was incorporated in 1998, and its membership is open to both corporate entities and individuals. In 2001, the ICGU published the Recommended Guidelines for Corporate Governance. These guidelines are not mandatory either, but contain the basic framework for corporate governance such as best practices related to boards of directors, shareholders, regulatory bodies, investors and other stakeholders (Musaali, 2010). However, the ICGU recommends them to be used by all corporate entities in Uganda regardless of their form of ownership or size. This is because both public and private sectors are equally affected by corruption, bad leadership, public mistrust and lack of transparency and integrity, to mention a few (Wanyama et al., 2013).

In addition, the Uganda Securities Exchange listing requirements direct issuers to comply not only with the listing rules of the exchange but also with the laws (e.g. the Companies Act) and requirements of various regulatory and supervisory authorities (e.g. the CMA). The Central Bank, on the other hand, through the Financial Institutions Act (FIA), 2004, has made corporate governance compulsory for all financial institutions. The FIA sets the minimum number of board members, and requires all directors to be fit and proper persons. The Act provides for disclosure requirements, establishment of audit committees and duties of the internal and external auditor to the Central Bank, among others.

4.5 Corporate Governance and Firm Performance

Literature from around the world provides mixed evidence regarding the relationship between corporate governance practices and firm performance (Doidge et al., 2007, Love, 2011). This is the case even in US studies where the governance systems are built on a prescriptive rule based legal approach, with high quality of enforcement of the laws. One possible reason is that governance practices vary significantly not only across countries but also across firms. Another explanation could be that, even if it is companies from the same country, differences are likely to arise because of the flexibility allowed in their governance structures. That is, firms may comply with the governance provisions imposed by the regulatory authorities, by either adopting them voluntarily or decline by explaining the alternative practice they have implemented to achieve the same principle.

Compliance to corporate governance provisions seems to be more important in jurisdictions where the legal environment is weak. As these firms need access to capital markets on favourable terms, the adoption of better governance mechanisms, particularly for firms with growth opportunities, is a means of assuring suppliers of finance that they will get back their money plus a return (see; La Porta et al., 1997).

While evidence of the relationship between governance and performance proliferates, the reported overall effect of the relationships is still mixed. Some empirical evidence indicates that the associations between governance and market-based measures of performance tend to be stronger and stable compared to the accounting-based measures. In their study, Gompers et al. (2003) show that there is a strong positive relationship between corporate governance and stock returns. They find that firms with strong shareholder rights outperform those with weak shareholder rights in terms of risk-adjusted returns by 8.5%, although they do not find any causal direction. However,

they do not find significant evidence from their sample indicating that firms with weak shareholder rights underperform in terms of operating performance.

In their analysis of 14 emerging markets, Klapper and Love (2004) present evidence indicating that well governed firms perform better, both in terms of operating performance and market valuation. They point out that a little improvement in a firm's governance framework relative to others, causes a big change on investors' perception of how their funds are going to be used in a more productive way. It is therefore possible that, these firms managed to access external financing at lower cost of capital, hence decreased operating expenses.

Black et al. (2006a) used data from Korean companies, an emerging market, to establish whether the association between overall corporate governance and a firm's market value or performance is likely to be causal. Their findings show that it is good corporate governance that causes higher market value. Unlike in developed countries, they further report that, Korean firms with boards that are composed of 50% outside directors have higher predicted market values. Nevertheless, their findings do not give strong evidence to suggest that better-firm level governance causes more profit or higher dividend pay-out.

Black et al. (2006b) on the other hand, argues that most prior studies on governance-performance relationship, relied on cross-sectional data in their analysis. The problem with this approach they argue, is that it is prone to omitted-variable bias and endogeneity problems, hence making the results unreliable. Using OLS and fixed effects regressions, they find that better-governed Russian firms are more likely to have higher market values. And the relationship is economically important and statistically strong.

Selvaggi and Upton (2008), studied the governance quality of companies in the FTSE all shares index for over a four-year period. Their findings indicate that there is a strong relationship between good governance and company performance indicators. For example, they point out that well-governed companies deliver higher risk adjusted returns, have lower share price volatility, and that the overall balance of the board plays an important role in influencing company performance. The study showed that the impact of governance on performance was long-term. Regarding the direction, they discovered that corporate governance practices influences company performance, but not otherwise. Likewise, Bhagat and Bolton (2008), also studied the impact of corporate governance measures on firm performance. They found that there is a positive correlation between better governance, as measured by Gompers et al. (2003) and Bebchuk et al. (2009), and better contemporaneous and subsequent operating performance. Using the same measures however,

Bhagat and Bolton (2008) did not find any association between better governance and future stock performance. This observation is consistent with the market efficient hypothesis. That is, stock prices reflect all publicly available information including differences in governance. Accordingly, there should be no governance impacts on subsequent stock returns.

Core et al. (2006) conducted a study to investigate the findings by Gompers et al. (2003) that firms with weak shareholders rights had persistent low stock returns performance for the period from 1990 to 1999. They argued that if there is any causal relation between governance and returns, then one should expect the market to be negatively surprised by underperformance in terms of operating performance by weak shareholders-rights firms. Consistent with Gompers et al. (2003) they found that poorly-governed firms exhibited significantly low operating performance. However, with regard to stock performance, their results rejected the hypothesis that weak governance causes poor performance. Likewise, Johnson et al. (2009) examined whether industry clustering by strongly-governed and weakly-governed firms would yield differences in long-term abnormal returns. In support of Core et al. (2006), the results sorted on governance show there is no statistically significant difference.

4.6 Determinants of Corporate Performance and Hypothesis Development

Principals institute a variety of internal and external corporate governance mechanisms to address the agency problem. The problem manifests more when the company's performance is poor because the divergence between the interests of the agents and principals is amplified under this situation (Ward et al., 2009). This subsection examines the effects that two key internal governance mechanisms - the corporate boards and ownership structures - have on performance (Denis and McConnell, 2003).

4.6.1 Board Structure

It is widely accepted that both the board structure and the quality of corporate governance have a positive impact on firm performance. The literature identifies two main responsibilities of the board of directors in corporate governance related to performance. The first one relates to the principal-agent relationship, to mitigate the agency costs and expropriation by managers (Fama and Jensen, 1983). The board is responsible for protecting the interests of the shareholders of the company (Klein, 1998, Hillman and Dalziel, 2003, Zhang, 2012). In discharging these duties, the board has powers to hire, fire, monitor and control, and compensate management. In addition the board has the duty to ensure that the firm complies with applicable laws and regulations (Denis and McConnell, 2003).

The second major responsibility is consistent with the resource dependency theory; the provision of advice and key resources to the management of company. The directors are expected to link the firm to the external environment, and bring their knowledge, wider business perspective, and intellect into the firm (Daily et al., 2003, Hillman and Dalziel, 2003). The firm can benefit through independent judgement concerning issues related to strategy, resources, performance, and standards of conduct (Sir Cadbury, 1992). In the ensuing subsections we discuss some elements of board structure that are reported to impact on firm performance in FMs.

4.6.1.1 Board Size

The size of the board is one of the important determinants of its effectiveness. It is, however, not clear what size of the board is optimal. Arguments in favour of small board sizes indicate that it is quite difficult to organize and coordinate large groups of people. Also, when the size of the board is large, it increases costs to the firm, and lengthens the time to resolve issues due to squabbles (Ujunwa, 2012). This school of thought suggests a negative relation between board size and performance. Other scholars assert that the size of the board depends on whether it is chosen for monitoring or advisory purposes (Yermack, 1996, Lipton and Lorsch, 1992, Hermalin and Weisbach, 2003). Putting it differently, if the firm need the board for monitoring roles, then smaller boards are more effective. On the other hand, larger boards are said to be useful when the firm seeks quality of advice (Dalton et al., 1999, Coles et al., 2008).

However, it is debated that the breadth of services offered by small boards is limited. This manifests, for example, when small boards fail to effectively monitor managers because they have fewer members to allocate to different committees (Lipton and Lorsch, 1992, Yermack, 1996, Klein, 1998, Klein, 2002). One can therefore suggest that big firms, with complex operational structures and depending on external sources of financing, should require large boards for more effective discharge of both the monitoring responsibility and provision of advisory role (Dalton et al., 1999, Anderson et al., 2004). Similarly, Dalton et al. (1998) in their meta-analysis provide confirmation for the moderation effect of firm size and performance indices on the relationship between board composition and financial performance. Other empirical studies, however, find an inverted U-relationship between board size and performance (Coles et al., 2008, Andres and Vallelado, 2008). Nevertheless, most of the listed firms in the EA exchanges do not have complex operational structures, but still have higher chances of growing and expanding even across boundaries. It is thus hypothesized that:

Hypothesis 1: Board size positively affects firm performance

4.6.1.2 Board Diversity

Despite receiving considerable attention, empirical evidence concerning the benefits of board diversity provides mixed results. For instance, Watson et al. (1993) contends that heterogeneous boards have a long-term impact on the objectives of the firm; Pelted et al. (1999) on the other hand report that diversity has detrimental effects on firm performance. Majority however, concur with the view that diversity plays an important role in shaping the functioning of the board. It creates different culture, new mind set, equality and fairness, enhances competence profiles, and provides new perspectives in the boardroom.

Other studies examine the diversity of directors in terms of international versus local profiles. According to Egon Zehender International (2010), international board diversity represented through international experience is increasing in the developed economies. It is expected that companies benefit from this board combination, as there are many associated opportunities. In the case of FMs, these include attracting capital from foreign investors, market expansion to foreign countries, and exposure to skills and expertise that is not available locally (Oxelheim and Randøy, 2003). As Fairchild et al. (2014) contend, presence of foreign members on the board serves as a means of breaking information asymmetries and monitoring gaps that exist between domestic and foreign investors. Gulamhussen and Guerreiro (2009) have observed that foreign board membership led to reduction in operating and total costs. They attributed this achievement to the enhanced monitoring role and the influence of the foreigners on the adoption of efficient strategic and operational practices. Therefore:

Hypothesis 2(a): Foreigners on the board of directors positively affect firm performance

The attractiveness of an individual to be appointed as an outside member on a board of directors is determined by the depth and breadth of their human and social capital, which is critical to discharging the board's resource provision function (Hillman and Dalziel, 2003, Daily et al., 2003, Hillman, 2005). It is common to find listed companies on the EA stock markets having appointed currently-serving or retired senior civil servants and/or politician as outside directors in their boards. From the resource dependence perspective, placing government officials on the board aims to capitalize on valuable non-business perspectives that they bring to an organization. These include their networks and linkages to other government officials and decision-makers, legitimacy to the firm, expertise, counsel and advice about the public policy environment (Pfeffer, 1973, Pfeffer, 1972). They can also be used to influence the shaping of policies, laws and regulations, and even enforcement of the same (Berglof and Claessens, 2004).

The institutional theory on the other hand, suggests that appointment of this kind of outside directors could be seen as a bandwagon effect. This is because, majority of these officials have built their internal career in traditional government bureaucratic systems and lack business acumen, may not necessarily be effective in monitoring and controlling management thus failure to improve firm performance (Peng, 2004, Muth and Donaldson, 2002). In partially SOEs, directors may be appointed by the state not on merit but purely on political grounds (Rossouw, 2005, Wanyama et al., 2009). Some research however, strongly suggests that firms with government officials on their boards perform better than those without (e.g. Hillman, 2005). This is consistent with Pfeffer (1972) who contends that creation of linkages with main sources of external dependence helps to reduce risks and uncertainty, which in turn impacts firms' operations. Since the government is the key source of uncertainty for firms in terms of policy and regulations, companies that choose to appoint politicians on boards, can avoid some transaction costs such as those of securing information about political decisions, ultimately improving performance (Hillman, 2005, Lester et al., 2008). Therefore:

Hypothesis 2(b): Civil servants (or politicians) on the board of directors positively affect firm performance

As stated earlier, the attractiveness of an individual as a director candidate is determined by a set of unique attributes and resources that he or she can bring into the organization (Hillman and Dalziel, 2003, Lester et al., 2008). It is suggested that boardrooms composed of directors with different education attainment qualifications can benefit from the diversity of individuals' knowledge, expertise, skills and cognition abilities (Anderson et al., 2011). Directors with higher levels of education are assumed to be more adaptive and innovative. Possession of these qualities may in turn create value to the firm. Research on this phenomenon is not yet confirmed. Rose (2007) finds educational qualification of no impact on firm performance. She further argues that since the work carried out in the boards is not discipline specific, having a university degree or equivalent skills may be sufficient to understand information received from the management. Similarly, Anderson et al. (2004) do not find significant difference in monitoring among academics and other occupations. On the contrary, Ujunwa (2012), Murphy (2007) and Anderson et al. (2011) all found that educational qualification had a positive impact on firm performance. Therefore:

Hypothesis 2(c): Directors with Msc or PhD on the board of directors positively affect firm performance

4.6.2 Ownership Structure

Ownership structure is another important internal element of corporate governance that affects firm performance. There are two basic corporate ownership structures: concentrated and dispersed. In developed economies and jurisdictions where the legal system subjects large traded public corporations to one-share-one-vote rules (e.g. UK, US), the ownership is highly diffused (La Porta et al., 1999, Demsetz and Lehn, 1985). The conflict of interest arising from this kind of setting involves the shareholders and managers of the corporations. Controlling-shareholders here do not have significant power to control the company (La Porta et al., 1998, Claessens, 2006). Agents who manage the affairs of the company, on the contrary, have significant powers. It is asserted that shareholders in dispersed ownership structures may lack the incentive and ability to closely monitor the agent (Demsetz and Lehn, 1985). This in turn, gives room to the managers to squander company's assets or pursue objectives that benefit their own interests (Morck et al., 1988). In this context, better corporate governance mechanisms are therefore, more likely to provide better investor's protection, and ultimately create higher value for the firm (Bhagat et al., 2008, Gompers et al., 2010).

Ownership of a corporation is concentrated when a large part of its shares is in the hands of a few owners, such as family-owned firms, block-holders, or institutional investors. The nature of the conflict of interest in this context concerns the minority and the controlling-shareholders. This is also known as principal-principal conflicts. This structure is most common in countries where the legal system is weak. The main governance problem in these jurisdictions is the protection of the interests of minority shareholders (La Porta et al., 2000, La Porta et al., 1998, La Porta et al., 1999). This is because controlling-shareholders are likely to expropriate the company's resources for their own benefit. This expropriation may negatively affect corporate performance (Claessens et al., 2000, La Porta et al., 2002, La Porta et al., 2000). Example forms of expropriation include appointing unqualified family members or friends to take top management posts, engaging in relationship-based transactions, empire building, tunnelling, and pyramid control (Claessens et al., 2000, Claessens and Fan, 2002, Young et al., 2008). Notwithstanding, there are benefits associated with concentrated ownership. In most cases, high concentration enables the controlling shareholders to effectively exercise close monitoring, promptly participate in decision making, and discipline the management (Bhagat et al., 2008, Erkens et al., 2012). In addition, problems of information asymmetries are not common, since the block-holders can institute mechanisms of acquiring all the needed information.

In developed economies where a market-based governance system is followed, the situation is different. It is argued that the presence of efficient legal systems and market mechanisms counterbalances the behaviour of controlling shareholders (Claessens et al., 2000, Denis and McConnell, 2003). In the ensuing subsections we highlight the common elements of ownership structure prevailing in the EA FMs and how they impact firm performance.

4.6.2.1 Ownership types

In this sub-section we examine three main ownership types that are most common in EA frontier markets.

4.6.2.1.1 Foreign ownership

One of the outputs of implementing economic reforms in EA countries was the improvement of corporate governance systems and practices. Adherence to the recommended best practices has become a top item on the agenda. The aim is to enable listed companies to be able to attract both domestic and foreign investors. Increased participation of foreigner investors is expected to enhance not only liquidity in the markets but also values of the firms. This is because, when foreign investors participate in FMs, they buy large stakes of the shares in the firms. They are, therefore, more likely to perform arms-length monitoring through their board representatives (Oxelheim and Randøy, 2003, Gulamhussen and Guerreiro, 2009). Moreover, Wanyama et al. (2009) contends that investors from oversees where markets are vigorously governed are experienced and may have power to influence key institutions and the government to take actions to enhance governance practices. Thus:

Hypothesis 3: Foreign ownership is positively associated with firm performance

4.6.2.1.2 Institutional Ownership

Institutional investors normally hold significant proportions of the share capital of companies compared to other investors in countries where ownership is dispersed. Accordingly, the presence of institutional investors may be instrumental in ameliorating the agency problem. Firms with substantial participation by institutional investors are expected to pursue activities that are aligned with creating shareholders' wealth. Such activities include bringing about low financial leverage, which in turn increases the market value of equity (Tong and Ning, 2004). Like block-holders, institutional investors are better positioned to improve monitoring by exercising their powers to remove managers who go against their interests or basing on managerial performance. This is

possible because they are well-informed and have the tools to acquire such kinds of information (Tong and Ning, 2004). They can also improve managerial accountability by increasing their representation as outsiders in the board (Mak and Li, 2001), or indirectly by withdrawing their stake in the firm (Gillan and Starks, 2005).

Empirical findings pertaining to the oversight role of institutional investors are rather mixed. Faccio and Lasfer (2000) analysed the monitoring role of pension funds in UK. They found that the role that institutional investor play in minimizing agency conflicts is weak. Furthermore, they reported no significant relationship between institutional ownership and firm performance. Agrawal and Knoeber (1996) on the other hand, argued that because there exists alternative control mechanisms, it is inappropriate to use one mechanism in empirical estimations. And therefore, the conclusion derived from regressing firm performance on a single mechanism may be misleading. In another study, Al-Najjar (2010) investigated the determinants of investment decisions by institutional investors in Jordan. Consistent with the agency theory and the results reported by Tong and Ning (2004), they found that there is a strong negative relationship institutional shareholding and the leverage of the firm. Moreover, Al-Najjar (2010) reported that business risk and institutional ownership are negatively related. This finding disagrees with the well-documented role of institutional investors that they are monitoring devices. Other authors including McConnell and Servaes (1990), Smith (1996), and Ackert and Athanassakos (2003) on the contrary, reported that the control exercised by institutional owners has a significant positive relationship on firm performance. On the other hand, Cronqvist and Nilsson (2003) found that the presence of institutional owners had no significant relationship on firm value.

However, the institutional environment in the EA frontier markets, as it pertains to corporate governance is largely different from that of the advanced markets. An important difference is the ownership structure of the firms, where the largest shareholder owns up to as high as 77% of the issued share capital (see Table 4.4). This level of ownership reduces the participation of institutional investors, thus warranting a further investigation into the role they play on firm performance. It is hypothesized that:

Hypothesis 4: Ownership by institutional investors is positively associated with firm performance

4.6.2.2 Ownership by the Largest Shareholder

As noted earlier, in FMs some external governance mechanisms (i.e. legal frameworks and financial institutions) are underdeveloped or do not exist (e.g. hostile takeovers). The agency theory

postulates that block ownership may be an important governance mechanism for monitoring the management in such a kind of environment (Shleifer and Vishny, 1997). Block-holders can be active in mitigating the agency conflicts either directly, by monitoring management performance (Mak and Li, 2001), or indirectly by withdrawing their stake in the firm (Gillan and Starks, 2005). Unlike individual investors, large shareholders make significant investments in the companies they invest in (Tong and Ning, 2004). This gives them more incentives to effectively monitor the firm's management performance (Ozkan, 2007). In addition, concentrated owners are more informed than individual investors are because they have the necessary resources to enable them access different information they need (Mak and Li, 2001). Moreover, their incentive to exercise the monitoring role arises from the fact that the benefits of doing so exceed the related costs.

Empirical studies on the relationship between ownership concentration and firm performance offer mixed results. A study conducted by Demsetz and Lehn (1985) found no significant positive relationship. Tam and Tan (2007), found a negative relation between ownership concentration and firm performance. Also, Tong and Ning (2004) revealed that financial leverage, and institutional ownership were negatively related. However, studies like those of Holderness and Sheehan (1988); Shivdasani (1993); Sarkar and Sarkar (2000); and Khanna and Palepu (2000) largely support the notion that ownership concentration increases the firm value.

It should be emphasized that in most listed privatized SOEs, the majority (more than 50%) shares are held by a single large shareholder (strategic investor). A similar situation is observed in privately owned firms that were listed, where the founders hold a larger proportion of the floated shares. The concept of larger shareholder in the EA context, therefore, is different from that of advanced markets where concentrated ownership refers to shareholders with greater than 5% ownership (Shivdasani, 1993). We, therefore, extend the logic of concentrated ownership, to hypothesize that:

Hypothesis 5: Ownership by the largest shareholder is positively associated with firm performance

4.6.3 Measuring Firm Performance

The concept of corporate performance has always been on the financial side and there exist several measures. Accounting-based and market-based measures are, however, the most common measures used to evaluate overall financial aspects of a firm's performance (Gentry and Shen, 2010).

The accounting proxies portray the historical performance of the company to generate profits in terms of the capital employed (Gentry and Shen, 2010, Al-Matari et al., 2014). That is, they indicate

the extent to which the agents have effectively and efficiently utilized the resources entrusted to them. In this study, we use the return on asset (ROA) as a proxy for accounting performance. The main criticism of using the accounting measures to evaluate performance, is that there is little correlation between historical accounting earnings and shareholder value; the shareholder value is what matters in the world dominated by capital markets. Another critique is that the accounting measures can be misleading if they have been manipulated to portray spurious reflection of performance.

The market-based measures, on the other hand, are forward-looking and focus on the shareholder-value maximization objective of the firm. They reflect the present value of future streams of cash flows or the expected long-term performance of the firm. This incorporates accounting profits or income and other external factors to the firm. A key concept in this perspective is "market capitalization" or the "market value of equity". This value is obtained by multiplying the share price by the outstanding number of shares in the market. The most frequently used market-based measures are:

- Market-to-book value (MTB): market value of equity (MVE) over the book value of assets;
- Share price performance (SPP): the percentage change in share price;
- Price-to-earnings (P/E) ratio: current market price over earnings per share;
- Tobin's Q: market value of a company over the replacement value of the assets.

In the current study, we apply the most widely used market-based measure of performance (see, also; La Porta et al., 2000, Doidge et al., 2004, Ammann et al., 2011) - Tobin's Q (see the definition and measurement in Table 4.2). The main reason of employing this valuation measure is that it is an integrated approach. It includes all important elements that are used in most of the other valuation measures – that is, number of shares outstanding and share price - that capture investors' expectations into a single value. Therefore, the ratio is strongly positively correlated with other measures of performance like the MTB and SPP.

The theoretical motivation of using Tobin's Q to measure performance originates from maximization of firm value based on the invested capital. From the agency framework, the management is expected to effectively and efficiently utilize the resources entrusted to them by investors to fulfil this objective. The denominator of the Tobin's Q model represents the invested capital (see Table 4.2). It should be noted that in corporate governance relationships, capital is endogenous as it depends on governance.

Table 4.2: Variable Definitions and Measurement

Variable	Measure	Hypo. Sign	Source
Dependent variables			
Return on assets (roa)	The proportion of profit before interest and tax (EBIT) over total assets employed		Klapper and Love, 2004; Ehikioya, 2009; Jiang and Kim, 2004
Tobin's Q (tq)	Market value of equity (MVE) plus book value of assets (BVA) minus book value of equity (BVE), and then divide the whole thing by BVA		La Porta et al., 2000; Klapper and Love, 2004; Doidge et al., 2004; Ehikioya, 2009; Ammann et al., 2011
Independent Variables			
Board structure variables			
Board size (bsize)	Natural log of the total number of board members	+	Yermack, 1996; Agrawal and Knoeber, 1996; Coles et al., 2008; Ehikioya, 2009; Ujunwa, 2012
Foreigners in the board (bfgn)	Proportion of foreigners to the total number of board members	+	Oxelheim and Randoy, 2003; Black et al., 2006
Senior civil servants or politicians (civ)	Proportion of senior civil servants (or politicians) to total number of board members	+	Muth and Donaldson, 2002; Peng, 2004; Hillman, 2005; Rossouw, 2005; Lester et al., 2008; Wanyama et al., 2009
Academic Qualification (ed)	Proportion of directors with masters' degree and directors with PhD to total number of board members	+	Anderson et al., 2004; Murphy; 2007; Rose, 2007; Ehikioya, 2009; Anderson et al., 2011; Ujunwa, 2012
Ownership structure variables			
Government ownership (gov)	Proportion of shares held by the government	-	Mak and Li, 2001; Sun et al., 2002; Wei and Varela, 2003; Bai et al., 2004; Wei et al., 2005
Largest shareholder (big)	Proportion of shares held by the biggest shareholder	+	Holderness and Sheehan, 1985; Shleifer and Vishny; 1986; Holderness and Sheehan, 1988; McConnell and Servaes, 1990; Khanna and Palepu, 2000; Sarkar and Sarkar, 2000; Dahlquist and Robertsson, 2001; Bai et al., 2004; Minguez-Vera and Martin-Ugedo, 2007; Tam and Tan, 2007; Bae et al., 2012; Oxelheim and Randøy, 2003; Jameson et al., 2014
Foreign ownership (fown)	Proportion of shares held by foreign investors	+	Dahlquist and Robertsson 2002; Dahlquist, 2003; Bai et al., 2004; Peng, 2004; Young et al., 2008; Mangena and Tauringana, 2007
Institutional ownership (inst)	Proportion of shares held by institutional investors	+	Pound, 1988; McConnell and Servaes, 1990; Mak and Li, 2001; Dahlquist and Robertsson 2002; Dahlquist, 2003; Tong and Ning, 2004; Jiang and Kim, 2004; Karamanou and Vafeas, 2005
Other Variables			
Firm size (fsize)	Logarithm of total assets	+	Klapper and Love, 2004; Black et al., 2006; Ehikioya, 2009; Aggarwal et al., 2009
Sales growth (sgr)	We measure sales growth rate as the percentage growth in total sales		Klapper and Love, 2004; Black et al., 2006; Aggarwal et al., 2009
Leverage (lev)	Debt-ratio is calculated as total debt divided by book value of total assets	-	Tong and Ning, 2004; Jiang and Kim, 2004; Mangena and Tauringana, 2007; Aggarwal et al., 2009; Ehikioya, 2009
Profitability (prof)	We use net income over total assets to measure profitability		Black et al., 2012;
Industry sector (dsec)	We include six sector dummy variables to control for the effects of industry-specific factors as categorized by the NSE		Kang and Stulz, 1997; Dahlquist and Robertsson, 2001; Mangena and Tauringana, 2007; Ehikioya, 2009
Year (yr)	We include year dummy variables to control for board and ownership structure trends		Kang and Stulz, 1997; Dahlquist and Robertsson, 2001; Mulherin, 2005; Guest, 2008; Mangena and Tauringana, 2007
Stock exchange (dexch)	We include three stock exchange dummy variables to control for the country specific effects		Kang and Stulz, 1997; Dahlquist and Robertsson, 2001; Mangena and Tauringana, 2007

Source: *Author's own*

The main limitation of using Tobin's Q is that it can be influenced by the quality of corporate governance. Strong governance, for example, can decrease Tobin's Q by mitigating underinvestment (Aggarwal and Samwick, 2006). This is because, with additional monitoring, managers will be obliged to operate at optimal investment scale e.g. by expanding existing facilities or start new projects. This increases the denominator hence reducing the ratio. Strong governance can also result in superior cost discipline hence increasing Tobin's Q. Cronqvist et al. (2009), for example, conclude that entrenched managers pay their workers more, but managerial ownership mitigates that behaviour. Another drawback of using the Tobin's Q ratio is that the denominator requires using the replacement cost of assets. In practice, this value is difficult to obtain. Instead, the ratio is computed using the book value of assets, which is influenced by or prone to accounting manipulations.

4.6.4 Control Variables

Previous studies have shown that firm characteristics influence, in different ways, both the performance of the firm and its governance mechanisms. For example, Wintoki et al. (2012) argue that the scope and complexity of operations, as well as the monitoring costs and a manager's private benefits are among the determinants of a firm's board structure. We therefore, include several control variables that have commonly been used in the literature, in order to minimize the possible misspecification in our analysis (see; Tam and Tan, 2007, Black et al., 2012).

We include *firm size*, for a number of reasons. It may cause governance practices to change, e.g. board structure, due to the increased complexity of the firm's operations (Wintoki et al., 2012). Larger firms may perform better because they possess many resources to enable them capitalize on the economies of scale. They are also more capable of adopting and implementing good governance systems, since they are well equipped.

Similar to prior studies, such as Black et al. (2012) and Fairchild et al. (2014) we control for *leverage,* because firms with a high debt ratio may be financially constrained and should be less able to perform better. Moreover, debt providers may be motivated to provide close monitoring and hence pressurize the companies to adopt governance practices that best suit their interests.

Performance is also related to the firm's *profitability* and *growth* prospects (see; Yermack, 1996, Black et al., 2012). We control for profitability when Tobin's Q is used as the dependent variable because it influences market valuation. Similarly, growth level may have a significant impact on both governance mechanisms and financial performance. For example, small boards may be more appropriate for high-growth companies because they facilitate fast decision-making. Likewise, we

include year, sector and exchange dummies in the analyses to reflect their influence on governance mechanisms and performance. The industrial sectors (as classified by the NSE) used in the sample include: agriculture; automobiles & accessories; commercial & services; construction & allied; energy & petroleum; manufacturing & allied; and telecommunication & technology, see also Table 4.3.

4.7 Data and Methodology

The ensuing sub-sections present a description of the sources of data, and the methodology employed in the analyses.

4.7.1 Data Sources and Collection

This study draws its sample from non-financial companies primarily listed on the three frontier stock markets in the EA countries, namely; the Dar-es-Salaam Stock Exchange of Tanzania, the Nairobi Securities Exchange of Kenya, and the Uganda Securities Exchange of Uganda. Excluding Kenya, the exchanges in the other two countries are a result of the privatization programs that swept across Africa during the 1990s. It is about the same period that the world experienced a number of financial and economic crises, which were arguably related to failures in corporate governance mechanisms. These crises triggered the need to implement corporate governance reforms across the globe.

The floatation and listing of the first equity in the USE took place in early 2000. In order to have a representation of companies from all the three countries in our sample, we chose the duration of the study to cover from 2000 to 2013. With regard to sources, some previous studies, (e.g. Ehikioya, 2009), have documented that availability of data in many African stock markets is a major obstacle for undertaking research. To address this problem, we used the websites of each stock exchange in the region to obtain the list of all quoted companies. From this initial sample, we excluded all firms operating in the banking and financial related sectors. The reason is that accounting treatments of certain line items in financial statements are different from other sectors. Moreover, they have additional requirements and governance structures that are regulated by monetary authorities. The omission of financial firms is consistent with the analyses done in similar previous studies. Our final sample consists of 47 firms drawn from seven industries as classified by the NSE. This number includes both active and failed or companies that have left the market, thus making our data set survivorship bias free. Out these, 33 companies are listed in the NSE, the largest stock market in the region. The stock markets of Tanzania and Uganda are very small,

with nine and four companies in the sample respectively. In total, we had 482 firm-year observations, see Table 4.3.

Table 4.3: Summary of Firm-Year Observations

		Year														Total
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Panel A: Observations by Stock Exchange																
	DSE	4	4	5	6	6	6	7	7	7	7	8	8	9	9	**93**
Exchange	NSE	4	4	7	24	27	27	31	33	34	34	33	33	32	29	**352**
	USE	0	2	2	2	2	3	3	3	3	3	3	3	4	4	**37**
	Total	**8**	**10**	**14**	**32**	**35**	**36**	**41**	**43**	**44**	**44**	**44**	**44**	**45**	**42**	**482**
Panel B: Observations by Industry Categorization																
	Agriculture	0	0	0	5	5	5	5	6	6	6	6	6	5	3	**58**
	Automobiles & Accessories	0	0	0	2	3	3	3	3	3	3	3	3	3	3	**32**
	Commercial and Services	1	1	3	6	6	7	9	9	9	9	9	9	10	10	**98**
Industry	Construction and Allied	2	3	4	6	7	7	8	8	8	8	9	9	9	9	**97**
	Energy and Petroleum	1	1	2	4	4	4	5	5	5	5	5	5	6	6	**58**
	Manufacturing and Allied	4	5	5	9	10	10	11	11	11	11	10	10	10	10	**127**
	Telecommunication and Technology	0	0	0	0	0	0	0	1	2	2	2	2	2	1	**12**
	Total	**8**	**10**	**14**	**32**	**35**	**36**	**41**	**43**	**44**	**44**	**44**	**44**	**45**	**42**	**482**

Source: *Author's Own*

Data for ownership and board characteristics were handpicked from published annual reports of the respective companies. The reports, collated from various websites, including the company's own. Annual reports for all companies listed on the DSE, for example, were downloaded from the exchange's website, http://www.dse.co.tz. The annual reports for companies listed on the NSE for the years 2003 to 2012, were available for downloading on the Kenyan Capital markets Authority (CMA) website, http://www.cma.or.ke and the African Financials website (http://www.africanfinancials.com). The annual reports for the Ugandan listed companies were obtained from the respective companies' websites and the African Financials website. The African Financial website boasts as being the world's largest portal of free African investor documents. It has a large collection of annual reports for listed companies in Africa. Despite using different websites, there were still missing annual reports for some companies. We did not drop off firms with missing information. Instead, we retained whichever part, before or after the gap that had the most consecutive observations.

Data for year-end market prices, foreign exchange rates and accounting related variables, on the other hand, were obtained from the Bloomberg database. In cases where some data were missing, these were manually picked from the published annual reports to fill the gaps. It is important to note, however, that the annual reports are prepared in local currencies, while the information downloaded from Bloomberg was in US dollars. To put them in a common currency, we translated the local currency data into US dollar using the yearly average foreign exchange rates.

4.7.2 The Estimation Methodology

The main objective of this study is to examine the association between corporate governance mechanisms and firm performance. As explained earlier, our dependent variable is firm

performance, and is proxied by ROA, and Tobin's Q. These approximations of performance are common in corporate governance studies. With respect to the explanatory variables; the study employed three components for the measurement of ownership structure: largest shareholder, foreign ownership and institutional ownership. For the case of board structure, we use the following variables: board size, presence of foreigners on the board, presence of senior civil servants on the board, and the level of schooling. Consistent with previous studies (e.g. Ehikioya, 2009, Ujunwa, 2012), we included a group of firm specific variables that are associated with firm performance as control predictors. These are; firm size, sales growth, leverage and profitability. Detailed definitions and measurements of these variables are provided in Table 4.2.

Since most of the corporate governance data were handpicked, it was therefore, important to examine the data for the presence of extreme observations that would unduly influence the empirical results before any analyses was conducted. In additional to the statistical measures, the researcher employed the scatter plot technique to gain a thorough understanding of the basic relationships and to assess the linearity assumption. A box plot method was also applied to detect the existence of outliers. These examinations revealed that the following variables, namely; ROA, Tobin's Q, presence of senior civil servants in the board, the level of schooling, sales growth, leverage and profitability, had observations that are unrepresentative of the studied population. The top and bottom 5% extreme values for these variables were winsorized using STATA software to address the problem of extreme observations (see also; Ammann et al., 2011). Winsorizing is a process that involves modifying the outliers down or up to a specified value, so that they are closer to within the normal distribution curve. This approach of dealing with outliers is appealing because it ensures that the data is valid to portray the features of the population from which it is derived. Besides, retaining the data ensures generalizability of the findings to the entire population (Hair et al., 2006).

Furthermore, the researcher used histograms to visually examine the shape of data distribution for each variable. A normal curve was also superimposed on the distributions to assess the normality of the variables. The examination showed that the distributions of Tobin's Q and board size were non-normal. This necessitated a further normalization of these variables by logarithmic transformation.

Therefore, our conceptual model was summarized as:

$$Performance = f\,(board\ structure,\ ownership\ structure,\ control\ variables) \quad (4.1)$$

Using econometrical notations, equation (4.1) can be stated as:

$$y_{i,t} = \beta_0 + \beta_n \sum BOD_{n,i,t} + \beta_k \sum OWN_{k,i,t} + \beta_q \sum CTRL_{q,i,t} + \varepsilon_{i,t} \quad (4.2)$$

where y represents the performance of firm i at time t; BOD refers to the board structure components; OWN refers to the ownership structure components; $CTRL$ are the control variables; $n, k, and\ q = 1, \dots, N$ and $\varepsilon_{i,t}$ is an error term. Given the dynamic nature and structure of the data, a panel data methodology was considered to be the most appropriate to carry out the analyses. This is because, the panel data approach addresses the heterogeneity concerns that exist between the firms and the explanatory variables (Bond, 2002).

Equation (4.2) can be estimated using the panel data pooled-ordinary least squares (OLS). However, recent studies have highlighted two major econometric concerns associated with model specifications in corporate governance and firm performance studies. These include: the omitted variable bias and the endogeneity problem (Wintoki et al., 2012). The former occurs when the researcher wrongly assumes that firm-specific effects are uncorrelated with the other explanatory variables (see, also; Wooldridge, 2009, Brooks, 2008). The second problem arises when endogeneity concerns are not taken into account. That is, the possibility of ignoring the fact that, current values of the explanatory variables could be influenced by past values of the dependent variable. A good example in corporate governance structures is the question, whether governance influences performance or otherwise. It is asserted that failure to address this problem properly may result into biased and inconsistent parameter estimates. Hence the inferences drawn from the same may be highly distorted, or it can even be impossible to draw any meaningful conclusions (see, also; Flannery and Hankins, 2013, Wintoki et al., 2012).

To address the endogeneity concern, the study employs the fixed-effects (FE) and the random-effects (RE) – two-stage least square – instrumental variable (RE-2SLS-IV) transformations in the analyses. According to Wooldridge (2009), if omitted variables are correlated with other variables in the model; the FE estimator provides a means to control for or remove the effects of time-invariant differences (or unobserved effects), thus mitigating the endogeneity problem. The random-effect (RE), on the other hand, assumes that the unobserved variables are uncorrelated with all observed variables. RE estimator, therefore, allows the effects of time invariant variables to be estimated in the model. However, the researcher may need to specify all firm-specific effects having or not having influence on the predictors. In practice, this may not be possible, hence leading to omitted-variable bias. Furthermore, the RE estimator assumes that the observed heterogeneity is uncorrelated with all independent variables, be it fixed over time or not.

We perform a number of tests before running the estimations. We use the Breusch-Pagan Lagrange multiplier (LM) test to establish the presence of panel effect. The null hypothesis in the LM is that the variance across entities is zero (i.e. no panel effect). A rejection of the null hypothesis implies that the OLS is not the appropriate model to apply.

Next, a Hausman test is carried out to examine whether individual-specific effects are correlated with the regressors. The null hypothesis is that a random-effects specification is the preferred model (i.e. explanatory variables are not correlated). To implement the test; therefore, the FE model that captures all the unobservable individual-level effects is regressed. The assumption is that the model is consistent for true parameters. We store these estimates. Next, the RE model is run assuming that the individual effects are randomly distributed. After that, these estimates are compared with the stored FE results using the Hausman test. If it is found that they are correlated, then the FE model is chosen as the most suitable.

It is well documented in the literature that it is practically difficult to identify valid and purely exogenous instruments in corporate governance and performance relationships. Some studies, such as Bhagat and Bolton (2008), Barontini and Bozzi (2011), Chen and Al-Najjar (2012), and Wintoki et al. (2012), however, have treated board and ownership structures as endogenous variables and used their lagged values as instruments. The idea is that the current and previous period's governance simultaneously determines firm performance. This study follows this same approach. It employs the Durbin–Wu–Hausman (augmented regression) a variant of the Hausman test to assess whether the corporate governance regressors used throughout the study are endogenous. The Durbin-Wu-Hausman (DWH) test uses the 2SLS approach to test the null hypothesis that the coefficient of the residual term is zero. In the first stage, we run the regression of the endogenous variable X on its lagged value and other variables (assumed to be exogenous). In the second stage, we estimate the measure of performance (dependent variable) on the endogenous and other variables, including control variables, and the first-stage residual term. A rejection of the null hypothesis means that the variable should be treated as endogenous. That is, the 2SLS-IV estimator is the appropriate model to estimate equation (4.2). However, if we do not have endogeneity, the OLS is preferred to IV (2SLS), since it is both consistent and efficient.

The econometric literature points out that the IV/2SLS regression is most biased and suffers from severe size distortions when the instruments are weak (excluded instruments only weakly correlated with included endogenous regressors). In the light of this, it was appropriate to initially examine the strength of the instruments. The test involves assessing the goodness-of-fit of the "first stage" regressions relating each endogenous regressor to the entire set of instruments.

Accordingly, we adopt the Stock et al. (2002) criteria, which suggests that the *F-statistic* greater than 10 makes inferences based on the 2SLS estimator reliable for a just-identified model.

4.8 Results and Discussion

4.8.1 Descriptive Results

Table 4.4 presents the whole sample summary statistics of the main variables used throughout the analysis. The firms have a mean (median) roa of 12% (9%) and tq of 1.58 (1.28) respectively. Descriptive statistics by industry categorisation *(Appendix 1)* reveal that companies from the manufacturing and allied industry have the highest mean (median) roa, of 17% (16%) respectively; while those from the energy and petroleum industry have the lowest average. In terms of tq, the telecommunication and technology industry recorded the highest average (median) market valuation of 2.10 (2.00) respectively. This indicates that, on average, EA investors anticipate companies from this industry to have higher intrinsic values. This is because, a Tobin's q value greater than one suggests that a company makes financially sensible investments.

The evidence in Table 4.4 further suggests that listed firms in EA exchanges tend to have concentrated ownership. On average (median), 50% (51%) of the total issued share capital is owned by the largest shareholder. This observation is largely explained by the privatization strategies that governments in the EAC used. Since most of the SOEs were ailing when they were privatized, the governments were looking for investors who could turn them around by investing a significant amount of money in exchange of the company's issued shares. The same reason applies to the observed percentage of ownership by foreign investors in Table 4.4. That is, it reflects the effect of the economic reforms and privatization across the EA member states. The shares that the governments retained after the privatized SOEs were sold to local institutional (with mean 51% and median 63%) and retail investors. A closer look by industry in *Appendix 1* shows that the highest average ownership by the biggest shareholder is 54% in the telecommunication and technology industry, whereas the lowest ownership is 42% in the automobiles and accessories industry. Foreign owners, on the other hand, seem to be mostly attracted by the manufacturing and allied stocks with the highest mean of 41%. *Appendix 1* further indicates that institutional investors own more stocks of companies in the agricultural sector, with a mean of 57%. It is surprising to find that the average ownership by both foreign and institutional investors is lowest in the lucrative telecommunication and technology industry. The industry has experienced the fastest growth through mobile phones take-up and Internet usage in the past five years. Besides, companies in this industry collect regular (daily, weekly and monthly) payments

from their clients. These factors, could therefore, make investors more interested in stocks from this industry because it is easy to predict cash flow and revenues, and hence stability of dividends.

Table 4.4 shows that the average board size is 10 members, with a minimum of three and a maximum of 22. This is higher than the recommended number of seven to eight members (Lipton and Lorsch, 1992, Jensen, 1993, Hermalin and Weisbach, 2003). Examination of *Appendix 1* further shows that except for the agriculture and the automobiles and accessories industries, the mean board sizes for the rest is around 11 members.

Table 4.4: Descriptive Summary Statistics - Whole Sample

Variable	N	Mean	Std Dev	Min	25th	50th	75th	Max	Skew	Kurtosis
Dependent variables										
Return on Assets (ROA)	482	0.12	0.11	-0.04	0.04	0.09	0.18	0.38	0.89	3.10
Tobin's Q (tq)	482	1.58	0.90	0.60	0.89	1.28	1.97	3.72	1.13	3.22
Independent variables										
Board size (bsize)	482	10.36	3.37	3.00	8.00	10.00	13.00	22.00	0.39	2.79
Proportion of foreigners on the board (bfgn)	482	0.28	0.22	0.00	0.10	0.27	0.44	1.00	0.38	2.36
Proportion of civil servants on the board (civ)	482	0.12	0.14	0.00	0.00	0.09	0.20	0.50	1.20	3.73
Proportion of members with masters or higher (ed)	482	0.35	0.24	0.00	0.17	0.33	0.50	1.00	0.48	2.60
Largest shareholder (big)	482	0.50	0.17	0.12	0.36	0.51	0.63	0.77	-0.32	2.32
Foreign ownership (fown)	482	0.30	0.29	0.00	0.04	0.17	0.60	0.94	0.61	1.87
Institutional ownership (inst)	482	0.51	0.32	0.00	0.18	0.63	0.78	0.97	-0.42	1.64
Control Variables										
Firm size (fsize)	482	2.68	2.21	-2.96	1.83	2.95	4.17	6.73	-0.67	2.98
Sales growth (sgr)	482	0.10	0.16	-0.22	0.01	0.11	0.19	0.47	0.13	3.10
Leverage (lev)	482	0.16	0.17	0.00	0.00	0.11	0.30	0.54	0.76	2.31
Profitability (prof)	482	0.10	0.10	-0.05	0.03	0.07	0.15	0.33	0.79	3.04

Notes: This table provides summary statistics for the data employed throughout the analysis. Data for ownership and board characteristics were handpicked from the published annual reports of the respective companies. The data for year-end market prices, and accounting variables, were obtained from the Bloomberg database. Table 4.2 provides the operational definitions of the variables. Information on descriptive statistics by industry categorization is presented in *Appendix 1*.

Table 4.4 further shows that the representation of foreigners on the boards, averages 28% and the maximum proportion is 100%. A dissection of the results in *Appendix 1* indicates that companies that operate in the telecommunication and technology industry have the highest average proportion (35%) of foreign board members followed by agriculture (33%) and commercial and services industry (31%). This level of participation of foreigners on corporate boards is something that should be expected. It is a reflection of the influence of the highly concentrated ownership, for both the privatized SOEs that were sold to strategic investors and other privately owned companies. It can be construed from these findings that ownership by biggest shareholders is the primary governance mechanism of the EA listed companies. Alternatively, these results may reflect the fact that foreign board members bring certain skills and expertise that business operations in the three industries mentioned above need, but are not available locally.

The proportion of senior civil servants or political leaders on the boards in Table 4.4 averages 12% (maximum 50%). The energy and petroleum industry has the highest mean (17%), while the

agriculture industry has the lowest (2%), see *Appendix 1*. For privatized SOEs, board members represent the interests of the governments. For other public companies, the appointment of civil servants in their boards may be interpreted as a ploy to protect the businesses against political risks, but also for lobbying purposes.

Table 4.4 also provides information about the level of education of the board members. It indicates that, on average, 35% (maximum 100%) have a master's degree or above. The categorization in *Appendix 1* also shows that the energy and petroleum industry has the highest mean (47%) of board members who are well educated. The commercial and services industry follows (44%), whereas the agriculture industry has the least average (11%). This may reflect that education qualification is an important attribute for appointments of board members.

In Table 4.5, we report the pairwise correlation matrix for the variables employed in the analysis. The purpose of examining this relationship is twofold. Firstly, is to identify the degree of interaction between the variables. We note several important observations. The correlation between measures of firm performance and firm size, and leverage is negative and strongly significant. Board size is negatively and significantly correlated with ***roa***, but positively correlated with ***tq*** and insignificant. The relationship between ***roa*** and board size suggests that companies with large board sizes have lower current profitability.

Table 4.5: Pairwise Correlations Matrix

Variable	roa	tq	big	fown	inst	bsize	bfgn	civ	ed	fsize	sgr	lev	prof
roa	1.0000												
tq	0.5491*	1.0000											
big	0.2704*	0.1488*	1.0000										
fown	0.2532*	0.1240*	-0.0793	1.0000									
inst	0.3189*	0.0955*	0.2462*	0.2145*	1.0000								
bsize	-0.1577*	0.0281	-0.0269	0.0344	-0.0502	1.0000							
bfgn	0.2659*	0.1352*	0.2296*	0.2041*	0.2357*	-0.1090*	1.0000						
civ	0.1316*	-0.0364	-0.0823	0.0734	-0.0134	0.3904*	-0.1814*	1.0000					
ed	0.2957*	0.1658*	0.2413*	-0.0040	0.2183*	0.1753*	0.0535	0.2567*	1.0000				
fsize	-0.3929*	-0.1375*	-0.0707	-0.1397*	-0.2499*	0.4399*	-0.2429*	0.0424	-0.2457*	1.0000			
sgr	0.1480*	0.0998*	-0.0861	-0.0528	0.0288	-0.0107	0.0681	-0.0441	-0.0373	0.0424	1.0000		
lev	-0.3944*	-0.1691*	-0.2855*	-0.0889	-0.1869*	0.2252*	-0.0548	0.1576*	-0.0274	0.0422	-0.0117	1.0000	
prof	0.9476*	0.5404*	0.2911*	0.2338*	0.3161*	-0.1276*	0.2732*	0.0878	0.2683*	-0.3350*	0.1307*	-0.4526*	1.0000

Notes: This table presents the pairwise correlation matrix for the data employed in the analysis. Data for ownership and board characteristics were hand-picked from the published annual reports of the respective companies. The data for year-end market prices, and accounting related variables, were obtained from the Bloomberg database. Variable definitions and measurements are presented in Table 4.4. * $p < 0.05$.

Table 4.5 further shows that largest shareholder, foreign ownership, institutional ownership, proportion of foreigners on the board, proportion of members with masters or higher and sales growth are strongly positively correlated with the proxies of firm performance. These findings validate our earlier assertions. That is, if ownership is concentrated in the hands of few shareholders, there is close alignment of interests, which ultimately affects firm value. Given the

huge investment that they have put in these companies, largest investors are compelled to maintain a dominating voice in the company's strategies, policies and decisions.

The same applies to the foreign and institutional investors. That is, they may be influential in the monitoring and advisory roles which can help firms to avoid over-reliance on concentrated ownership (Young et al., 2008). The proportion of senior civil servants on the board has a strong positive correlation with roa, but is negatively correlated with tq. Consistent with the resource dependence theory, the findings suggest that the presence of government officials or politicians on the boards facilitates access to crucial resources the firms need to enhance operations and performance (Daily et al., 2003, Okpara, 2011, Hillman and Dalziel, 2003)The second purpose of examining correlation is to identify the presence of the multicollinearity problem in the data. According to Hair et al. (2006), a high correlation equal to 0.9 or above is an indication of substantial collinearity. The correlation between roa and $prof$ in Table 4.5 is greater than this cut-off point and highly significant. This variable was therefore not included in the roa regression. The magnitudes of the correlation coefficients for the remaining variables indicate that there is no multicollinearity problem.

4.8.2 Analysis of Board and Ownership Variables on Performance Proxies

Table 4.6 and Table 4.7 present the findings of equation (4.2). As stated earlier, the study employed the DWH approach to test whether the independent variables representing governance mechanisms are endogenous. The results show that when performance is measured by the Tobin's Q, all the explanatory variables should be considered exogenous. With respect to the ROA, the DWH results indicate that the presence of foreigners on the board and foreign ownership should be treated as endogenous variables in the model.

Likewise, the Hausman test rejected the null hypothesis that individual specific effects or errors are not correlated with the regressors for the Tobin's Q model, but failed to reject the same hypothesis for the ROA model. The study, therefore, employed the pooled FE regression to estimate the relationship between governance variables and Tobin's Q. We also used the RE-2SLS-IV approach to estimate the ROA model. In each case, control variables were included.

4.8.2.1 Results Based on Tobin's Q

Consistent with hypothesis 1, the estimations in Table 4.6 show that board size has a statistically significant positive relationship with Tobin's Q as an approximation of market valuation. The evidence supports the school of thought that large boards enhance the performance of a firm. It

could be argued that firms from these EA states need larger boards with a range of expertise because they seek for the quality of advice (Dalton et al., 1999, Coles et al., 2008). Another explanation for larger board sizes can be attributed to the dominant ownership structure in the region. For privatised SOEs for example, their big investors, governments and other stakeholders need to protect their interests and therefore, will often appoint more representatives, making the boards bigger. These findings however, contradict other studies that suggest relatively small boards as being more effective in monitoring the activities of top management for the best interests of the firm's stakeholders (Jensen, 1993, Yermack, 1996, Ujunwa, 2012).

To investigate the optimal size of the board, we included a squared term of the board size variable in the model. Both the linear and quadratic terms were statistically insignificant. This implies that the relationship between Tobin's Q and board size is not curvilinear. We, therefore, dropped the squared term.

The results in Table 4.6 indicate that the presence of foreigners on the board is negatively related to performance although not significant. This observation disputes hypothesis 2a and is not consistent with the resource dependency theory. The evidence implies that presence of foreigners on the boards of firms from EAC frontier markets does not bring any significant difference in terms of exposure to skills and expertise, mitigation of information asymmetry, and reduction in operating costs as the literature shows (Oxelheim and Randøy, 2003, Gulamhussen and Guerreiro, 2009, Fairchild et al., 2014).

Table 4.6 further shows that coefficients for presence of civil servants on the board room lead to a discount in firm valuation. This finding contradicts our expectation as stated in hypothesis 2b. The results also disagree with the resource dependence viewpoint and the findings from past research (Hillman and Dalziel, 2003, Hillman, 2005, Lester et al., 2008). It was expected that government officials would bring to the firms valuable resources such as networking and linkages that would be vital for improving business operations. The finding seems to support the reasoning from the institutional theory that the appointment of civil servants onto boards is a bandwagon effect. That is, since they are used to bureaucratic systems, they do not have business acumen, and that their appointment is based on political grounds, it is unlikely that they will be effective in discharging monitoring and controlling functions (see also, Muth and Donaldson, 2002, Peng, 2004, Rossouw, 2005, Wanyama et al., 2009).

Table 4.6: Fixed Effects Regression of Tobin's Q on Board and Ownership Variables

Variables	Coefficients
Largest shareholder	**-0.361*** (0.122)**
Foreign ownership	-0.024 (0.122)
Institutional ownership	0.004 (0.084)
Board size	**0.208*** (0.075)**
Foreigners on the board	-0.061 (0.159)
Civil servants on the board	-0.355 (0.290)
Education	-0.132 (0.128)
Firm size	**-0.083** (0.034)**
Sales growth	0.007 (0.088)
Leverage	**0.489*** (0.139)**
Profitability	**1.086*** (0.237)**
Constant	-0.295 (0.211)
Year dummies	Yes
Industry and exchange dummies	No
Obs.	482
Number of groups	47
R^2 overall	0.1249
Adj. R^2	0.0810
F-test	**8.12*** **
Breusch-Pagan Lagrange Multiplier (LM) test χ^2	**374.71*** **
Hausman test χ^2	**38.96*** **

Notes: This table presents the results of pooled panel regression with fixed effects estimations of Tobin's Q on various governance structures including firm specific characteristics. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors are reported in parentheses. The null hypothesis for the Breusch-Pagan Lagrange multiplier (LM) test is that variances across entities are zero (Var (u) = 0). If the test is rejected at the 5% level, it means there is a panel effect, and thus the OLS model is not appropriate. The null hypothesis for the Hausman test is that individual specific effects of the regressors are not correlated with the error term. If the hypothesis is not rejected at the 5% level it means that the random effect model is more efficient than the fixed effects model. Table 4.2 provides the operational definitions of the variables.

Hypothesis 2c suggested that directors with MSc or PhD on the board of directors positively affect firm performance. Table 4.6 shows that the coefficient for education has an insignificant negative effect on Tobin's Q. The results do not offer support for our conjecture. The interpretation of this is that, possession of higher academic qualifications does not seem to create value for listed companies in the EA frontier markets. The findings are consistent with previous studies such as those by Anderson et al. (2004) and Rose (2007), but not consistent with (Ehikioya, 2009) who found a significant relationship between board skill and price earnings ratio and return on equity. Our results therefore contradict the resource dependency theory which views board members with such academic qualities as important and beneficial to the firms in terms of the mix of skills and cognition abilities (Anderson et al., 2011).

We further examine the influence of ownership by foreigners on Tobin's Q. The coefficient is negative and insignificant; meaning that hypothesis 3 is rejected. The lack of a meaningful relationship between issuing shares to foreign-investors and market valuation is surprising. It implies that the market does not appreciate the foreign investors' role in monitoring the companies, and hence creating value for the shareholders. In other words, the presence of foreigners in the EA listed companies does not signal to investors any potential for higher performance. This observation contradicts one of the main motives of adopting and promoting

good governance practices by many African markets. That is, to make the countries appealing destinations for attracting capital flows from within the region and abroad (see also; Wanyama et al., 2009, Rossouw, 2005, Wanyama et al., 2013, Waweru, 2014a, Waweru, 2014b) and therefore, increase the value of local companies while reducing the cost of capital (Bekaert and Harvey, 2000, Bekaert et al., 2002).

Another explanation as to why participation of foreigners does not positively influence firm performance relates to trading restrictions. Apart from companies that were or are strategically owned by foreign companies, foreigners' participation in the stock exchanges was not substantial during the period under study. For example, it is 2014, that the Government of Tanzania removed the regulation restricting the levels of each stock's foreign ownership. Coupled with the fact that most of the firms are controlled by larger shareholders, only a few of the issued shares can be freely available to foreign-investors, thus, making them unable to exert influence on key decisions (Young et al., 2008). Our results are also not consistent with those of Bai et al. (2004), who reported that foreign ownership positively affected market valuation.

The coefficients for institutional ownership in Table 4.6 provide no evidence in support of hypothesis 4. According to the literature, institutional investors play three major roles in a firm's corporate governance (Al-Najjar, 2010). From the agency theory perspective, large institutional investors act as monitoring devices – since they are better positioned to monitor the performance of the management and hence minimize agency conflicts (Jensen, 1986, Pound, 1988, Gillan and Starks, 2005). From the bankruptcy theory, institutional investors can avoid investing in a firm with high business risk or provide intensive monitoring to minimize bankruptcy costs. And from the signalling perspective, ownership by institutional investors may serve as a signal to the market about the future positive performance of the firm (Gillan and Starks, 2005). The lack of a significant effect is consistent with the prediction of conflict-of-interest, and the strategic-alignment hypotheses proposed by Pound (1988). That is, given the concentrated ownership structure prevalent in the companies listed in EAC exchanges, institutional investors may have little or no incentives to play their monitoring role. Such a decision may have detrimental effects to the value of the firm. This result is in line with Faccio and Lasfer (2000) who found no significant relationship between institutional ownership and firm performance.

Moreover, the estimates presented in Table 4.6 show that the biggest owner has a significant negative effect on Tobin's Q. This observation is not consistent with our hypothesis 5. For the majority of the privatized SOEs, the strategic investors are foreign corporations. As stated earlier, privatization was instigated to facilitate the restructuring of ailing SOEs with the main motive to

improve performance of the enterprises. For other public companies, the majority shareholder could be founders. Our findings suggest that the largest shareholders in EA listed companies are not concerned with improving the market values of the firms. According to Mínguez-Vera and Martín-Ugedo (2007), a negative effect of high ownership is an indication of a poorly developed capital market. In such a situation, using the level of ownership as a control mechanism for disciplining the management may not be effective. Another explanation for the negative relationship could be the conflict-of-interest, and strategic-alignment hypothesis. Whereby, the owners and the management cooperate for the mutual benefit of each other (Pound, 1988, McConnell and Servaes, 1990). Previous studies that reported consistent findings include Faccio and Lasfer (2000) and Tam and Tan (2007). This result is inconsistent with Ehikioya (2009) in Nigeria, who found ownership concentration to exhibit a significant positive relationship with all measures of performance employed in the study.

With respect to the control variables, Table 4.6 further reveals that firm size has a significantly negative effect on performance. The negative coefficient indicates that smaller firms tend to have higher market values. Previous studies reporting similar evidence include; Hermalin and Weisbach (1991), Bhagat and Black (2002), and Mínguez-Vera and Martín-Ugedo (2007). The coefficient for sales growth is negative and insignificant. This is not consistent with the view that the firm's growth prospects affect its value (see also; Black et al., 2012).

In Table 4.6 we further show that leverage has a strongly significant positive effect on Tobin's Q. The findings suggest that high-levered firms have higher values. This is consistent with Modigliani and Miller (1963) with respect to tax shields on corporate income, and Ross (1977) and Jensen (1986) with respect to signalling and free cash-flow hypotheses respectively. The positive relationship between leverage and Tobin's Q is in line with McConnell and Servaes (1990) in the US; Davies et al. (2005) in the UK; and Ehikioya (2009) in Nigeria. The results are contrary to Demsetz and Villalonga (2001) and Cui and Mak (2002) who found a negative effect in the American market. The coefficient for profitability is significantly positive. This is not surprising because Tobin's Q is related to current profitability of the firm (see also; Black et al., 2012).

4.8.2.2 Results based on ROA

Hypothesis 1 suggests a positive relationship between board size and firm performance. The evidence presented in Table 4.7 reveals that the coefficient of board size is negative and very significant, thus opposing our conjecture. This result is consistent with that by Ujunwa (2012). The negative sign implies that larger board sizes have an adverse impact on the operational

performance of the companies listed in the EAC exchanges. Moreover, this observation is in line with the assertion that as the board increases in size, its efficiency in terms of discharging the monitoring and advisory roles reduces (Yermack, 1996, Lipton and Lorsch, 1992, Hermalin and Weisbach, 2003, Ujunwa, 2012). This study also investigated whether the size of the board has a non-linear effect on performance by including the squared to term of the board size variable in the model. Both the linear and quadratic terms were statistically insignificant. We, therefore, dropped the squared to term of the board size.

Table 4.7: 2SLS-IV Regression of ROA on Ownership and Board Variables

Variables	Whole
Largest shareholder	**0.052*(0.029)**
Foreign ownership	0.015 (0.033)
Institutional ownership	**0.033*(0.018)**
Board size	**-0.070***(0.018)**
Foreigners on the board	**0.166***(0.048)**
Civil servants on the board	**0.238***(0.057)**
Education	**0.054*(0.028)**
Firm size	-0.008 (0.007)
Sales growth	**0.109***(0.021)**
Leverage	**-0.144***(0.030)**
Exchange dummies	
Uganda Securities Exchange	0.015 (0.052)
Nairobi Securities Exchange	0.022 (0.049)
Constant	0.115 (0.075)
Industry, and year dummies	Yes
Observations	435
Number of groups	47
R^2	0.4826
Adj. R^2	0.4494
F-test	**6.17***
Breusch-Pagan Lagrange Multiplier (LM) test χ^2	**235.29***
Hausman test χ^2	16.45
Durbin-Wu-Hausman F-test	**4.10****
First stage F-test	**2577.71***
	RE-2SLS-IV

Notes: This table presents the random effects 2SLS-IV estimates of ROA on various governance mechanisms and control variables. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors are reported in parentheses. The null hypothesis for the Breusch-Pagan Lagrange multiplier (LM) test is that variances across entities are zero (Var (u) = 0). If the test is rejected at the 5% level, it means there is a panel effect, and thus the OLS model is not appropriate. The null hypothesis for the Hausman test is that individual specific effects of the regressors are not correlated with the error term. If the hypothesis is not rejected at the 5% level it means that the random effect model is more efficient than the fixed effects model. The Durbin–Wu–Hausman (augmented regression) test for endogeneity tests the null that the variable in question is exogenous. A rejection of the null hypothesis implies that compared to an IV regression, the OLS is not an appropriate estimation technique, and that the variable in question should be treated as endogenous. Table 4.2 provides the operational definitions of the variables.

Hypothesis 2a suggests that presence of foreigners on the board of directors positively affects firm performance. Table 4.7 indicates that the estimate of foreigners on the board is positive and strongly significant, thus supporting this conjecture. That is, the operating performance (ROA) of listed firms with foreign directors on their boards in the EAC markets is 17% higher than that of firms without. It is worth of a note that, most of these foreign directors represent the larger shareholders as the *strategic investors*, in the case of privatized SOEs. They, therefore, have every incentive to ensure that the resources that the parent company has invested yield sufficient returns.

The findings, nevertheless, are not in line with those of Masulis et al. (2012), who found a negative relationship between ROA and presence of foreign directors on the board.

The study also investigates the effect of the presence of senior civil servants (or politicians) on the board on ROA. Consistent with our conjecture, in hypothesis 2b and the resource dependence theory, the regression coefficient in Table 4.7 is positive and highly significant. This result implies that firms prefer to appoint this type of directors on their boards in order to create linkages with the government, which is an important source of external dependency (Pfeffer, 1972). This is because the government's policies, regulations and enforcements shape the external environment in which businesses operate. In the developing world and in African FMs in particular, this is a major source of risk and uncertainty, because of the weak legal and regulatory frameworks (La Porta et al., 1997, La Porta et al., 1998, Rossouw, 2005, Wanyama et al., 2009, Wanyama et al., 2013, Claessens and Yurtoglu, 2013). Therefore, creating linkages with the government reduces transaction costs of securing information concerning important political decisions, lobbying, risk and uncertainty, and ultimately enhances operating performance. The findings are consistent with prior studies such as Hillman (2005) and Lester et al. (2008).

Although marginally significant, the findings in Table 4.7, concerning the effect of education on ROA, are in line with the prediction of hypothesis 2c. Consistent with the resource dependency theory, the results show that, all else being equal, firms with a mix of skills and expertise of directors with higher levels of education perform better than counterparts without. Similar findings are reported by Murphy (2007), Ujunwa (2012) and Anderson et al. (2011). It is interesting to note that these results are largely different from those of the Tobin's Q regression. The explanation for this observation is that the focus of the directors in EAC listed companies is to protect the interests of the shareholders whom they represent. And in most cases, this is the larger shareholders or block-holders that own huge stakes of the issued share capital.

Hypothesis 3 states that foreign ownership is positively associated with firm performance. The evidence presented in Table 4.7 does not support this proposition. As stated earlier, this finding is surprising as it contradicts the main motive for attracting foreign investors by African FMs. Among other motives, given their level of involvement and influence, it was expected that their presence would be reflected in enhancing both operational performance and market valuation.

The results for institutional ownership in Table 4.7 marginally support hypothesis 4. That is, ownership by institutional-investors is positively associated with ROA. This could mean that, institutional investors in EAC exchanges are, to a certain extent, concerned with profitability, in

contrast to market values of the firms in which they invest. In other words, the existence of institutional ownership may be a signal of good operating performance and higher likelihood of dividend payment (Jensen, 1986, Zeckhauser and Pound, 1990, Short et al., 2002, Grinstein and Michaely, 2005, Amidu and Abor, 2006). The finding is consistent with Al-Najjar (2010) who reported that investors in Jordan consider a firm's profitability as one of the factors when they take their investment decisions.

The evidence presented in Table 4.7 does not provide sufficient grounds to support hypothesis 5. The coefficient for the largest shareholder is positive but marginally significant at the 10% level. The opposite signs in the ROA and Tobin's Q estimations are inconsistent with the overall correlation between the two variables in our sample (see Table 4.5). The interpretation for this finding could be that, the main shareholders of the EAC firms are more concerned with the operational performance rather than the market values. In other words, the larger shareholder may be taking advantage of minor shareholders by engaging into business deals that are advantageous to themselves but not the overall interests of the firms they control. This result is consistent with Demsetz and Lehn (1985) who found no significant relationship between ownership concentration and accounting profit rates.

With respect to control variables, Table 4.7 shows that firm size has no significant association with ROA. On the other hand, sales growth has a significant positive coefficient. This means that sales growth determines the operating performance of the firms listed on the EAC exchanges. The finding supports the argument that managers pursue sales growth because it allows them to sustain profitability. Consistent with the agency theory and strategic-alignment hypothesis, the implication of this finding is similar to those of larger shareholder and institutional ownership. As stated earlier, the evidence suggests that the main focus of these big investors is on the profitability of the firms and not shareholder's value creation. The incentive for managers to pursue sales growth, on the other hand, is to increase their powers by increasing the resources under their control.

Furthermore, the findings on leverage have opposite signs in ROA and Tobin's Q regressions. Generally, the results suggest that smaller firms with low leverage have higher ROA. This evidence is consistent with the findings by Demsetz and Villalonga (2001) and Cui and Mak (2002) who found a negative effect in the American market. However, as stated earlier, the evidence contradicts the long-standing theories such as the Modigliani and Miller (1963) with respect to the capital structure irrelevance principle. Finally, we included the exchange dummy variables in the regression model to control for the exchange specific trends. The estimates reported in Table 4.7

shows that there is no statistical difference in terms of operating performance by companies listed in either of the stock exchanges with reference to the DSE.

4.9 Summary of the Results and Conclusions

The summary results on the effects of corporate governance mechanisms on firm performance is presented in Table 4.8, showing conflicting results depending on the performance measurement used (i.e. the dependent variable) (see also, Mollah et al., 2012). With regard to hypothesis 1, the result for Tobin's Q is consistent with our expectation and is econometrically significant. There is therefore, strong evidence to conclude that board size directly influences the market performance of listed firms in the EAC frontier markets. The ROA result on the hand, is negative and significant, thus does not support hypothesis 1. This result, however, supports the school of thought that small boards are effective in monitoring the operating performance.

The evidence in Table 4.8 shows that the presence of foreigners on the boards does not affect the market values of the listed companies as measured by Tobin's Q. This result disagrees with our conjecture in hypothesis 2a. However, the relationship is strongly significant and consistent with the proposed relationship when performance is measured by ROA. Based on this evidence, the study concludes that the effect of foreign board members in the companies listed in EAC exchanges is only observed in the operating performance rather than the market valuation of the firms. The same conclusion is reached with respect to the presence of civil servants on the corporate boards. That is, the finding offers strong support to hypothesis 2b when performance is measured by ROA.

Table 4.8: Summary of the Tested Hypotheses

Hypothesi No.	Proposition	Tobin's Q			ROA		
		FE	Sign	Remarks	2SLS-IV	Sign	Remarks
	Board Structure						
Hypothesis 1	Board size positively affects firm performance	**S**	**+**	**A**	**S**	**-**	**NA**
Hypothesis 2(a)	Foreigners on board of directors positively affect firm performance	NS	**-**	NA	**S**	**+**	**A**
Hypothesis 2(b)	Civil servants (or politicians) on board of directors positively affect firm Performance	NS	**-**	NA	**S**	**+**	**A**
Hypothesis 2(c)	Directors with Msc and PhD on the board of directors positively affect firm performance	NS	**-**	NA	**S**	**+**	**PA**
	Ownership Structure						
Hypothesis 3	Foreign ownership is positively associated with firm performance	NS	**-**	NA	NS	+	NA
Hypothesis 4	Ownership by institutional investors is positively associated with firm performance	NS	**+**	NA	**S**	**+**	**PA**
Hypothesis 5	Ownership by the largest shareholder is positively associated with firm performance	**S**	-	NA	**S**	**+**	**PA**

Source: Derived from the analysis reported in Tables 4.6 and 4.7; S = Significant at 5% level; NS = Not Significant; A = Accepted; NA = Not Accepted; PA = Partially Accepted

The Tobin's Q summary presented in Table 4.8 shows that our results do not support hypothesis 2c. The finding for ROA, on the contrary, partially accepts our conjecture. The results lead to the

conclusion that board members with a Master degree or above have little or no influence on improving a company's performance. The summary further indicates that there is no significant relationship between foreign ownership and both measures of performance – Tobin's Q and ROA. Hence hypothesis 3 is rejected.

The summary in Table 4.8 also shows that there is no significant association between institutional investors and Tobin's Q. This finding does not support hypothesis 4. The ROA result, however, is partially significant. Based on these results therefore, this study concludes that institutional ownership listed companies in EA exchanges has little or no influence on firm performance.

The study also evaluated the effect of ownership by the largest shareholder on the firm's performance. Contrary to hypothesis 5, the summary for Tobin's Q is negative and strongly significant. The finding points to the lack of incentive by dominant shareholders on improving market values of the firms. With regard to ROA, the summary shows there is partially significant evidence in support of hypothesis 5. It is concluded that, ownership by the largest shareholder in the companies listed in the EA exchanges, negatively affects the market values of stocks. In terms of operating performance; however, the biggest owners have little or no influence.

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CHAPTER 5: THE INFLUENCE OF PSYCHOLOGICAL FACTORS ON INVESTORS' TRADING BEHAVIOUR

5.1 Introduction

The literature on the financial decision-making of individuals has predominantly been viewed from two main schools of thoughts. The first assumes that investors are rational or near-rational economic agents - e.g. the efficient market hypothesis (EMH) and the capital asset pricing model (CAPM). That is, the judgements or decision-making process of individuals entails the selection of the most optimal option or one that maximizes the individuals' utility. In the valuation of stocks, for example, the EMH predicts that investors respond appropriately to the arrival of new information about a firm and that prices accurately reflect all the available information and represent the assets' fundamental value. In cases of deviation, the EMH further posits that market forces will adjust the mispricing to equilibrium through the arbitrage process.

The second school of thought supports the behavioural finance stance on understanding of investment decision-making process of individuals. These models assume non-rational behaviour in judgement and decision-making (Tversky and Kahneman, 1974, De Bondt and Thaler, 1994). The consensus here is that investors have limits to their information-processing abilities. Moreover, they are prone to biases and cognitive illusions in intuitive judgement (Kahneman and Riepe, 1998). Investors who are predisposed to biases are most likely to be affected in their investment decisions, particularly when faced with risks and uncertainty. That is, trading in the financial markets is complex and time consuming, and may require a lot of thinking efforts before a decision is made. At the same time, opportunities do not wait for one to make his mind up (i.e. bounded rationality). Investors usually tend to formulate rules (short cuts) that would simplify the problem-solving process. Thus, they end up showing repeated patterns of systematic errors of judgement. It is because of these irrational behaviours that asset prices, at least temporarily, deviate from their fundamental values (although not all misvaluations are caused by psychological biases).

In response to the EMH argument, supporters of behavioural finance (e.g. De Long et al., 1990, Barberis and Thaler, 2003) clearly state that there are limits to arbitrage (i.e. it is not always possible to properly predict when arbitrage forces work effectively). This makes the classical finance theory imprecise in explaining the market's dynamics. Behavioural finance attempts to integrate the human perspective in understanding the - why, how, and what – of investment decision-making (see; Ricciardi and Simon, 2000, Shefrin, 2002). As a relatively new and evolving field, there is no single accepted definition of what behavioural finance is. Scholars like Shefrin (2002), and Ricciardi (2006) suggest that the best place to start in defining it, is by understanding the interdisciplinary

relationship of its main elements which include; traditional finance, psychology and sociology. We may therefore, define behavioural finance as a field of study that incorporates cognitive biases and emotional aspects into financial models in order to explain and enrich the understanding of the overall judgment processes of investors and its implications in stock markets.

5.1.1 The Aim and Motivation for the Study

Research that focuses on what influences investors' behaviour (behavioural finance) has grown tremendously over the past few decades. As it is the case in other areas in financial markets, most empirical behavioural finance research has been carried out in the developed markets (see, for example, De Bondt and Thaler, 1985, De Bondt and Thaler, 1987, Barber and Odean, 2000, Barber and Odean, 2001, Glaser and Weber, 2007b, Graham et al., 2009). Evidence from African frontier markets is very scarce. The purpose of this study therefore, is to contribute evidence to fill this gap by investigating several behavioural factors that affect the trading decisions of retail investors, utilising primary survey data from an African FM.

The researcher is aware of a closely related study conducted by Waweru et al. (2008) at the Nairobi Securities Exchange (NSE). This study investigated how psychological factors affect financial decision-making by institutional investors in Kenya. The study used a survey questionnaire approach with relatively few items, to measure the behavioural constructs using responses from a sample of 23 fund managers. In addition, the authors used closed "Yes/No" questions. The main problem with this kind of questioning is that it restricts the respondent to take a particular stand on a subject matter. Nonetheless, their results revealed that the behaviour of institutional investors, operating at the NSE is affected by numerous biases.

A large body of the literature (e.g. Shiller et al., 1984, Barber and Odean, 2008) documents that institutional investors are less-likely to fall prey of psychological biases than individual investors. The evidence from the NSE contradicts this assertion, which therefore, presents a justification for conducting further studies in the East African Frontier region. The aim of the current study is to contribute to the scant literature by examining the trading behaviour of retail investors in the Tanzanian frontier market, in contrast to institutional investors in the Waweru et al. (2008) study. This is motivated by the fact that African frontier markets are still at an infant stage in terms of most aspects of development. That is, African FMs exhibit low levels of awareness of the stock markets in general, have small market sizes (i.e. market capitalizations and number of listed companies), low liquidity, bottlenecks in infrastructural development, legal and regulatory frameworks, to mention a few. Moreover, proponents of behavioural finance assert that real

individual investors behave differently from the rational investors. That is, they hold under-diversified portfolios, trade speculatively, etc. Therefore, the evidence from this context may help to develop a better understanding of the manifestations of various behavioural biases and their likely influence on trading behaviour of the investors.

Specific to the Tanzanian market, the country's economic, social, political and cultural background is another motivating factor to undertake this study. The establishment of the Dar-es-Salaam Stock Exchange (DSE) is an outcome of the Economic Recovery Programme (ERP), which started in the mid-1980s, and more specifically, the financial sector reforms that the country has implemented since 1991. Before this, Tanzania was for a long period following the African Socialism *(Ujamaa)* politics. This socialist model of economic development put all sectors of the economy, including corporations, under the strict control of the State. Thus, investment and ownership of shares in companies is a relatively new phenomenon to majority of the citizens. There are about 200,000 investors who participate in the market, less than one-percent of Tanzania's population (Mrindoko, 2011, Andrew, 2014). Therefore, given these differences in the cultural and institutional frameworks, it would be interesting to explore whether the psychological theories explaining the trading behaviour of investors in advanced markets could be extended to the retail investors at the DSE. More specifically, the current study, which is also a pioneering study at the DSE, intends to address the following questions:

1. Which behavioural/psychological biases influence the trading behaviour of retail investors at the DSE?
2. How do the identified psychological factors affect the retail investors' trading behaviour (i.e. trading frequency, domestic stock preference, portfolio diversification, and disposition effect)?

In this pioneering study, we investigate four different types of investors' behaviour. Following Graham et al. (2009) this study directly measures the effects of the underlying psychological constructs on trading behaviour of investors using field data. Furthermore, and unlike most studies on behavioural finance, the current study empirically models trading behaviour using the integrated approach. That is, in order to establish which psychological biases are most important in explaining certain investor behaviours, we employed a combination of psychological constructs in a single model. The adoption of the integrated approach is more appealing since when psychological constructs are deeply ingrained they tend to affect several aspects of trading behaviour (see, also; Graham et al., 2009, Jain et al., 2015). The first question was answered by testing the reliability and validity of a scale developed to measure the effects of psychological biases on investment decision-

making. We obtained the answers to the second question by testing hypotheses developed under section 5.3.

Our main results can be summarized as follows. We conducted factor analysis on a total of 90 items. We find that, out of these, 45 items loaded to 16 factors. We, therefore, conclude that these are the scales that influence retail investors' decisions at the DSE. Next, the study thought to find out the effect of these factors in explaining the trading behaviours of these investors. With regard to trading frequency, we find that investors who perceive themselves experienced, knowledgeable in trading (scale6) and self-confident (scale9) are more likely to actively trade. In addition, the evidence in this study shows that the tendency to overweight domestic stocks is explained by the inclination to focus on stocks that come to investors' attention (scale1), reliance on advices from experts (scale2), need for adequate information (scale11) and fear of regret (scale15).

The study further intended to establish the factors that determine the portfolio compositions of investors at the DSE. We find that the following factors; focusing on stocks that come to their attention (scale1), perceived trading knowledge (scale6), being courageous (scale14), and trading experience were associated with portfolio diversification. Moreover, the tendency to exhibit the disposition effect is explained by gender, extrapolation of past performance (scale4), and perceived competence (scale5). Other factors include; need for assurance (scale13), being courageous (scale14), fear of regret (scale15) and realizing losses (scale16).

The contributions of this chapter to the extant knowledge are: First, the present study is a pioneering study about the influence of psychological factors on trading behaviour from the context of the Tanzanian stock market. This study shows that several behavioural factors matter in explaining the trading behaviour of retail investors in frontier markets, specifically the DSE. Second, in order to test the applicability of existing theories in explaining the trading behaviour of retail investors, this study developed a number of items to measure the behaviour constructs. We argue that most of these behavioural factors are applicable to the Tanzanian market. The study, therefore, has contributed to the reliability of measurement items that were adopted from previous studies, and added new ones to some of the psychological constructs.

Third, it has recently been noted that most behavioural finance studies have been conducted using market data. The majority of these studies have been carried out in a rudimentary fashion, where only one or two psychological constructs are investigated in exploring investors' trading behaviour. Moreover, these studies have been conducted in emerging and developed markets. Scholars (e.g. Graham et al., 2009) have therefore, called for research testing the behaviours of investors that

incorporate several psychological factors in theoretical models. Consistent with the recommendation by Waweru et al. (2008) this chapter has focused on the investigation of the influence of demographic factors and psychological constructs on individuals' trading behaviour from a frontier market's context. By developing and testing models that include these variables, this study contributes to a better understanding of the predominant factors that influence retail investors' trading behaviour.

Fourth and last, the demographic characteristics in our study contribute to existing knowledge by showing that trading experience has a strong negative relationship with trading frequency and portfolio composition. Trade experience however has an insignificant association with the tendency to exhibit behaviours that are consistent with the disposition effect. Financial literacy and income, on the other hand, have no relation with any trading behaviour examined in this study. In addition, the study has revealed that gender explains differences in the disposition effect.

The arrangement of the remaining sections in the chapter is as follows. The next section covers the theoretical literature review. Further, section 5.3 describes the formulation of the hypotheses, followed by an account of different types of investment decisions that investors make in section 5.4. Moreover, section 5.5 provides a description of the research methodology that has been employed in the study. This covers: the research design, area of study, sampling procedures, sample size, ethical considerations, data collection and analysis strategy, measurement of the variables; and a description of the validity and reliability of the tools used in the study. Section 5.6 presents the empirical analyses, while the discussion of the findings is presented in section 5.7. Finally, we present the conclusions from the study in section 5.8.

5.2 Theoretical Literature Review

Since the early 1980s, several studies (e.g. De Bondt and Thaler, 1985, De Bondt and Thaler, 1987, Barber and Odean, 2000, Barber and Odean, 2001) have challenged the research findings on investors' judgement and decision-making behaviour based on the traditional finance theory, arguing that it inadequately describes how investors actually behave in the real-life context. This is because human reasoning does not always follow classical or rational norms. For example: investors tend to extrapolate earnings into the future while ignoring the random walk and mean reversion hypotheses (De Bondt and Thaler, 1985, De Bondt and Thaler, 1987); practitioners also make costly mistakes (Shefrin, 2002); probability reasoning fallacies (Tversky and Kahneman, 1974); and investors make inconsistent decisions (Tversky and Kahneman, 1986). According to Olsen (1998), the new paradigm (behavioural finance) attempts to understand and forecast the

systematic errors that investors make in order to improve the accuracy and correctness of their investment decisions, and the functioning of financial markets (Olsen, 1998, Ricciardi, 2006).

Behavioural finance literature (e.g. Hirshleifer, 2001, Shefrin, 2002, Barberis and Thaler, 2003, Kim and Nofsinger, 2008) classifies biases in investment decision-making process under cognitive and emotional themes. Cognitive biases originate from faulty reasoning. These biases are concerned with information-processing arising from the way people think or form beliefs, and the resulting systematic errors. That is, individuals who exhibit these biases tend to disregard some relevant information and objective analysis when making investment decisions.

Emotional or affective biases, on the other hand, arise from impulse or intuition. These biases are concerned with the feelings of people (e.g. moody, fear of regret) as they register information; or when confronted with choice under conditions of risk and uncertainty. The ensuing sub-sections present a discussion of the various behavioural finance theories that influence investors' decision-making processes.

5.2.1 Heuristic Theory

Tversky and Kahneman (1974) argue that beliefs influence many decisions regarding the likelihood of uncertain events. That means people do not always process information based on objective probabilistic judgement as the traditional finance maintains, but rather on personal subjective judgement (see, also; Kahneman and Riepe, 1998).

Heuristics in human decision-making can be defined as experience-based 'simple strategies' or 'mental shortcuts' or 'rules of thumb' that people develop using readily accessible information or through trial-and-error, to facilitate decision-making processes when facing complex situations (see also; Shefrin, 2002, Lo, 2005, Ritter, 2003, Fairchild, 2010). It follows that, heuristics provides general guidelines to follow in order to reduce the level of efforts to be spent while making decisions. For example, Ritter (2003) asserts that the rules of thumb are aimed at making the decision process faster and easy; in order to reduce the complexity of assessing probabilities and predicting values, resulting in simpler judgments (see also, Tversky and Kahneman, 1974, Tversky and Kahneman, 1973, Baker and Nofsinger, 2002). Consistently, Benartzi and Thaler (2001) show that investors rely on the "1/n" shortcut for asset allocation when evaluating a number of investment options. For instance, when "n = 3" investment options, an investor will allocate one – third of the funds in each. This line of reasoning denotes that although heuristics are useful in a number of situations, they are generally not guaranteed to be optimal or perfect. That is, there are

still chances of making sub-optimal decisions, however, heuristics are sufficient for achieving immediate goals.

On the other hand, the work by Gigerenzer and his colleagues (e.g. Gigerenzer and Goldstein, 1996, Gigerenzer and Todd, 1999), challenges the above stylised rational notion by arguing that heuristics are not necessarily sub-optimal. What differentiates Gigerenzer's definition of rationality from that of Kahneman and Tversky, is the relative scope of application of risk in financial decision-making (Forbes et al., 2015). Gigerenzer and colleagues define risk from an ecological point of view and not procedural. More precisely, they provide a more positive view of heuristics by focusing on its fast and frugal properties, which together form an "adaptive toolbox" (Gigerenzer and Goldstein, 1996). Thus, an individual facing a judgement task will select the most valid tool for making the best decision in the context of a constantly changing and uncertain environment. For example, Gigerenzer and Gaissmaier (2011) report that both individuals and organisations make more accurate decisions by considering only part of the information (one-cue) rather than all the options available. Accordingly, Gigerenzer and Gaissmaier (2011:454) define, a heuristic as "a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods".

Investor rationality is agreeably influenced by heuristics and Gigerenzer argues for the reunion of the norm with these psychological biases (Forbes et al., 2015). The following sections describe the common heuristics: availability bias, representativeness bias and gambler's fallacy, overconfidence, anchoring and adjustment, and aversion to ambiguity.

5.2.1.1 Availability Bias

Availability bias describes the behaviour of making judgment based on how easily one can remember, or predict, or imagine an event, using the most readily available set of information. Drawing on Tversky and Kahneman (1973), it is argued that people exhibiting availability bias tend to perceive the phenomena that are easier to recall or salient as more likely to happen than those which are unfamiliar or difficult to imagine. Consistently, they posit that depending on the magnitude; availability bias is useful in assessing frequency and probability of the incidence occurring. Furthermore, Tversky and Kahneman (1973) point out that people tend to recall instances of large classes better and faster than those of infrequent classes. Along similar lines, Hirshleifer (2001) argues that, instances that are easier to remember tend to be judged as common, because they are noticed or reported frequently, and thus they are more available.

The literature documents that several experiments have been conducted to illustrate this bias. Shefrin (2002) for example, asked people to answer the question; "What is the most frequent cause of deaths in the United States between homicide and stroke?" Majority responded that deaths due to homicide were more frequent. This was incorrect. He attributed the bias towards this answer, to the inequality in media coverage, where deaths due to homicide were frequently reported, hence making it easier to imagine than deaths caused by a stroke. Organizers of lotteries also take advantage of availability bias. Past winners are publicized heavily to build the winning mentality in the minds of potential buyers of tickets. A good example of availability bias in financial markets is the 1987 stock market crash. Investors are more likely to remember or to be heavily influenced by events like this when considering investment options, since they are vivid and always in the news.

Tversky and Kahneman (1974) also contend that *familiarity, salience, and recency* biases affect the availability of recalled instances. Although familiarity-bias is not defined by Tversky and Kahneman (1973), the term can be generally taken to mean the degree of being knowledgeable about something. Familiarity reduces people's perception of risk on an investment. People get to be familiar with an event or a situation through a recent experience or knowledge about the industry. Other ways include; immediacy and salience of the event, geographical location, affiliation, to mention a few. People who exhibit familiarity bias tend to hold and be driven by their distorted perceptions (familiar views) when formulating judgments and hence, may ignore valuable investments whose information is not readily available or not quickly understood. They usually end up making unsound judgements because they put too much faith on familiar items, and not willing to engage in risky dealing (Baker and Nofsinger, 2002). A rational person, on the other hand, would have used mental efforts to assess the available facts or seek new evidence before embarking to the decision.

Another characteristic of past instances that affect availability bias is recency bias. Tversky and Kahneman (1974) argue that people are prone to the influences of recent experiences and more salient events when making decisions because they are relatively more available, and neglect events that are not fresh in the mind. Stated differently, things that happen last (seeing, hearing, etc.) tend to persist in people's minds and can heavily bias their perceptions and judgments. People exhibiting this bias in stock markets tend to base their decisions on short-term memories or the most recent stored information in one's memory, because it is much easier to recall it, particularly, if the information is relevant to the current decision. As a result, they erroneously extrapolate the extreme latest stock performance assuming that the same will continue in the future (De Bondt and Thaler, 1985, De Bondt and Thaler, 1987).

5.2.1.2 Representativeness Bias and Gambler's fallacy

The representativeness bias is a cognitive bias wherein people make judgments based on how well the available data share similar features with the phenomenon, object or the parent population in question (Tversky and Kahneman, 1973, Tversky and Kahneman, 1974). In particular, Kahneman and Tversky (1972) show how people violate Bayes' rule. They argue that when evaluating the probability of an event or sample, people determine the degree to which the same: (i) is similar in essential characteristics to its parent population; and (ii) reflects the salient features of its generating process. That is, the probability of, say, a *company A* - a new initial public offering (IPO) belonging to *group B* (representing growth stock companies), is assessed in terms of the extent to which *company A* characteristically resembles *group B*. Thus, when *company A* highly shares similar features of *group B,* then the probability that *company A* belongs to *group B* is judged high (see also, Tversky and Kahneman, 1974). Accordingly, Shefrin (2002) refers this as a type of evaluation made based on stereotypes.

Representativeness bias also leads to a psychological error known as the *base-rate neglect*. That is, when making judgements, people normally do not consider all relevant information that could affect their decisions. They make probability judgments that systematically violate Bayes' rule (Tversky and Kahneman, 1973, Tversky and Kahneman, 1974). Considering the example of Company A's IPO given above, in order to avoid this bias, one should also take into account the fact that in the long-run, few of them turn out to be good investments despite how hot the IPO is (De Bondt, 1998, Loughran and Ritter, 1995, Ritter, 1991).

The literature also documents that representativeness bias motivates individuals to *neglect the effect of sample-size* in their decisions. That is, people sometimes erroneously assume that generalized conclusions may be drawn from a small-sample of information (Tversky and Kahneman, 1974, Kahneman and Tversky, 1972). To demonstrate this bias, Kahneman and Tversky (1972) asked people to judge the probability of at least 60% boys from random samples of 10, 100, or 1000 new-borns. They showed that majority of the people did not consider the size of the sample in making their probability judgments. This was evident even when they were explicitly told that 60% or more boys were more likely to be found in a small sample of new-borns than in a large one.

Similarly, trusting small samples may cause systematic errors particularly when people extrapolate a sequence of certain types of events and perceive that there is a causal pattern. For example, given a limited sample of prior performance, one may conclude that the financial prospects of two companies are significantly different within that period. According to Barberis and Thaler (2003)

the belief that small samples represent the population is sometimes referred to as the "law of small numbers." Individuals who fail to incorporate sample sizes in their classification or predictions are likely to suffer from the so-called gambler's fallacy, when they mistakenly believe that the characteristics of the population apply to a small - as well as to a large – sample. For instance, when a fair coin is flipped and gives heads five times in a row, people will believe the chance of tails turning up on the sixth flip is in order to balance out the large number of heads.

5.2.1.3 Overconfidence Bias

Overconfidence is generally a personal trait. Overconfidence bias is a cognitive bias which describes how excessively confident people are, concerning the accuracy of their beliefs, knowledge, and judgments (Fischhoff et al., 1977). Due to this bias, people do exaggerate their knowledge, engage in risky deals, and overestimate the degree to which they are capable of controlling events. However, Odean (1999) documents that people are not usually as precise as they believe they are. The literature further indicates that overconfidence is associated with the limitations inherent in people's ability to process complex or diverse sets of information (Fischhoff et al., 1977, Barberis and Thaler, 2003, Hilton, 2001). That is, since they are not capable of taking up all information, their decisions are influenced by the extent of the conscious attention that a set of information receives. Gervais and Odean (2001) also show that overconfidence is learned. People build confidence by learning from, or observing the outcomes of their past judgements while ignoring external determinants associated with the outcomes.

The literature identifies three main attributes that lead to overconfidence (Skala, 2008, Beckmann and Menkhoff, 2008, Ben-David et al., 2007, Graham et al., 2009). These are: miscalibration; unrealistic optimism or better-than-average effect; and illusion of control or self-attribution.

5.2.1.3.1 Miscalibration

Miscalibration is one facet of overconfidence. People tend to overestimate the precision of their private information, their ability to perform tasks well, and/or are too optimistic about the future. The experiment by Fischhoff et al. (1977) to measure miscalibration is the most cited work. Their study asked people to indicate how certain they were with their answers to general knowledge questions or estimations. For a well-calibrated person, 90% of his answers or estimations would consistently fall within the specified range.

Consistent with the miscalibration hypothesis, their findings revealed that for the majority, the answers or estimations were outside the range. The results showed that people often overestimated

the probabilities they assigned (i.e. confidence levels) as compared to the true accuracy of their answers. Furthermore, they observed that the confidence intervals that respondents provided were too narrow. This implied that they exaggerated the precision of their knowledge, beliefs, or predictions. The authors concluded that people's poor calibration is due to overconfidence.

5.2.1.3.2 Better-than-Average Effect

The better-than-average effect or unrealistic optimism is another kind of overconfidence in judgment. People tend to inaccurately evaluate their skills and personal-attributes as better than those of their peers (Graham et al., 2009). They think their abilities, and prospects are very high as compared to a benchmark. People also tend to be overly optimistic about almost everything concerning their future life, and thus expect to be successful more often than others (De Bondt, 1998).

5.2.1.3.3 Illusion of Control

Overconfidence also manifests in the form of illusion of control (or self-attribution). People tend to believe that they are capable of influencing or controlling the outcomes of random events than what their abilities may warrant (Ben-David et al., 2007, Gervais and Odean, 2001, Langer, 1975). If people expect a certain performance outcome, and it turns out as anticipated, they attribute the success to their skills rather than luck, and hence re–affirm their belief of being in control over the situation (Simon et al., 2000). Failures, on the other hand, are associated with external factors that are beyond their control (Skala, 2008).

Investors' confidence about their decision-making ability may also increase after having observed and/or learned from a series of favourable past performances. Many scholars argue that, people's general knowledge, experience, or understanding of the subject matter is likely to make them feel more competent than in an unfamiliar situation (Heath and Tversky, 1991). They further claim that both cognitive and emotional factors account for the development of competence, and hence overconfidence, though emotional factors could be the major reason.

Similarly, psychology literature (Heath and Tversky, 1991) shows that people prefer to bet in a situation where they feel competent, and the pay-offs of each bet include, among others, the credit or blame associated with the bet's outcome. The psychic pay-offs depend on the attributions for success and failure. Heath and Tversky (1991) classify the willingness to bet into two domains; on chance and on one's knowledge or understanding of the context. They argue that both success and failure are associated to luck under the domain of chance. When a person bets on her

judgment, while their understanding of the context is limited, resulting failure may be attributed to ignorance whereas success to chance. On the other hand, when an individual understands the context, then success is attributable to his skills or knowledge, while failure may be attributed to chance.

5.2.1.4 Anchoring and Adjustment

Anchoring and adjustment refer to the tendency of making a decision, such as a quantitative estimation, by relying heavily on an anchor-point (Tversky and Kahneman, 1974). The anchor can take any form; like a first impression or perception about something, attribute, one piece of information, trait, outcome or value. In their experiment, Tversky and Kahneman (1974) noted that in the process of producing estimates, the subjects started with a random initial value (the anchor-point), and then adjusted their estimations based on the information at their disposal to arrive at the final judgement (Kahneman and Riepe, 1998). The starting point can be arbitrary determined depending on the framing of the phenomenon in question or on how the computations for the estimates are carried out. All of these, however, lead to insufficient adjustments (Tversky and Kahneman, 1974).

Findings from experimental studies, show that anchoring behaviour can be a result of both rational and irrational responses to the presented information or anchor. For example, Shiller (1999) contends that the way people respond to questions in research requiring them to indicate the bracket in which their incomes fall into, is influenced by the brackets shown on the questionnaire. The author further points out that people rationally assume that the person who developed the instrument considered their typical incomes in devising it, and hence rely on the tool in providing their answers. The experiment conducted by Tversky and Kahneman (1974) also demonstrated that anchoring behaviour can occur even in situations where the reference point has no relevant information to the target question. They posed simple questions to participants whose answers were in percentages, and simultaneously spin a wheel of fortune, which had numbers from 1 to 100. In addition to responding to questions, each participant had to indicate whether his answer was higher or lower than the number shown on the wheel of fortune. The experiment aimed at testing whether the number at which the wheel of fortune would stop would influence the participants' answers. The results show that, the number that came out on the wheel of fortune influenced respondents' answers.

Apart from financial markets, empirical evidence on anchoring has also been observed in other fields such as real estate pricing (Northcraft and Neale, 1987); prediction of spousal preferences

(Davis et al., 1986); negotiations (Ritov, 1996, Kristensen and Gärling, 1997, Kristensen and Gärling, 2000); and consumers' judgement (Wu and Cheng, 2011).

5.2.1.5 Ambiguity Aversion

Aversion to ambiguity refers to a phenomenon which explains how people make decisions when they attach unknown probabilities about their future prospects. The extant literature shows that people prefer the selection of events whose outcome probabilities are clearly known over vague ones (Fox and Tversky, 1995). That is, people avoid unfamiliar things. Ambiguity therefore, arises when conflicting, incomplete, or excessive information for structuring a decision is presented to a decision-maker. These circumstances increase the complexity and uncertainty of decisions. Given their limited cognitive capacities and tendency to employ simplifying strategies, individuals will spend less effort in assessing the available options in order to lessen the ambiguity associated with the decision. Consequently, they may end up making contradictory, irrational and less-comprehensive decisions. As Shefrin (2002) puts it, fear of the unknown makes decision-makers prefer to play it safe by avoiding uncertain or conflicting options.

In support of the above position, Benartzi and Thaler (2001) argue that, in order to cope with the complexity problem, individuals opt for spreading their investments in everything that they come across. That is, they apply the "1/n" heuristic diversification strategy, which divides funds evenly among the "n" available options. According to Benartzi and Thaler (2001) the impact of this approach to decision making is that the portfolios of investors who exhibit ambiguity aversion are likely to be insufficiently diversified.

5.2.2 Prospect Theory

Risk consideration is a central aspect of financial decision-making. The prospect theory was developed by Kahneman and Tversky (1979) as a behavioural finance's alternative to the expected utility theory (EUT). The EUT describes how people make choices under conditions of risk and uncertainty. The prospect theory, on the contrary, examines an individual's attitude toward risk from the contextual perspective. That is, from how people react when they face gains or losses. Thus, the prospect theory considers the tendency to take risks as not a stable personality attribute.

Kahneman and Tversky (1979), and Tversky and Kahneman (1981), indicate that people assign value to outcomes (i.e. gains and losses) as opposed to the final net assets. In the domain of gains, individuals tend to avoid risks, while in the case of losses, they tend to take and accept risks (see

also; Waweru et al., 2008, Angela et al., 2011, Shefrin and Statman, 1985). Therefore, the decision-making context affects the degree and direction of risk that an individual is prepared to take.

Making decisions under risky situations is regarded as a choice between prospects or gambles (Kahneman and Tversky, 1979). A prospect is an outcome with a given probability. The overall utility of a prospect according to the EUT is the summation of the probability-weighted utilities of all possible outcomes. According to Kahneman and Tversky (1979) and Tversky and Kahneman (1981) however, this is not actually what happens in real life. They indicate that the way people prefer to make their choices systematically violates the EUT principle. The authors further point out that in contrast to the EUT, decision weights replace the statistical probabilities in the prospect theory. The value of a prospect therefore, is expressed in terms of the subjective value of each outcome and a decision weight.

There are two distinct phases to each decision problem (Kahneman and Tversky, 1979, Tversky and Kahneman, 1981). The initial phase is the editing or framing phase, which arises when different metaphors of the same problem present different possible decision outcomes. The way of presenting or framing choices affects decision-making. Therefore, the decision maker has to edit or organize all choices in a particular way, in order to simplify the final selection of the most valuable outcome. In other words, the editing phase leads to a representation of all possible choices (acts, outcomes, and contingencies) associated with a particular decision problem in terms of their potential value relative to a fixed reference point, to the decision maker (Tversky and Kahneman, 1981).

The editing phase involves the application of several operations that simplify the decision problem (Kahneman and Tversky, 1979). These include *coding*; which organizes the outcomes in terms of gains and losses relative to a reference point. The categorization of the various prospects depends on the context in which they occur. The next editing operation is combination. Here the probabilities of prospects, which depict identical outcomes, are added together in order to facilitate evaluation. The segregation operation of the editing phase refers to a process of separating the riskless component of a prospect from its risky component. Unlike the preceding three (Kahneman and Tversky, 1979), the cancellation operation applies to a set of more than one prospect. It refers to the tendency for decision-makers to discard some common components of the offered prospects.

In the second phase, which is called the evaluation phase, the edited choices are evaluated and the prospect with the highest value to the decision-maker is selected. According to Shefrin and

Statman (1985), decision-makers at this stage employ the *S-shaped value function* to evaluate the available options. Its discernible feature is that the determinants of the value of the prospect are the changes in wealth or welfare, and not the expected level of final wealth (Tversky and Kahneman, 1992). Kahneman and Tversky (1979) emphasize that, the value depends on the magnitude of the deviation (gains and losses) from the reference point and not other levels of wealth. The function is concave for gains, convex for losses, and steeper for losses than gains (Kahneman and Tversky, 1979). In addition, the shapes of the value and the weighting functions imply that people are risk-averse over gains, and risk-seeking over losses (Tversky and Kahneman, 1992, Kahneman and Tversky, 1979). It is well documented that people's dispositions that influence the decision-making process in financial markets can be explained by the prospect theory as discussed below (Shefrin, 2002, Barberis and Thaler, 2003).

5.2.2.1 Regret Aversion Bias

The literature suggests that decisions may cause regret, and the expectation of regret may also affect decision-making (Zeelenberg, 1999). Regret is an emotional feeling that is experienced in response to an undesirable outcome of a decision. It is a negative emotion that is evoked when a person understands that a different course of action would have resulted in a better result (Fogel and Berry, 2006). People who exhibit regret aversion tend to avoid making a decision that may result into a bad outcome (Connolly and Zeelenberg, 2002). They fear that the same may be regarded as proof that they made a wrong decision (Shefrin and Statman, 1985, Solnik, 2008). According to Shefrin (2002), the sense of being accountable for a decision that went wrong, aggravates the pain of regret. Otherwise, when the decision turns out to be right, the responsible person feels joy and pride.

5.2.2.2 Loss Aversion

Loss aversion concerns the emotional feeling associated with the difficulty people face when realizing losses. It refers to the tendency of people to think that losses cause a greater feeling of pain than the pleasure caused by equivalent gains (Kahneman and Tversky, 1979, Tversky and Kahneman, 1992, Tversky and Kahneman, 1991). As stated earlier, the psychological power of loss aversion depends on prior gains or losses. That is, people tend to be more concerned with losses than with gains. As such, they are more willing to take on gambles after prior gains than they normally do, and refuse to do the same after prior losses. In explaining this observation, Barberis and Thaler (2003) contend that losses become less painful after prior gains because they

are covered by those gains. However, losses after earlier losses become even more painful because people do not like additional setbacks.

According to Tversky and Kahneman (1991) loss aversion induces the status quo bias. This is an inclination to do nothing; or remain conservative by sticking to an earlier decision when faced with many attractive choices. One of the effects of the status quo bias is that individuals are likely to forfeit their potential gains since they are reluctant to change their portfolios or tend to hold onto the investments they already possess.

Endowment effect is also related to loss aversion. Given that people are more sensitive to losses than gains, the loss of utility associated with giving up something is felt deeply than the gain of receiving the same (Kahneman et al., 1991). In other words, owners do not like to sell their assets because they attach a higher value to them than a person who does not own the same would. If they decide to sell, they tend to demand higher prices in exchange for the asset they possess than they would be ready to pay to acquire it (Nofsinger, 2001).

Another facet of loss aversion is disposition effect, which deals with the problem of realization of capital gains and losses. The literature shows that, individuals are inclined to realize gains as this justifies that they made a good decision earlier and gives them pleasure (Shefrin and Statman, 1985, Barber et al., 2007). At the same time, people avoid the realization of losses since they do not like to admit their mistakes, and the feeling of pain caused by regret (Baker and Nofsinger, 2002, Chen et al., 2007). This is exactly contrary to the rational decision-making principles, which would require individuals to consider the treatment of tax on capital losses.

5.3 Hypotheses Formulation

In the following sub-sections, the study presents hypotheses derived from the research questions. The study examines the investment behaviours that the literature indicates are a consequence of cognitive and emotional biases. In the context of this study, "investors' trading behaviour" constitutes the dependent variable. Such behaviour includes trading frequency, preference for domestic stocks, insufficient diversification, and disposition effect. Our independent variables constitute demographic factors, and the scales obtained from the factor analysis of questionnaire items measuring the behavioural biases.

More specifically, the theories used to explain investor-trading behaviour in this study are a combination of several psychological constructs. We adopt an integrated theoretical approach to understand investors' trading behaviour in the DSE. This style is widely applied in other disciplines

such as ICT adoption and usage studies. Figure 5.1 summarizes the proposed relationships in this study.

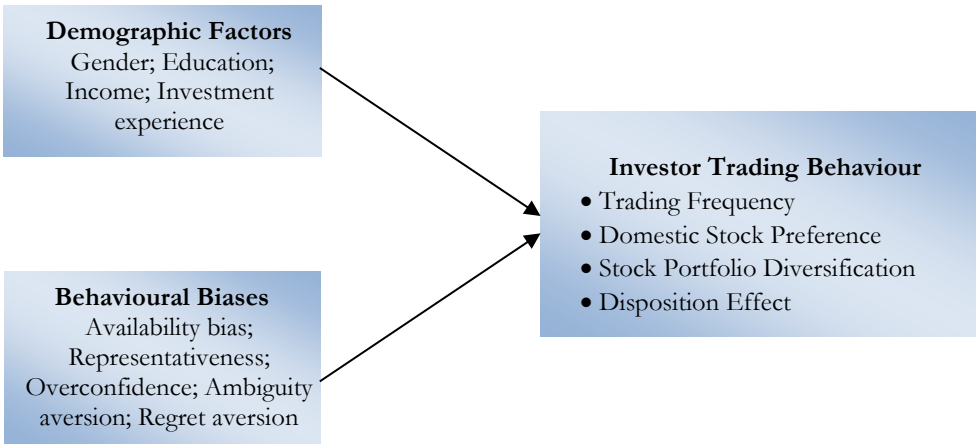

Figure 5.1 Illustration of the Research Model

5.3.1 Availability Bias

The literature review has indicated a number of ways in which availability bias affects trading behaviour. Generally, evidence shows that investors' decisions are influenced by extent to which they can easily recall information such as certain positive or negative investment outcomes happening in the stock markets. We argue in this study that investors who operate in frontier stock markets may be victims of availability heuristic as well (see, Shiller, 1999, Kratz, 1999, Minier, 2009, Girard and Sinha, 2008). We adopted recency bias and advocate recommendation bias in our conceptual framework. We summarize the availability bias model in Figure 5.2.

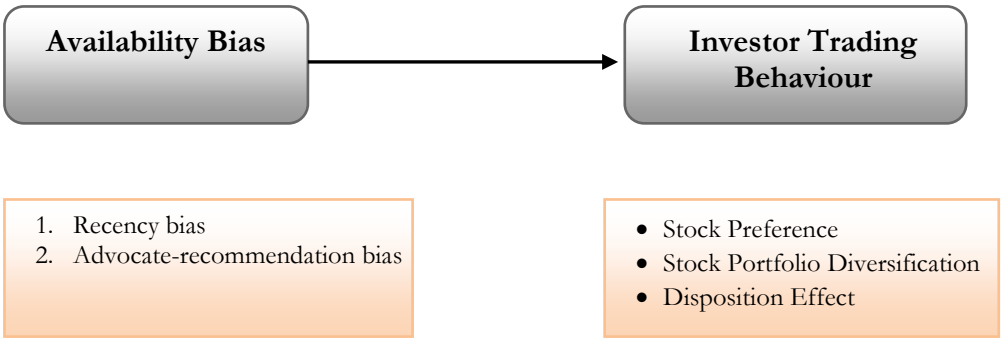

Figure 5.2 Influence of Availability Bias on Investor Trading Behaviour

5.3.1.1 Recency Bias

Recency bias theory asserts that investors tend to overweight recent salient information such as opening price or market activity when making decisions, instead of determining investment alternatives based on objective analysis of all relevant information. For example, on days when

investors experience unusual trading volume in the market, or extreme positive earnings surprises, it is likely to perceive it as an appropriate time for trading (Barber and Odean, 2008, Kliger and Kudryavtsev, 2010, Frieder, 2003). As a consequence, many investors end up chasing stocks that have recently caught their attention because they hold wrong expectations about their future prospects (Odean, 1999, Gervais et al., 2001). From the context of the DSE, domestic stocks are the ones that are mainly traded by investors. The literature proposes several reasons to explain attention-driven buying behaviour. The first reason is that domestic investors are prone to over-optimism towards home assets. Also, even though information is readily available in the market, most retail investors lack the necessary skills to process it (Lee et al., 2008, Barber and Odean, 2008). They therefore, opt to actively follow only few stocks to buy or sell. This style of decision making may lead to unfavourable trading performance. Accordingly, is it hereby hypothesized that:

H1.1a:	*Susceptibility to recency bias positively influences preference for domestic over foreign stocks in the portfolio*
H1.1b:	*The higher the susceptibility to recency bias the lower the likelihood of holding a diversified portfolio*

5.3.1.2 Advocate-recommendation Bias

Another strand of literature indicates that advocate-recommendation (e.g. by analysts, relatives, etc.) plays an important role in shaping the decision behaviour of investors (see, Shiller and Pound, 1989, Barber et al., 2001, Hirshleifer and Teoh, 2003, Hong et al., 2004, Jegadeesh and Kim, 2006, Kaustia and Knüpfer, 2012). Investors tend to rely on recommendations by stock analysts because they trust that they are based on value-relevant information. Jegadeesh and Kim (2006) point out that in order to get the benefit of a analyst recommendation, investors have to pay attention to changes in the provided recommendation. Shiller and Pound (1989) find that investors get interested in a company after consulting professionals. Evidence shows that stocks that are favourably recommended outperform stocks with unfavourable recommendation (Green, 2006, Barber et al., 2001). Consistently, Kliger and Kudryavtsev (2010) show that revisions following a analyst recommendation affect, both positively and negatively, stock price reactions.

A number of other studies show that social interaction has a positive impact on investors' decisions. For example, Hong et al. (2005) find that, a fund manager's decisions are influenced by the actions of others from the same city. Similarly, Kaustia and Knüpfer (2012) show that investors decide to participate in stock markets after hearing success stories from their peers. Moreover, investors share interests, and enjoy talking with their friends and colleagues about the challenges of the stock markets (Hong et al., 2004, Brown et al., 2008, Shiller et al., 1984, Hirshleifer and

Teoh, 2003). It is therefore, reasonable to expect investors to place a high value on advocate-recommendations for decision-making. With regard to the above discussion, is it hereby hypothesized that:

H1.2a:	*Susceptibility to advocate-recommendation bias positively influences preference for domestic over foreign stocks in the portfolio*
H1.2b:	*The higher the susceptibility to advocate-recommendation bias the lower the likelihood of holding a diversified portfolio*
H1.2c:	*Susceptibility to advocate-recommendation bias positively influences disposition effect*

5.3.2 Representativeness Bias

We revisit the conceptual framework to show representative bias and investor trading behaviour in Figure 5.3. The literature on this cognitive bias, suggests that people have a tendency of putting very little weight to the base-rate frequency or prior information (e.g. long-term averages) and overweighting recent experiences or new evidences (Ritter, 2003). The use of representative heuristic causes investors to make systematic errors that affect their investment decisions. For example, when examining the stocks of companies, investors erroneously assume that those with strong earnings are associated with healthy performance in the future. They use past returns as representation of the expected future performance. Putting it differently, over-reliance on familiar clues makes investors often fail to distinguish good companies from good investments and thus producing faulty investment-decisions. The features of good companies include high price-to-earnings (P/E) and sales growth, quality management, and quality products. Good investments, on the contrary, are stocks whose prices are expected to increase more than others in the market.

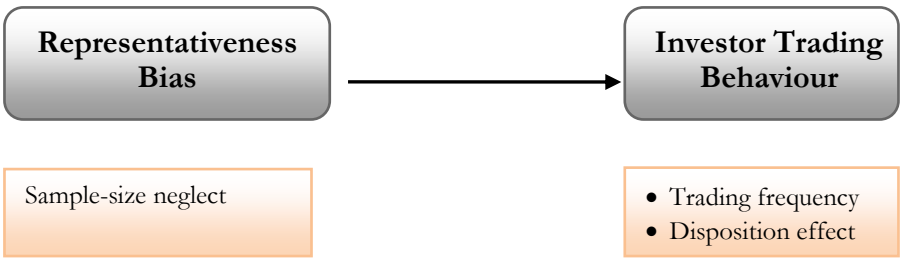

Figure 5.3 Effect of Representativeness Bias on Investor Trading Behaviour

In their two seminal papers, De Bondt and Thaler (1985, 1987), also claim that investors who take decisions based on inference from too few observations (sample-size neglect) or performance clues do not get the expected results (see also, Barberis and Thaler, 2003, De Bondt and Thaler, 1994). They reported that, the portfolios of prior losers outperformed former winners over longer time horizons.

The use of extrapolation bias is also studied by Barber et al. (2005) who examined whether performance influenced Taiwanese day traders' trading behaviour. They reported a strong relation between successful past performance and subsequent trading activity. That is, the top-performing group of day traders increased their trading activity, while worst-performers reduced or quit trading altogether. Other studies reporting similar findings include Glaser and Weber (2009) who showed that both past market and portfolio returns affect the trading activity of investors through German online brokers; and Nicolosi et al. (2009) who confirmed that investors learn from their trading experience. Several reasons such as overconfidence, need for entertainment, and the desire to gamble explain why investors exhibit such behaviour (Linnainmaa, 2011). The consequence however, is that they end up losing money. Based on these findings, it is hypothesized that:

H2.1:	*Representativeness bias positively influences trading frequency*
H2.2:	*Representativeness bias positively influences disposition effect*

5.3.3 Overconfidence Bias

Compelling evidence in the literature shows a relationship between overconfidence and investment activities such as excessive trading, disposition effect, and portfolio diversification (see, Odean, 1998b, Barber and Odean, 2001, Glaser and Weber, 2007a, Glaser and Weber, 2009, Glaser et al., 2010, Graham et al., 2009, Grinblatt and Keloharju, 2000, Grinblatt and Keloharju, 2009). Moreover, empirical findings show that professionals and naive investors are subjects of this psychological flaw. We, therefore, argue that the same applies to investors operating in frontier stock markets. In the context of this study, we adopted the better-than-average and the illusion of control forms of overconfidence, as summarized in Figure 5.4.

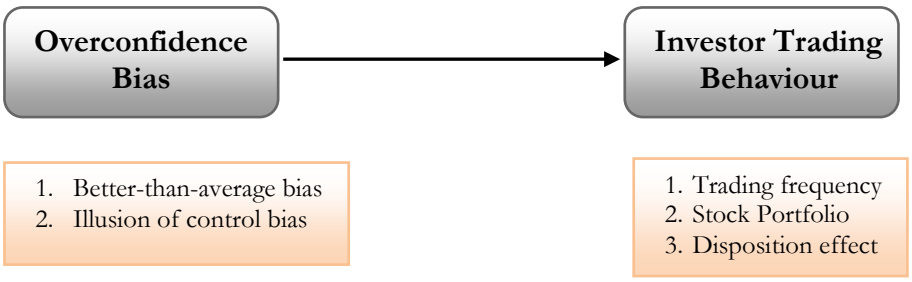

Figure 5.4 Influence of Overconfidence Bias on Investor Trading Behaviour

With regard to the better-than-average variant of overconfidence, Glaser and Weber (2007a) found that investors who considered themselves above average in terms of investment skills or past performance traded actively. Likewise, Graham et al. (2009) reported higher trading frequency for

overconfident investors who see themselves as more competent. The authors attributed this behaviour to the investors' willingness to act on their beliefs.

Furthermore, it is contended that the effects of overconfidence on trading frequency vary with time (Gervais and Odean, 2001). Suggesting that, investors improve their trading ability after trading for some time because they learn from their previous experiences (Seru et al., 2010, Nicolosi et al., 2009). Coupled with a near past good performance, it is very likely for the investors to become overconfident as they mistakenly attribute the success to their ability (illusion of control or self-attribution bias) to choose stocks. This may ultimately culminate into increased trading frequency.

Empirical evidence regarding the effects of overconfidence on portfolio performance and diversification provides conflicting findings. Many studies report that overconfident investors suffer huge losses because of frequent trading, continue to hold on losers, and hold insufficiently diversified portfolios (Barber et al., 2009a, Barber and Odean, 2000, Barber and Odean, 2001, Goetzmann and Kumar, 2008, Chen et al., 2007). In another study, De Long et al. (1990) asserts that overconfident investors hold riskier portfolios than would be justified by the utility theory because they underestimate the risk of stock ownership. In spite of holding risky assets, they earn higher expected returns than rational more sophisticated investors do. These authors further point out that, individual investors earn abnormal returns despite holding concentrated portfolios, or stocks composed of locally or geographically close companies. This is by capitalising on the available local knowledge or information. In this study, we argue that investors are overconfident because they feel that they possess favourable information about the companies in which they invest. In other words, possession of this information causes self-attribution, which results in expanded overconfidence. Because of this illusion, they hold few stocks so that they can be able to monitor them. They also exhibit the disposition effect by being reluctant to sell losers because they believe that the losers will turn out to be winners in the future. Based on the discussion above, we test the following hypotheses:

H3.1a:	*Susceptibility to better-than-average bias has positive influence on trading frequency*
H3.1b:	*The higher the susceptibility to better-than-average bias the higher the likelihood of holding a diversified portfolio*
H3.1c:	*Susceptibility to better-than-average bias has positive influence on the disposition effect*
H3.2a:	*Susceptibility to illusion of control bias has positive effect on trading frequency*
H3.2b:	*The higher the susceptibility to illusion of control bias the lower the likelihood of holding a diversified portfolio*

H3.2c:	*Susceptibility to illusion of control bias has positive influence on the disposition effect*

5.3.4 Ambiguity Aversion

The literature on financial markets (e.g. Graham et al., 2009) suggests that ambiguity aversion helps to explain both home and familiarity biases. Ambiguous-averse investors amplify the possibilities of unfavourable events happening. That is why they prefer to invest in domestic or familiar companies in contrast to foreign or unfamiliar companies. Similarly, in order to avoid ambiguity, investors feel it safer to invest in their own employers' stock than in other companies' stocks (Benartzi, 2001). It has been repeatedly claimed that the level of an individual's confidence matters in determining whether a situation is ambiguous or not (Graham et al., 2009, Barberis and Thaler, 2003, Fox and Tversky, 1995). That is, we do not expect individuals, who perceive themselves as competent, all else being equal, to act in the same manner as the ambiguous-averse investors. This is because they like to take decisions based on their skills or knowledge (Graham et al., 2009). In this study, we assume the majority of the DSE investors are still naive to tolerate ambiguity in stock investment. It is therefore hypothesized that:

H4.1:	*Susceptibility to ambiguity-aversion has positive influence on investor's preference for domestic over foreign stocks*
H4.2:	*The higher the susceptibility to ambiguity-aversion the lower the likelihood of holding a diversified portfolio*
H4.3:	*Susceptibility to ambiguity-aversion has a negative effect on trading frequency*

5.3.5 Loss Aversion

According to Kahneman and Tversky (1979, 1991), a loss is felt more, in peoples' minds, than an equivalent gain. Individuals also seem to be more risk-seekers after a success (in gambling this is also known as the house money effect), while they tend to shy away from risks following a prior loss. This tendency is extensively documented in investor trading behaviour literature as well. It is asserted that contrary to what rational analysis would suggest, investors do sell winning investments too early and tend to hold on to losing assets for too long (Odean, 1998a, Kim and Nofsinger, 2003, Odean, 1999, Barber et al., 2007, Grinblatt and Keloharju, 2001b). Likewise, Samuelson and Zeckhauser (1988) contend that investors cling onto stocks they already own, particularly, when the prices fall. They do this to avoid being seen as though they made a poor decision at the time of purchasing their holdings (Chen et al., 2007). This behaviour is attributed

to the tendency of individuals to resist change and unwillingness to acknowledge mistakes. This argument leads to the following proposition:

H5.1:	*The higher the susceptibility to loss-aversion bias, the higher the degree of the disposition effect*

5.3.6 Regret Aversion

The literature has extensively documented the relationship between regret-aversion and investment decision-making. For example, the disposition to realize gains and to hold onto losses, is associated with the behaviour of showing off and avoiding regret respectively (Shefrin and Statman, 1985, Odean, 1998a, Odean, 1999, Barberis and Huang, 2001, Nofsinger, 2005, Chen et al., 2007). That is, in times of paper gains, the investor worries about the stock price falling. Therefore, the investor disposes off the stock to become realized gain in order to avoid regret. Conversely, investors postpone selling stocks whose prices fall for so long in anticipation that the prices will go up in the future. It is also reported that when investors want to buy additional shares of a company, chances of buying a stock whose price has decreased since the last purchases are higher than that whose price has increased (Odean, 1998a, Barber et al., 2007). In addition, due to information asymmetry, regret aversion bias may be used to explain why investors are unwilling to invest in foreign stocks (Coval and Moskowitz, 1999). This is particularly so, when the performance of foreign stocks compares unfavourably, to domestic equity (Solnik, 2008). With this hindsight, it is hereby hypothesized that:

H6.1:	*Susceptibility to regret aversion bias has a positive effect on preference for domestic over foreign stocks*
H6.2:	*The higher the susceptibility to regret aversion bias the lower the likelihood of holding a diversified portfolio*
H6.3:	*Susceptibility to regret aversion bias positively influences disposition effect*

5.3.7 Demographic Characteristics

Demographic characteristics such as gender, age, experience, education level, wealth/total investments, income, and employment status are linked with investment decision-making behaviour. A good number of recent studies reveal a significant relationship between these variables (e.g. Graham et al., 2009, Deaves et al., 2009).

5.3.7.1 Gender

Empirical evidence on gender differences in financial decision-making provides mixed results. Some studies reveal that men are more overconfident (and less risk-averse) in their investment decisions than women investors are, and men trade more than women do (Biais et al., 2005, Bhandari and Deaves, 2006, Barber and Odean, 2001, Prince, 1993, Estes and Hosseini, 1988). Other studies are in disagreement with this observation. Deaves et al. (2009) for example, report no differences in overconfidence and trading activity between males and females in Canada and Germany. In addition, they assert that risk-aversion has little impact on trading volume after considering overconfidence. Likewise, using data from four countries, Beckmann and Menkhoff (2008) analyzed fund managers' behaviour towards risk. Their findings revealed that women behaved more risk averse than men. The authors further indicated that the number of women whose behaviour was consistent with the disposition effect was higher than men. To gain insight from the DSE, it is hypothesized that:

H7.1: *There is a gender difference in the degree of showing disposition effect*

5.3.7.2 Education

Education increases ones level of knowledge and hence cognitive ability (Christelis et al., 2010). This translates into higher perceived competence, understanding, and reduced uncertainty in the evaluation of subject matters, including investment decisions (Bhandari and Deaves, 2006, van Rooij et al., 2011). Thus, a knowledgeable person is likely to act according to his own judgement because of overconfidence. Empirical evidence shows that while the level of formal education plays a role (Graham et al., 2009), financial literacy (or formal education in business-related subjects) is more important in making investment decisions (van Rooij et al., 2011). Moreover, Graham et al. (2009) show that investors who understand various investment products, alternatives, and opportunities hold more efficient portfolios. Based on this discussion, the following hypotheses are developed:

H8.1: *The higher the level of financial literacy the higher the likelihood of holding a diversified portfolio*

5.3.7.3 Trading Experience

The literature supports that different levels of investment experience lead to different trading behaviours (Gervais and Odean, 2001, Chen et al., 2007, Deaves et al., 2010, Puetz and Ruenzi, 2011). For example, Gervais and Odean (2001) and Linnainmaa (2011) point out that an investor

becomes most overconfident in the early days of their trading career and will trade actively. However, trading skills improve and overconfidence fades away as investors acquire more experience. The reason is that, with more experience, their view of the market changes, and they become more realistic with the assessment of their capabilities and knowledge about trading matters. In support of this argument List (2003) and Chen et al. (2007) emphasize that, accumulated investing experience teaches investors to become rational. Those who fail to learn, make loses and quit the market. Furthermore, Puetz and Ruenzi (2011) share similar findings that overconfidence is greatest for investors who have traded for a short period of time but recorded continued successful trading. Consequently, they trade more actively (see also, Barber and Odean, 2000, Barber and Odean, 2001). In the long run however, while overconfidence persists coupled with intensive participation in the market, they gain experience through learning. They thus adjust their trading accordingly.

The literature also suggests that an investor who trades actively develops skills, and gains investing experience quicker (Barber and Odean, 2000, Chen et al., 2007). It is therefore, logical to assume that in a short period, this kind of an investor will be less inclined towards behavioural biases. This is because, the experience gained makes the investor become a strategist or systematic trader (Chen et al., 2007). However, this argument contradicts the observation by Barber and Odean (2000) that trading frequency is an outcome of overconfidence bias. They contend that the performance of investors who are prone to this bias is poor. Accordingly, the above discussion leaves us with two conclusions. That is, active trading can be an indication that the investor is overconfident or because of experience, he or she has learned to be rational. Experience in trading is also found to reduce disposition effect (Nicolosi et al., 2009, Dhar and Zhu, 2006, Seru et al., 2010, Feng and Seasholes, 2005).

5.3.7.4 Age

Research shows that younger investors exhibit higher overconfidence than older investors. For example, Deaves et al. (2010) observe that the level of overconfidence differs between the young and the old. Since they have lived longer and learned from experience, older investors can assess their capabilities better than how the younger ones do. Consistently, Korniotis and Kumar (2011) indicate that the portfolios of older and more experienced investors reflect greater investing knowledge. They hold less-risky and better-diversified portfolios, and trade less frequently (Grinblatt and Keloharju, 2009, Odean, 1999). In terms of investing skills; however, they find that older investors have worse stock selection abilities and poorer diversification skills. They attribute this to the declining cognitive abilities, especially memory. This hinders them from effectively

applying the fundamental principles of investing. They conclude that old age can adversely affect people's ability to make sound investment decisions. Based on the evidence presented above, we argue that:

H9.1:	*Trading experience has negative influence on disposition effect*
H9.2:	*The higher the experience in stock market investments the higher the likelihood of holding a diversified portfolio*
H9.3:	*Experience in stock market investments has negative influence on trading frequency*

5.3.7.5 Income

Intuitively, it is expected that individuals with higher income or wealth are more knowledgeable about finances and less likely to suffer from psychological biases. The empirical support for this assertion, however, is mixed. For example, Graham (1999) shows that competence levels increase with investment size and income, finding that wealthier individuals trade more actively. Other studies, however, document that larger investors are less overconfident than smaller ones (Ekholm, 2006, Ekholm and Pasternack, 2008). The survey conducted by Vissing-Jorgensen (2004) revealed almost similar results. That is, U.S. investors showed a disposition to several psychological biases, although, the effect of these biases diminished with higher levels of wealth. Consistently, Dhar and Zhu (2006) reported that wealthier and professional investors are less likely to be victims of the disposition effect. In the study by Bhandari and Deaves (2006), the impact of income on overconfidence in terms of gender is examined. They show that men with higher income are more certain and overconfident than their female counterparts. Based on these findings, it is hypothesized that:

H10.1:	*Income has a negative relation to trading frequency*

5.4 Investors' Trading Behaviour and Performance

In the context of this study, investors' trading behaviour refers to the investment decision-making patterns of individuals engaged in stock trading. The literature (Odean, 1998a, Odean, 1998b, Odean, 1999, Barber and Odean, 2000, Barber and Odean, 2001) documents that individual investors: (1) rely on past return performance during their purchases; (2) trade frequently; (3) under perform standard benchmarks; (4) hold poorly diversified portfolios; (5) they sell when prices rise and are reluctant to realize losses (i.e. disposition effect); to mention a few. These behaviours may have adverse impacts on their investment performance and financial well-being.

From a rational point of view, we expect individual investors to look for moderate returns, and invest small or the same amounts at regular intervals. Many individuals, however, seem to know little about stocks and demonstrate poor selection ability. For example, investors need to know the right time for buying and selling, although this is not as easy as it sounds. The two types of decisions are very different. According to Odean (1999) and Barber and Odean (2008), the buying decision should be more complex than the selling decision. The reason is that, when buying, one has to choose from thousands of listed stocks, which can be tedious and difficult. Whereas, when selling, an investor will only limit her selection on the few stocks, she holds.

Repetition is one of the most intuitive ways of learning. According to the constructive learning theory, the advantage of repetition is obtained when relating new and previous experiences. Knowledge occurs when the latest information enhances the cognitive structures that enable the individual to think again about his prior action. That is why an individual may repeat a behaviour following a previous experience of success and perhaps avoid one that resulted into pain. Odean (1999) and Barber et al. (2005), for instance, state that the majority of individual investors extrapolate from their personal experience. That is, they are more likely to buy stocks with extremely good recent performance, such as a persistent price increase (Barber et al., 2009b). Chances are also high for the investor to repurchase a stock that one previously sold for a profit than otherwise (Barber et al., 2005). Moreover, studies indicate that investors actively engage in trading following recent successful trades (Barber and Odean, 2000, Barber and Odean, 2001, Deaves et al., 2009, Glaser and Weber, 2009). Indeed, Kaustia and Knüpfer (2012) found that the likelihood of an investor to subscribe to an IPO was associated with the performance of the previous IPO performance. Those who profited in the past were most likely to subscribe.

Previous research (e.g. Barber and Odean, 2008) documents that individual investors devote a limited amount of attention to investing. While paying too much attention can result into overreaction, the opposite can also be detrimental. Little attention may result in delays in reacting to important news. Barber and Odean (2008) show that despite being complex, many individuals tend to make their purchases on high attention days compared to professionals. They point out that the attention-grabbing events; such as big press-coverage for a particular stock, unusual trading volume, high-price movements, and extreme returns, greatly influence investors' decisions. A recent study conducted by Engelberg and Parsons (2011) also found an association between local media coverage and local trading. There was a higher trading chance by individual investors following the earnings' announcement of S&P 500 index firms in the local newspaper. Likewise, Engelberg et al. (2012) examined the market reaction to the buy recommendation of Jim Cramer, host of a television show Mad Money. They found that the average overnight abnormal returns

were 3% higher following the recommendations. The authors further indicate that the price response was strongest for small market capitalizations and stocks with no other news surrounding the recommendation.

Other studies provide evidence that investors suffer from disposition effect. That is, they tend to sell stocks that increase in value and hold onto stocks whose prices fall (Barber et al., 2007, Barber et al., 2009a, Barberis and Huang, 2001, Odean, 1998a, Grinblatt and Keloharju, 2000, Chen et al., 2007). Using data from a large U.S. discount brokerage for the period 1987 to 1993, Odean (1998a) documented that the rate at which investors sell winners (realized gains) was about 50% higher than losers (realized losses). Further, informed trading (a rational belief in mean-reversion, rebalancing, or transaction costs) could be not attributed to the observed difference. Interestingly, there are studies that show investors learn to avoid the disposition effect after getting trading experience (e.g. Feng and Seasholes, 2005, Seru et al., 2010).

There is extensive empirical evidence about the investment performance of stocks held by individual investors. Barber et al. (2009a) for example, studied the complete trading history of all investors in Taiwan. They found that the losses that individual investors get are systematic and economically large. In comparison with the market, the stocks they buy perform poorly – even before costs. The authors attribute the individual trading losses to aggressive trading behaviours. The study by Barber et al. (2009c) also found that trading by individuals is highly correlated and persistent. According to the authors, the possible explanation for the behaviour was psychological biases. Due to this, they exhibit the disposition effect (Shefrin and Statman, 1985, Odean, 1998a); buy recent winners (Odean, 1998a); and buy additional shares if the current price is lower than the original purchase price (Odean, 1998a).

Chen et al., (2007) also investigated decision-making in an emerging market using data from China. Their findings revealed that the Chinese investors suffered from three psychological biases, namely; the disposition effect, overconfidence, and representativeness bias. The stocks individuals sell perform better than stocks they purchase, thus demonstrating that they make poor trading decisions. Barber and Odean (2000) previously showed consistent observations. They analyzed the return performance of stocks held by individuals in the U.S. Their findings revealed that the net returns of investors who traded actively were significantly low – 3.5% below the market returns. They attributed the results to the overconfidence bias prediction that investors' excessive trading is harmful to their wealth. Similarly, the findings from a study conducted by Kim and Nofsinger (2003) reveal that Japanese individual investors make poor trading decisions. The Japanese investors also buy stocks that have recently performed well, trade in risky and high book-to-market

stocks, and trade frequently. The authors concluded that the tendency to hold value stocks during a bull market and high-risk stocks during a bear market was largely attributable to the overall poor performance of the individual investors.

A large body of research has examined the performance of individual investors in terms of the holding period. One of the findings in the study conducted by Barber et al. (2009b) over the period 1983 to 2001 to examine the trading behaviour of individual investors, using the Trade and Quotes (TAQ) and Institute for the Study of Security Markets (ISSM) transaction data revealed that returns were predictable over shorter periods (i.e. between one week and a month). That is, the stocks that many investors bought (sold) one month or less earned strong (poor) return in the following period. This pattern of performance, however, seemed to reverse for periods over one month. Equity markets consider individual traders as noise traders since the size of their orders tends to be small. The authors, therefore, extended their analysis to compare the return prediction ability of small and large trades. The results indicated that contrary to small trades, the performance of heavy purchases of large trades one week, was poor in the subsequent week. In contrast, performance in the subsequent week was strong for the heavily sold stocks. Furthermore, the study showed that when the authors measured performance over a longer horizon (e.g. annually), the imbalance between purchases and sales of each stock predicted the returns the subsequent period. That is, the return was low for heavily purchased stocks one year compared to stocks heavily sold in the following year. Barber et al. (2009b) attribute these deviations from fundamentals to the correlated sentiment-based trading of individual investors.

A recent study by Kelley and Tetlock (2013) examined the role of self-directed retail traders in stock pricing. They argue that retail traders may trade on noise because of little investment knowledge and experience (i.e. novice). Because of the noises, they influence and cause market prices to deviate from fundamental values. Their findings reveal that daily order imbalance of retail traders positively predicts returns at horizons up to 20 days. The authors further emphasized that their findings were consistent with the noise trader hypothesis since the point estimates of return predictability for horizons, up to one year, were positive.

A study by Barber and Odean (2000) examined household data in terms of their monthly turnover from 1991 to 1996. They compared the performance of the frequently trading versus the least trading investors. It turned out that the returns earned by the most active investors on annual basis, net of trading costs, was 11.4% while the same for the least active traders was 18.5%. In general, the preceding discussion suggests that the trading behaviour of individual investors has a deleterious effect on the performance of their investment.

Other research on trading behaviour, however, suggests that some individual investors systematically make profits. Ivković and Weisbenner (2005) for instance, found that despite strong susceptibility to locality bias, the average household earned an additional 3.2% per annum from its local investment compared to its non-local holdings. In another study, Ivković et al. (2008) examined whether individuals who hold concentrated portfolios do so in order to exploit information advantages. Their findings revealed that households whose investment portfolios had fewer stocks, outperformed those with more diversified holdings. They related the good performance to successful exploitation of information asymmetry. Similarly, Coval et al. (2005) document that individual investors differ in terms of investment skills. According to their findings, the returns of traders classified among the top 10% outperformed those classified among the bottom 10% by up to 15% per day during the subsequent week. The authors thus, argue that due to the differences in learning ability and skills development through trading, it may be rational for some traders to trade frequently and earn losses.

Traditional finance proposes that an investor can reduce risk and increase expected returns by holding unrelated investments. However, evidence shows that, on average, portfolios that individual investors hold have a small number of stocks, are under-diversified, and perform poorly (Barber and Odean, 2001, Barber et al., 2009a, Barber and Odean, 2000, Odean and Barber, 1999, Odean, 1999). In addition, Goetzmann and Kumar (2008) point out that individual investors invest in highly related portfolios. Research also indicates strong persistence in the performance of an individual investor's trades, and those who have investment skills may be able to earn abnormal returns (Coval et al., 2005). Moreover, Ivković and Weisbenner (2005) found that despite showing preference for local investment, households with investments in local stocks were able to benefit from local knowledge (other related work includes; French and Poterba, 1991, Grinblatt and Keloharju, 2001b, Huberman, 2001, Massa and Simonov, 2006). Studies such as Barber and Odean (2001) attribute the lack of diversification to a number of reasons, including ignorance of its benefits, entertainment (sensation-seeking) trading, and overconfidence. According to Ivković et al. (2008) other reasons include; higher fixed costs of trading in relation to the number of stocks, behavioural biases such as familiarity, and intentional following the assessment of the trade-off between benefits and the associated risks.

5.5 Research Methodology

This section presents a description of the research methodology that the study employed. We start by discussing the research design and the data collection strategy. After that, we provide the operational definitions (measurements) of the variables used to test the hypotheses. Furthermore,

we explain how we ensured the survey instrument's validity and reliability. Finally, we describe the data analysis techniques that we applied.

5.5.1 Research Design

Research design is the overall framework or blueprint for conducting a scientific study (Saunders et al., 2009, Creswell, 1994). The main function of the research design is to specify the needed procedures that enable the research to obtain appropriate evidence that would sufficiently answer the research question (Malhotra et al., 2003). For a given research question (or theory), it helps the research to address important matters such as what data is relevant and sampling issues. It also deals with methods of data collection and analysis of the results.

There are various research designs from which a researcher can select. The choice of the appropriate one is mainly determined by the research objectives and questions (Crotty, 1998). Other considerations include; the extent of existing knowledge, accessibility to data sources, theoretical underpinning, and the amount of resources available (Saunders et al., 2009, Zikmund, 2003). The main objective of the current study is to identify the dominant behavioural factors, their impact and relationship on retail-investors' decision-making. Consistently, the suitable methodological approach for this kind of study is a cross-sectional design.

The following reasons guided the choice of this design. First, the study is a type of conclusive research, where we collected data only once from a sample of shareholders of DSE listed firms. That is, the study involved retail individuals as a unit of analysis. In such circumstances, a sample survey becomes a more appropriate approach for examining individual attitudes and characteristics (Isaga, 2012, Malhotra et al., 2003). Second, a survey enables the researcher to collect a large amount of data in a quick, efficient and economical way from a sizeable population. Finally, typical of frontier-market characteristics, the DSE suffers from limited secondary data availability. In this case, the use of a survey strategy is plausible to quickly acquire new data (Zikmund, 2003).

5.5.2 Area of Study

The study mainly focused on retail-investors in the companies listed at the DSE. As such, we did not confine the conduct of the research to a particular geographical location. The reason is that the shareholders are widely dispersed all over the country, and a few even live abroad. However, it is important to note that the DSE is located in the Dar es Salaam Administrative Region. It is also the largest commercial city in the United Republic of Tanzania. According to the Tanzania 2012 Census Information, Dar es Salaam had more than 3 million inhabitants. Compared to other

cities in the country, Dar es Salaam has a high concentration of capital, economic and social activities, most of the economic infrastructure, and skilled labour (Ishengoma, 2005). Moreover, the city receives specific attention from the government because the headquarters of nearly all ministries are located there. Because of these qualities, all seven brokerage firms have offices and provide their services, mainly in Dar es Salaam, although a few of them have established their agencies up country. This is because it is more likely that majority shareholders are concentrated in the city than in other regions.

5.5.3 Sampling Procedure

A sampling approach is any procedure that enables a researcher to obtain a small part of the population and use the same to make conclusions about the whole population. There are two basic sampling approaches for selecting respondents. These are probability-based and non probability-based samples. The probabilistic sample is the one where every unit in the population has an equal chance of selection. On the other hand, a non-probabilistic sampling technique uses human judgement to select sample units (Malhotra et al., 2003). Accuracy and cost effectiveness guide the selection of the suitable procedure.

In this study, we adopted a combination of non-probability sampling techniques. First, we used a convenience sampling approach, which allows the researcher to select respondents from a particular group because they are readily accessible and fit the objectives of the study. In our case, the unit of analysis was the shareholders of listed companies at the DSE. These people possess the intended information for answering the research questions (Zikmund, 2003) and were therefore purposively selected. In addition, we employed snow balling; asking the initial participants who voluntarily agreed to complete our survey instrument to identify or signpost others (e.g. colleagues, relatives, etc.) who also own shares, informing them about the study. We then selected subsequent sample units based on these referrals. These approaches are suitable and more efficient than random sampling techniques in circumstances where there is no accurate and up-to-date sampling frame (Malhotra et al., 2003, Isaga, 2012).

This is exactly the situation in many countries in the sub-Saharan region and Tanzania in particular (Isaga, 2012, Milanzi, 2012). The DSE maintains the register of shareholdings in the Central Depository System (CDS). The CDS database electronically reports changes of ownership of stocks of all investors. The only contact details available in the database were the postal addresses investors provided during the IPOs. With increased usage of mobile phones and emails, many

people nowadays rarely use their post office boxes for communication. As such, the register was not very useful.

The researcher interviewed one of the DSE officers with regard to this issue who stated that efforts were underway to up-date the investors' details. The DSE instructed the brokerage firms to obtain details such as mobile telephone numbers and email addresses of all investors who trade with them. With this hindsight, the researcher contacted all seven brokerage firms and asked them to facilitate the administration of the survey instrument. They all agreed and provided the enormous support.

5.5.4 Sample Size

Sample size means the number of participants that the researcher includes in the survey. The size of the sample affects how the findings represent the population. Hair et al. (2006) point out that sample size directly affects the desired statistical power of multiple regressions and generalizability of the results. They contend that when the sample is not big enough, generalizations about the population cannot be realistic. On the other hand, they point out that statistical tests become too sensitive with very large sample sizes. That is, almost all variables in the model are likely to be significant. The researcher therefore, needs to ensure an appropriate sample such that the expected effect size is in line with the statistical significance. There is consensus in the literature that generalizations from larger samples are more likely to provide accurate reflections of the population characteristics (Saunders et al., 2009, Hair et al., 2007).

Our sampling units in this study were retail investors of the DSE. However, as stated earlier, we could not establish an acceptable sampling frame from the CDS database. As the nature of the study is quantitative, the absence of the sampling frame rendered the probability sampling strategies inappropriate. Notwithstanding, several qualitative factors influence the sample size determination. Apart from the nature of the research design, Malhotra et al. (2003) for example, point out that the requirements of the methods of data analysis, and the number of variables also guide how large the sample should be. The authors further contend that the average sample size used in similar studies, and resource constraints are important factors to consider.

The study mainly employed multivariate data analysis techniques (factor analysis, and multiple regression methods). These analysis methods require large sample sizes. Tabachnick and Fidell (2007) indicate that a sample size of N>=50+8*M is adequate for regression analysis. M stands for the number of independent variables. According to Hair et al. (2006) when non-probability sampling techniques are used; an average ratio of 10 observations per variable is sufficient to carry

out such scientific analyses. In this study, the psychological construct with the highest number of observations in our conceptual model has 21 items. According to the rule suggested above, the required sample size would be 210 respondents. However, using different types of research questionnaire mediation, the researcher distributed more than 1,800 questionnaires (see Table 5.4).

5.5.5 Ethical Considerations

Research ethics can be defined as set of moral principles, standards and values that shape the researchers' conduct in carrying out a scientific inquiry (Bailey, 2007, Pickard, 2007, Saunders et al., 2009). Despite being important, particularly when human subjects are involved, there is no agreement as to what constitute ethical behaviour in research due to different schools of thought (Johnson and Christensen, 2007). The differences are more inclined to how moral dilemmas (i.e. what is right or wrong) are dealt with than in the moral conclusions reached. In any social science research, however, the researcher is obliged to observe a number of ethical issues. These include; protecting the privacy of the participants, causing no psychological, physical or social harm to the respondents, and using fair means of obtaining the data (Malhotra, 2008).

From the beginning of this study to the report writing stage, appropriate weight was given to ethical considerations. The research documents were reviewed by and the study granted ethics approval by the University of Hull Business School HUBS Research Ethics Committee *Proforma HUBSREC201302*. We clearly defined the research problem, and supported the same with the relevant theoretical and empirical literature. Furthermore, we acknowledged all sources of references used in the study. With regard to the participants, we asked them not to reveal anything that they thought would harm them psychologically, physically and socially. The cover letter to our survey instrument sought the participants' consent and included a phrase that gave them freedom to withdraw anytime from the study. The researcher also made clear the objectives of the study to ensure mutual understanding. The letter provided assurance of anonymity and that respondents' information was confidential.

5.5.6 Data Collection Strategy

The data collection is a stage that follows the formalization of the sampling procedures and the required sample size. Like in other stages, Malhotra et al. (2003) point out that several factors like experienced response rate, and objectives of the study influence the selection of data-gathering methods. As we stated earlier, the lack of a useful sampling frame partly limited our study. This led us to adopt the convenience and snowball sampling techniques using the survey approach. Respondents in this study were drawn into the sample based on the characteristic as investors in

the DSE and also readily accessible to the convenience of the researcher. Snowball technique, on the other hand, is used when members of the population are difficult to locate. The researcher, therefore, contacted initial respondents and asked them whether they knew anybody with the shares of companies listed at the DSE. These were later approached and invited to participate in the research. These in turn gave referrals to other potential respondents.

5.5.6.1 Development of the Survey Instrument

Many studies in behavioural finance use proxies for psychological biases instead of examining them directly (Shefrin and Statman, 1985, Heath and Tversky, 1991, De Bondt and Thaler, 1994, Shefrin, 2002, Barber and Odean, 2000, Barber and Odean, 2001). Like Graham et al. (2009) who used data from several UBS/Gallup investor surveys, we intended to measure the influence of these biases using questionnaire responses. Unlike them, however, we developed our own survey instrument from scratch. We followed the instrument development approach used by Dwivedi et al. (2006). The process involved several stages, including selection and creation of items, content validation, pre-testing, and confirmatory study.

5.5.6.1.1 Selection and Creation of Items

There are various behavioural theories that explain why people sometimes act on emotions and end up in the wrong direction. In investment literature, however, a number of previous studies employing a survey design have examined only one or two psychological biases to predict their effects on investor behaviour (see, for example, Glaser and Weber, 2007a, Graham et al., 2009, Beckmann and Menkhoff, 2008). In addition to examining the individual effects of these biases, this study considered whether there are combined effects among the theories in explaining the dependent variables outcomes. Based on this, and in consideration of contextual issues, this study explores the six common behavioural biases that often affect investing behaviour among retail investors. These include; availability bias, representativeness bias, and overconfidence. Others were ambiguity aversion, regret aversion, and loss aversion.

We employed a combination of approaches to develop the survey questionnaire items for each of the constructs. The first method involved an extensive review of the literature. We also adopted and reworded a number of other items from previous surveys and experimental studies. The application of the methods resulted in 179 items representing the six behavioural constructs as shown in Table 5.1

Table 5.1: Initial Questionnaire Items

Construct	Number of Items	Source
Domestic Stock Preference	22	Literature review; adopted from (Dwivedi et al., 2006; Bearden et al., 2001)
Disposition Effect	4	Literature review; adopted from (Waweru et al., 2008; Beckmann and Menkhoff, 2008)
Availability Bias	28	Literature review; adopted from (Dwivedi et al., 2006; Bearden et al., 2001)
Representativeness	25	Literature review; adopted from (Waweru et al., 2008)
Overconfidence	35	Literature review; adopted from: (Beckmann and Menkhoff, 2008; Glaser et al., 2010; Bearden et al., 2001; Glaser and Weber, 2007; Simon et al., 2000; Chen et al., 1998; Chen et al., 2001; Deaves et al., 2009)
Ambiguity aversion	36	Literature review; adopted from: (Budner, 1962; Buhr and Dugas, 2002; Venkatraman et al., 2006)
Loss aversion	5	Literature review; adopted from (Waweru et al., 2008; Beckmann and Menkhoff, 2008)
Regret aversion bias	24	Literature review; adopted from (Waweru et al., 2008)
Total	**179**	

5.5.6.1.2 Content Validation

Content validity is the measure of the extent of communality or overlaps by knowledgeable members of the evaluation Panel regarding whether a created item captures the essence of a particular construct domain (Lawshe, 1975, Straub et al., 2004, Dwivedi et al., 2006, Saunders et al., 2009). Although instrument validation is useful in ensuring that the gathering of data is as objective as possible, its use in investor psychology related research when collecting data via surveys has been rare. Some authors, e.g. Straub et al. (2004), argue that despite using experts, a panel of judges or field interviews with key informants, there is no guarantee that the resulting lists of the drawn instrument items are representative of the universe. This is because the evaluation method is judgemental and subjective. Dwivedi et al. (2006) however, insist that the procedure is highly recommended not only when developing a new instrument, but also when using an existing scale to examine any new object. Since these conditions apply to our study, we proceeded to the validation of the initial pool of the identified items.

Following Dwivedi et al. (2006) we conducted an experience survey using the same list as a content validity questionnaire. We provided a brief description of each of the constructs and measured the items in the pool on a three-point scale where: 1 = not necessary; two = useful but not essential; and 3 = essential. Participants who took part in the validation process were drawn from three groups. First, we compiled a list of academic experts in the field of behavioural finance from articles published in three-star or above peer-reviewed journals as provided in the Academic Journal Quality Guide, version 4 of the Association of Business Schools (2010). We sent out requests to participate together with the questionnaire, to authors who provided email contact details on their published articles. Second, we consulted colleagues pursuing PhD studies in marketing and psychology-related areas to complete the same. The last group involved practicing

professionals from brokerage firms operating at the DSE. According to Lawshe (1975), those who perform a particular job are better positioned to make required judgement because they are expected to have greater understanding of the subject matter. We, therefore, included professionals in the experience survey since they deal with the retail investors daily, hence are knowledgeable about their behaviours. For these last two groups, we used the drop-and-pick strategy to administer the questionnaires.

Table 5.2: Content Validity Respondents

Group	Requested	Responded
Academic experts	49	3
Brokerage firms	7	4
Colleagues	5	2
Total	**61**	**9**

The cover page to the questionnaire contained the purpose of the study and the completion instructions *(Appendix 2*). In addition to completing the questionnaire, we asked the participants to assess how the initial list of items captured the expected dimensions. We requested them to provide any additional comments and suggestions such as rewording; proposing a new item, as they deemed necessary. Table 5.2 presents the summary of the number of questionnaires administered to, and usable responses received from the different groups described above.

We then pooled the responses from all the survey participants and determined the number indicating "essential" for each item (see, Lawshe, 1975, Dwivedi et al., 2006). The decision to retain or eliminate the item from the list depended on the extent of concurrence by the members of the content evaluation panel. When half or more of the panellist perceived an item as "essential," that implied there is a greater degree of consensus among the members about the validity of its content (Lawshe, 1975). Accordingly, the results in Table 5.3 show that the final questionnaire comprised of 90 items representing the behavioural constructs.

Table 5.3: Summary of Content Validity Items

Construct	Number of Items	Retained Items
Domestic Stock Preference	22	8
Disposition Effect	4	3
Availability Bias	28	15
Representativeness	25	12
Overconfidence	35	21
Ambiguity aversion	36	14
Loss aversion	5	3
Regret aversion bias	24	14
Total	**179**	**90**

5.5.6.1.3 Instrument Translation

Although English is the official language, Kiswahili is the language that many Tanzanians speak. It was therefore, necessary to have two versions of the questionnaires in order to accommodate those who were not comfortable with completing the English version. The researcher, in collaboration with the National Kiswahili Council (BAKITA), translated the instrument from English to Kiswahili. To ensure that the contents of the two versions were the same, we requested a different person from BAKITA to translate the Kiswahili version back to English and this was compared to the original English version to ensure meaning was retained. Accordingly, a few corrections were made to the final Kiswahili instrument.

5.5.6.1.4 Instrument Pre-testing

Questions that are clear and consistent in terms of meaning to all respondents can be instrumental in reducing bias. In addition, they are useful in reducing non-response and errors in drawing conclusions. As Saunders et al. (2009) and Choudrie and Dwivedi (2006) recommend, the researcher pre-tested the instrument before conducting field work. Pre-testing is necessary for checking whether the respondents understand the wording of the questions; confirming the suitability of the format of the questionnaire and questions; and for identifying areas of improvement before putting the instrument into use.

As suggested, we conducted the pre-test of the instrument between March 2013 and April 2013 with a sample of 20 respondents (see, Saunders et al. (2009) concerning sample size). The questionnaire was distributed to 13 members of academic staff at the School of Business of Mzumbe University and seven brokers in Dar-es-Salaam. Consistent with the comments made by the content validity experts, the respondents were concerned with the length of the questionnaire. Since the study aimed at exhausting as many psychological biases as possible, no change was made to reduce the length. Apart from aforementioned observation, the pre-test participants supported the contents of the instrument.

5.5.6.2 Conducting the Survey

The final questionnaire was comprised of three sections *(Appendix 3)*. The first section was designed to elicit individual information, including demographic characteristics of investors. The second section consisted of questions that sought the respondent's information about stock investment decisions. The third section of the questionnaire contained the multi-item measures of

each psychological construct thought to influence investment decisions. The items were measured on a five-point Likert scale ranging from 1(strongly disagree) to 5 (strongly agree).

The dissemination of the questionnaire for collecting the data took place between May 2013 and February 2014. Many studies using surveys have largely depended on hard-copies delivery to potential respondents. One of the delivery methods used is postal mailing whereby the researcher sends a personalized envelope, a signed cover letter, the survey, and a postage-paid envelope to each of the identified respondents. Graham and Harvey (2001) for example, employed both a mailed and a fax version to distribute copies of their survey. They further used phone calls and faxes to make follow-ups. The primary advantage of using mailed surveys is that it is possible to identify and reach literate individuals by name, organisation, etc., (Saunders et al., 2009). The main disadvantage of this method is that it has relatively high financial implications, for example, outward and return postage expenses, and response rate is also low. Graham and Harvey (2001), for instance, experience a response rate of about 9%.

Other researchers opt for the drop-and-pick strategy to administer their instruments in person in order to enhance respondents' participation (Saunders et al., 2009). However, the major weakness of this method is that the responses are not anonymous. According to Graham and Harvey (2001), anonymity is important if the researcher wishes to obtain frank answers.

Due to advances in web-based services, researchers in recent days replace and/or complement hard-copy surveys with online surveys as well (Malhotra, 2008). With the latter, the creation and distribution of the questionnaires and collection of the responses is online. The online survey enables the researcher to reach many potential respondents in a short period, particularly when they are geographically dispersed. Moreover, the design of online surveys enhances participation monitoring. For example, the survey can be set in a way that does not allow the respondent to skip any question hence facilitating higher question completion rate. As the collection of the data is in the electronic format, it is easier to export the same to statistical packages for analysis without much need for hand coding. This helps to avoid measurement errors that can arise due to mistakes during transcription and manual data entry. Consequently, the whole process becomes more efficient, expedient, accurate, and economical. However, Saunders et al. (2009) point out that the likely response rate for internet-mediated questionnaires is around 11% or lower.

With this hindsight, this study employed both of the above-discussed self-administered types of questionnaires. The researcher however, did not use postal mail method to administer the

questionnaires. As stated section 5.5.3, the details on the CDS database were not up-to-date making it difficult to ascertain whether the contact addresses were active or not.

The delivery and collection (drop-and-pick) approach was employed by visiting various places where stocks investors can be located such as; public and private offices, investor relations departments at the headquarters of listed companies, brokerage firms, schools, restaurants, seminars or workshops, Masters student classes at Mzumbe University and other institutions, to mention a few. In all these places, the researcher sought out individuals who own shares in any of the DSE listed companies and they were requested to participate. The researcher also attended some company annual general meetings where questionnaires were administered to shareholders who expressed interest to participate. Some respondents completed and returned the questionnaires on the same day, others took a few days to complete. With the latter, the researcher requested for their mobile phone numbers for follow-up and retrieval of the completed questionnaire.

It is worth noting that the participation of Tanzanians in equity investments is very low (less than one percent of the population) (Mrindoko, 2011). The contributing factors include low public awareness, lack of understanding of the available market opportunities, and low levels of income as measured by the GDP per capita (World Bank, 2011). As a result, there is a large geographical dispersion of investors, making it difficult to reach them using only the drop-and-pick approach. The researcher, therefore, considered online distribution of the instrument as an appropriate alternative. The study used *Survey Monkey* (www.surveymonkey.com) an online company that allows users to create and administer their web-based questionnaire to selected respondents.

The study used web-link and email dissemination mechanisms. The web-link can be sent via email or other options such as text message, or personal message using social media. The researcher used all collated contacts to deliver the questionnaire to respondents. This included contacts obtained from brokerage firms who maintain clients' email addresses, group mail contacts, investor relations departments at the headquarters of listed companies, and personal contacts, to mention a few. Note that for other sources, for example, group emails, the researcher could not establish in advance whether the account holder was or was not an investor.

The Survey Monkey email delivery method was most preferred. This was because it enables the researcher to add several email contacts at once and send a unique survey link through a customized invitation by the web's mail server to each individual recipient. The invitation email explained the purpose of the study, how the researcher obtained the contacts, and maintained that

participation was voluntary. Furthermore, it contained instructions on how to complete the questionnaire for example requesting respondents to click (or tick) the relevant response option on a five-point Likert scale; type answers to open-ended questions, and to submit the completed questionnaires by clicking the submit button on the last page of the survey. The invitation to participate also included a request that recipients provide contact details of other individuals, who own shares in DSE listed companies, and would like to participate in the study.

The email invite included a hyperlink (SurveyLink) that the recipient had to open if he or she accepted the invitation. This link allowed the respondent to take the survey at a convenient time. Another link (RemoveLink) gave the recipient the option to withdraw from participation if he or she so wished. The researcher used the Edit Recipient section of the SurveyMonkey that provides a respondent tracking feature. It checks the status of the emails, the number of those who have responded, not responded, and who have opted out. This enables the researcher to send reminders to those who have not responded. The researcher sent the initial invitation emails from July 2013 and several others whenever he obtained new contacts. Reminders were sent each month to those who had not responded or opted out of the survey. Potential participants who selected the RemoveLink did not receive reminders. The survey ran from July 2013 up to the end of February 2014 when the link was deactivated.

5.5.6.3 Response Rate

The researcher administered 1,827 questionnaires in total and 338 respondents completed the questionnaire by the end of the data collection process as indicated in Table 5.4. The breakdown shows that the researcher collected 160 questionnaires by hand and received 178 through the web. Out of the 178, however, 53 were partially completed and the remainder 125 were fully completed. The response rate for the drop-and-pick questionnaire type was higher than that of web-based questionnaires. This was partly because the researcher sent emails to all contacts at his disposal. It is therefore, possible that some emailed individuals were not shareholders of listed companies. Moreover, of the 1,277 questionnaires sent via the website, 1,030 recipients did not respond; 54 emails bounced, and 15 recipients opted out. The overall response rate was 19%.

Table 5.4: Survey Responses Summary

Questionnaire Delivery Type	Administered	Collected	Response Rate
Drop-and-Pick	550	160	29%
Online	1,223	178	15%
Total	**1,773**	**338**	**19%**

5.5.7 Data Analyses Strategy

Following the completion of data collection, the researcher embarked on analyzing the same in order to obtain the findings and make sense of the study. The ensuing section details the analysis strategy that the researcher followed.

5.5.7.1 Data Preparation

On completion of the fieldwork, the researcher coded and entered all collected questionnaires in the computer using the statistical package for social sciences (SPSS). Due to different questionnaire administration strategies, it was important to check the questionnaires for completeness, consistency, and ambiguous responses. With regard to completeness, out of the 338 collected questionnaires, 56 were not acceptable for further analysis because they were missing large parts of information. They were therefore, discarded. Of the remaining, 91 questionnaires had up to three missing responses considered as unsatisfactory responses, small omissions and hence ignorable (see also, Malhotra, 2008, Hair et al., 2006). A thorough examination of the responses revealed that the missing data was because the participants left the items blank. We thus replaced the missing values by assigning the series mean.

The researcher further cleaned the data by identifying unengaged and out-of-range responses. We checked the variations in the answers provided by the respondents by computing the standard deviation of their ratings on the 5-point Likert scale. Consequently, we discarded two questionnaires because of little variation. This resulted in a final sample size of 280 usable responses received from the retail investors. Several other surveys in behavioural finance have used almost similar sample sizes in their analyses (Nagy and Obenberger, 1994, Glaser and Weber, 2007a, Graham et al., 2009, Deaves et al., 2010).

5.5.7.2 Descriptive Statistics

The researcher conducted a number of analyses to provide the general description of the sample. These included the running of the frequency distribution to examine the number of out-of-range, missing, and extreme values. This also gave insights about the averages, and the distribution of the data (Malhotra, 2008).

5.5.7.3 Factor Analysis

Factor analysis is a technique used for reducing and summarizing a large amount of data in order to make them more manageable with a minimum loss of important information (Malhotra, 2008).

It enables the researcher to analyse interrelationships among a large number of variables and present them in terms of a set of fewer linear components (Hair et al., 2006, Zikmund, 2003). There are a number of reasons for undertaking factor analysis in this study. We used confirmatory factor analysis to examine the validity of the items. As stated earlier, we composed our survey instrument by combining adopted items from previous studies and from scratch based on theory and the literature. It was therefore, crucial to examine the correlation structure of the underlying dimensions (e.g. better-than-average bias) to have a better understanding of the variables (Hair et al., 2006, Malhotra, 2008). We also used factor analysis to reduce the number of variables to just a few that explain most of the observed variances. In addition, we created new composite variables (summated scales) for each factor and employed these composites in subsequent analyses such as multiple regressions.

According to Malhotra (2008), correlation between variables is an important ingredient warranting factor analysis. Two formal statistics are used to test the suitability of the factor model. The first is the Bartlett's test of sphericity, which tests the null hypothesis that the variables are uncorrelated. The rejection of the hypothesis implies that performing factor analysis is appropriate. The second widely used statistic is the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA). This is an index of the magnitude of observed and partial correlation coefficients. For the factor analysis to be appropriate, the value of the KMO statistic has to be larger than 0.5. The interpretation of KMO according to Hair et al. (2006) is as follows: 0.80 is commendable, 0.70 or above is middling, 0.60 or above is mediocre, 0.50 or above is miserable, and below 0.50 is unacceptable.

Another important step involved in conducting factor analysis is determining the method of factor analysis. In this study, we employed the principal component analysis (PCA) to establish the dimensions of our data set. This technique is concerned with locating the linear relationship that exists between different variables and narrowing it to a small number of components under common themes. We used the direct *oblimin* as the rotation method. When measuring psychological constructs, such as investors' decision-making behaviour, the oblique type of rotation seems to be more realistic as it allows the factors to correlate with each other.

5.5.7.4 Regression Analysis

Regression analysis is a popular data analysis technique used in many research areas to determine associations between variables. More clearly, the technique is used to analyse the relationship between one dependent variable and other (one or more) independent variables (Hair et al., 2006). It assumes that there exists a linear correlation between the two variables. When the relationship

involves predicting the dependent variable using a single independent variable, it is referred to as simple regression. Whereas, when there are several independent variables then it is termed multiple regression.

The distinction between simple regression and correlation analysis mathematically is almost negligible. The correlation is an interdependence technique that does not differentiate between dependent and independent variables. It rather, measures the strength and direction of the linear association between two variables. Values of the correlation coefficient are usually between -1 and +1. A correlation coefficient of +1 implies two variables have a perfect positive linear relationship, while a value of -1 means perfect negative correlation. Regression, however, differentiates between the dependent and independent variables. The multiple-regression method is more complex than correlation, as the analysis weighs the relative contribution of each independent variable in the model in the prediction of the dependent variable (Hair et al., 2006). Furthermore, Hair et al. (2006) point out that to apply regression requires: (1) the data to be metric or appropriately transformed, and (2) the researcher to identify the dependent and independent variables.

Consistent with the main objective of the study, the trading behaviour of investors constituted the dependent variable. We measured it into four dimensions, namely; trading frequency, domestic stock preference, stock portfolio diversification, and disposition effect. The current study uses multiple regression analyses to test the influence of the psychological constructs and demographic attributes on preference for domestic stock and disposition effect dimensions (see sections 5.5.8.1.2 and 5.5.8.1.4).

As explained in section 5.5.8.1.1 and 5.5.8.1.3, "trading frequency" and "stock portfolio diversification" are categorical in nature. For that reason, we ruled out the use linear regression since the parameter estimates would not be best linear unbiased estimators, hence violating this assumption. We, therefore, applied the binary logistic model for predicting stock portfolio diversification since the variable is dichotomous.

On the other hand, we measured the responses for "trading frequency" using an ordinal scale. When the dependent variable contains more than two response categories, that have a natural ordering or ranking, the multinomial logit or probit model fails to account for that ordinal nature. Similarly, the linear regression cannot be applied as it treats the difference between the responses, for example, the third and the second, the same as that between the second and the first without considering that the choices are only rankings (Greene, 2003, Gujarati and Porter, 2009). Accordingly, in order to take account of the multiple ranked outcomes, the ordered logistic model

is the most appropriate regression method to use (see also, Graham et al., 2009, Brooks, 2008). The researcher's interest in both methods was to find out the likelihood that a respondent would belong to one of the categories.

One of the differences between the linear regression and logistic models is that, the parameters in ordinary least square (OLS) estimations, aim at minimizing the sum of squared residuals of prediction. On the other hand, the logit model uses the maximum-likelihood method. That is, the estimated parameters maximize the likelihood of observing the actual data (Hair et al., 2006). The other difference is on the estimations' assumptions regarding error terms. While conducting statistical tests, the former assumes normal distribution, and the error terms can take on any values. In contrast, logistic models do not assume that the independent variables are normally distributed, linearly related or have homogeneous variances. Moreover, the value of each error depends on the probability of an event happening.

5.5.8 Measurement of Variables

Consistent with the research hypotheses, the ensuing subsections provide detailed explanations of the data requirements. It also explains how the researcher measured the different constructs.

5.5.8.1 Measuring the Dependent Variables: Investors' Trading Behaviour

Investors' trading behaviour constitutes the dependent variable in this study. We measured this variable based on four actions suggested in the behavioural finance literature; namely trading frequency, domestic stock preference, stock portfolio diversification, and the exhibition of disposition effect.

5.5.8.1.1 Measuring the Trading Frequency

Trading frequency (or propensity to trade) is perhaps the most commonly cited irrational investor trading behaviour that is subject to the influence of heuristic biases. Many previous studies have employed trading frequency as a proxy measure of overconfidence (Grinblatt and Keloharju, 2001b, Grinblatt and Keloharju, 2009, Glaser and Weber, 2009, Chen et al., 2007, Barber and Odean, 2000, Odean, 1999). These studies, used account transaction records, obtained from stock brokerage firms to examine this behaviour. In contrast, the current study employs a survey approach, to measure the influence of various behavioural biases on trading frequency. We, therefore, adopted the scale developed by Graham et al. (2009), modified it to fit our context, to obtain the opinions of the respondents directly without inferring their behaviour from account

transactions. The scale required respondents to assess themselves on how frequent they trade by selecting one out of the seven response categories (see Table 5.5). However, in order to ensure that the participants paid attention when making their selection, we shuffled the order of the choices.

Table 5.5: Trading Frequency

Categories	Frequency	Percent
At least once a day	0	0.00
Less than once a year	110	39.30
Never	134	47.80
At least once a week, but not more than once a day	1	0.40
At least once a year, but not more than once a quarter	21	7.50
At least once a quarter, but not more than once a month	13	4.60
At least once a month, but not more than once a week	1	0.40
Total	**280**	**100.00**

5.5.8.1.2 Measuring Domestic Stock Preference

The variable of domestic stock preference refers to the tendency of investors to favour domestic stocks in their stock portfolios. The researcher did not obtain validated scales for measuring the predisposition towards domestic stocks to adopt for the current study. However, based on extensive literature in behavioural finance and stock investment decision-making context (see, for example, De Bondt, 1998, French and Poterba, 1991), we generated eight items to measure this variable (see Table 5.3). The variable was therefore measured by a summated scale generated from factor analysis (see sections 5.5.7.3 and 5.6.2.1).

5.5.8.1.3 Measuring Stock Portfolio Diversification

In the context of this study, "stock portfolio diversification" refers to the number of DSE listed companies in which an individual investor holds shares. Prior studies document that retail investors do not adequately diversify their holdings across many stocks. In China, for example, the average holding by retail investors is 2.6 stocks (Chen et al., 2007). Ivković et al. (2008) provide a comparable observation. According to their sample, the study revealed that households owned, on average 3.9 stocks; more than half hold one or two stocks; and one-third hold only one stock. Goetzmann and Kumar (2008), however, caution that because of high correlation in returns, holding many stocks may not signify that the portfolio is well diversified. In this study, the examination of "concentrated" and "diversified" portfolio is based upon our operational definition provided previously.

The researcher has adopted and reworded two items from Glaser et al. (2007). That is, we incorporated a question in the questionnaire listing all the 17 DSE companies. Respondents were then asked to identify from the list, all companies in which one own shares in order to ascertain the total number of stocks that each investor holds. From the responses, we treated investors who hold one or two stocks as "concentrated or non-diversified" and those who hold three or more stocks as "diversified" (see also, Ivković et al., 2008).

5.5.8.1.4 Measuring Disposition Effect

We developed three items to measure disposition effect following a review of the literature of renowned behavioural finance experts (Shefrin and Statman, 1985, Odean, 1998a, Grinblatt and Keloharju, 2000, Beckmann and Menkhoff, 2008) and made some modifications to suit our study. We operationalised all items using five-point Likert scales. The variable was therefore measured by a summated scale generated from factor analysis (see sections 5.5.7.3 and 5.6.2.2)

5.5.8.2 Measuring Availability Bias

The availability bias section examines two psychological characteristics of investors that affect the availability of recalled instances. The first is recency bias, the predisposition to the influences of recent experiences and salient events when making judgments. The other is advocate recommendation bias, which is the tendency towards making decisions based on other people's recommendations. The items used to measure the constructs are also based on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Based on our conceptual definition, we measured recency bias using four items, developed from an extensive review of the literature. The scale for assessing the advocate recommendation bias, on the other hand, consisted of three items.

5.5.8.3 Measuring Representativeness Bias

We developed 12 items to examine the role that representativeness bias plays on influencing investors' trading behaviour. More specifically, we assessed how people erroneously assume that generalized or definite conclusions may be drawn from a small-sample informational input (sample size neglect). Two of the items were adopted from Waweru et al. (2008) and the rest from various literature. These items measure the extent to which trend analysis and past events affect individuals' investment decision-making. Again, respondents were required to indicate their extent of agreement with the items on a 5-point Likert scale.

5.5.8.4 Measuring Overconfidence Bias

In this section, we chose to examine two forms of overconfidence independently, covering the indicators of illusion of control and the better-than-average bias respectively. As before, a 5-point Likert scale was employed, where, a score of 1 indicated strong disagreement and a 5 strong agreement. We measured the effect of better-than-average bias using 13 items. One of the items was adopted from Beckmann and Menkhoff (2008). The item tests the extent to which individuals provide unrealistic positive self-evaluation. Three items were taken from a study conducted by Simon et al. (2000). These items asked the respondents to assess themselves how well they would have succeeded in making profit even if others failed. We also took six items from Chen et al. (2001), who developed and validated a new general self-efficacy scale. Lastly, two items were adopted from Dwivedi et al. (2006). Originally, these items were designed to measure consumer perceptions of the broadband adoption. We, therefore, modified them to fit the context of our study.

The study used eight items taken from previous studies and adjusted to fit our context to measure the illusion of control effect. One of the items was used by Glaser and Weber (2007a) and Deaves et al. (2009). The scale has two items, and was reported to have reasonable internal consistency. Another item was adopted from Beckmann and Menkhoff (2008). The measure asks respondents' approval of the statement that published business news related to companies listed at the DSE does not surprise them. The remaining six items were taken from a scale developed by Chen et al. (1998). This scale was developed based on the Levenson (1973) definition of locus of control (see, Levenson, 1981). The Cronbach alpha reliability coefficient of the scale was sufficiently strong.

5.5.8.5 Measuring Ambiguity Aversion

In this study, we measured the ambiguity aversion construct on a 5-point scale in reference to nine items. Of these, we chose five items that fitted well the context of our study from a 20-item scale developed by MacDonald Jr (1970). In addition, one item was taken from Budner (1962) and the remaining three items were adopted from Venkatraman et al. (2006). The scale of the latter items provides a direct self-reported measure of the extent to which an individual investor perceives a situation or material to be ambiguous. Previous studies have reported these scales to have high reliability and validity (see, Gürol and Atsan, 2006).

5.5.8.6 Measuring Regret Aversion

The items used to measure the susceptibility to regret aversion are based on a 5-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Three of the measures of this construct were developed from previous literature (see, for example, Kahneman and Riepe, 1998). We adopted other three items from the scale developed by Jin et al. (2012). The last two items were taken from Waweru et al. (2008). The items were included in our instrument because they reportedly have high reliability.

5.5.8.7 Measuring Loss Aversion

Our scale to measure the susceptibility to loss-aversion bias included three variables adopted from previous studies. Two of the items were developed and validated by Venkatraman et al. (2006). The other item was taken from a questionnaire survey used by Waweru et al. (2008). Here again, respondents were required to indicate their extent of agreement with the items on a 5-point Likert scale.

5.5.8.8 Measuring the Demographic Characteristics

We also explored the effect of several demographic characteristics on the trading behaviour of investors. A binary question was set to enquire about the gender of the subjects. In addition, the study measured the level of financial literacy (knowledge about stock investment) of the respondents by asking the following question: "What is your self-assessment about stock investment matters?" We ordered the responses randomly to allow honest respondents to select the most suitable answer that corresponds to their knowledge. There were five responses, ranging from "not knowledgeable at all" to "very knowledgeable."

Furthermore, the study measured the respondents' stock investment experience in terms of the number of years since the investor first bought shares (see, Deaves et al., 2010). On the other hand, we measured the subjects' annual income by asking them to tick one of five categories ranging from less than Tanzanian Shillings (TZS) 1,000,000 to more than TZS 12,000,000 (see, Bhandari and Deaves, 2006).

5.5.9 Validity and Reliability

Determination of the quality of the collected data is an important step in competent and effective research design. This is because measurement errors have implications for the significance of the results, and may considerably affect the interpretability of the scores.

5.5.9.1 Validity

Validity has been defined as the extent to which a test correctly measures the concept of a study it purports to measure (Hair et al., 2006). We can establish the validity of a measure from the inferences drawn from it, although it is not as simple as it sounds. It is about being able to make appropriate, meaningful, and useful, specific inferences from the items or scores of the instrument. Scholars normally refer to three types of validity for the testing of an instrument's items (Saunders et al., 2009, Zikmund, 2003).

5.5.9.1.1 Content validity

Content (face) validity considers whether or not there is correspondence between the items on a given test and the theoretical domain of the latent construct (Crocker and Algina, 1986). It normally involves a subjective assessment and then an agreement by expert judges of what the scale measures and its suitability. The objective is to ensure that the selected items effectively act as a representative sample of all the possible considerations that could be derived from the construct (Hair et al., 2006, Malhotra, 2008).

For this study, the researcher conducted an extensive review of the literature to find similar scales used in previous studies, which have been proven to be reliable. In cases where the literature revealed no validated scales for adoption, we developed new items from scratch using our conceptual definitions as a guide. We then consulted experts in the behavioural finance field for validation of the items (see, section 5.5.6.1.2). The instrument was also pretested on 20 respondents before data collection.

5.5.9.1.2 Construct validity

The construct validity of a measure addresses the theoretical relationships of defined sets of variables (Hair et al., 2006, Crocker and Algina, 1986, Malhotra, 2008). According to Malhotra (2008), this form of validity is the most sophisticated and difficult to establish. It requires the researcher to have a sound theory of the construct to be able to operationalise and syntactically relate to other constructs. Construct validity includes three most widely accepted forms. Convergent validity assesses the extent to which two hypothesized constructs positively correlate with each other. In contrast, discriminant validity examines the degree of relationship between a measure of interest, and other constructs hypothesized to differ. It involves demonstrating little to no correlation between them. Lastly, nomological validity examines the degree that the scale makes predictions of other concepts based on a formulated theoretical model or prior research

(Hair et al., 2006). In this study, we addressed construct validity issues by using multi-items to measure the psychological constructs. Moreover, we have supported all the hypotheses we have derived with relevant references and derivations.

5.5.9.1.3 Criterion validity

Criterion validity measures the ability of a scale to give an accurate prediction of an outcome (usually of the dependent variable) based on information from other variables selected as meaningful criteria (criterion variables). Depending on the time-period involved, this type of validity is often classified into "concurrent" and "predictive" sub-types of validity (Malhotra, 2008). The term concurrent validity refers to the simultaneous evaluation of the data on the scale and on the criterion variables. On the other hand, predictive validity refers to the degree to which an instrument can predict a future result. The researcher uses the test scores as the basis for making decisions (Crocker and Algina, 1986).

5.5.9.2 Reliability

Reliability, on the other hand, is a necessary but insufficient condition for validity. Reliability can be defined as; the degree to which observed scores of individuals across situations on the same or parallel testing instrument, are free from measurement errors and thus yield consistent results (see, Isaga, 2012, Komba, 2013). According to Saunders et al. (2009) reliability is an indication of the consistency of the findings based on the method of data collection and analysis. Consistently, Zikmund (2003) asserts that reliability is a measure of the internal consistency of an instrument.

There are different ways of measuring this consistency, particularly when the scale is a Likert-type questionnaire that employs multi-items to test a concept. One of the ways, all else being equal, is to administer the same scale or questionnaire to the same respondent at two different points in time. If the subject gets the similar score from the repeated testing, then the scale is reliable (Hair et al., 2006). This is known as stability-over-time reliability or test-retest method (Zikmund, 2003). Alternatively, the researcher can use the split-half reliability method. The researcher splits the data set randomly into two equal parts. The researcher then obtains the score for each participant on each half of the instrument for making a comparison. For the scale to be reliable, there should be a similarity in the person's results when comparing one-half against the other. In addition, the correlation of the scores between the two halves across several participants should be high. However, the major drawback of this method is that the way of splitting the data will largely affect the results.

Many scholars consider the Cronbach alpha (α) coefficient the most common method for testing the internal consistency of a scale for reliability (Hair et al., 2006, Saunders et al., 2009, Zikmund, 2003). It is the average of all split-half reliability estimates of a scale. The coefficient measures the inter-item reliability, i.e. the extent to which different items measure one construct to attain consistent scores. The values of the coefficient range from zero to one. In the social sciences, the generally accepted cut-off point is 0.7, with substantially lower values indicating an unreliable scale (Malhotra, 2008, Hair et al., 2006). However, Kline (2000) advocates that values a value less than even 0.7 can be realistic when dealing with psychological constructs. This is because the measured constructs are of a diverse nature. In this study, the researcher employed Cronbach's alpha method for testing reliability. Given the same reasons put forward by Kline (2000) we considered 0.6 to be an acceptable minimum level of the alpha coefficient.

5.6 Empirical Results

In the following sub-sections, we present the descriptive statistics for the demographic profiles of the respondents, the results of factor analyses, and the estimates of the regression analyses.

5.6.1 Demographic Attributes and Trading Behaviour

As stated earlier, our target respondents were individuals who have invested in shares of companies trading at the DSE. In line with the objectives of the study, this section presents the descriptive statistics of the demographic profiles of the respondents.

5.6.1.1 Gender

A number of behavioural finance scholars have examined gender differences in relation to investment decision-making. A study by Barber and Odean (2001) for example, reported that men are overconfident compared to women. The authors further found that women are less likely to suffer losses in trading as men are. Beckmann and Menkhoff (2008) on the other hand, found no gender differences in trading activity. Our results in Table 5.6 reveal that the composition of the sample was 68.6% males and 31.4% representing female respondents.

5.6.1.2 Financial Literacy

The literature documents that level of education is one of the personal attributes that positively influences the investment and trading behaviour of individuals (Bhandari and Deaves, 2006, Graham et al., 2009). Consistent with this argument, van Rooij et al. (2011) add that financial literacy is even more relevant for understanding various investment alternatives and opportunities.

Table 5.6: Demographic Profiles

Gender			Self-assessment of Stock Investment Matters			Years of Experience in the Stock Market			Annual Incomes in TZS		
Category	Frequency	Percent	Category	Frequency	Percent	Category	Frequency	Percent	Category	Frequency	Percent
Male	192	68.6	Very knowledgeable	56	20	0 - 1 year	22	7.9	Less than 1,000,000	23	8.2
Female	88	31.4	Fairly Knowledgeable	101	36.1	1 to 3 years	45	16.1	1,000,000 - 4,000,000	41	14.6
			Moderately Knowledgeable	107	38.2	3 to 5 years	52	18.5	4,000,001 - 8,000,000	41	14.6
			Not very knowledgeable	12	4.3	More than 5 years	161	57.5	8,000,0001 - 12,000,000	56	20.1
			Not knowledgeable at all	4	1.4				More than 12,000,000	119	42.5
Total	**280**	**100**	**Total**	**280**	**100**	**Total**	**280**	**100**		**280**	**100**

As indicated earlier, it is plausible to believe that knowledge about something may influence one's confidence and ability to evaluate things, including investment decisions by individuals (see also, Bhandari and Deaves, 2006, Graham et al., 2009). In this study, we requested people to rate themselves on their level of financial literacy in stock investment matters. The results of the self-assessment indicated that, a large proportion (38.2%) of the respondents are moderately knowledgeable. As Table 5.6 indicates, another category of the investors assessed themselves as fairly knowledgeable (36.1%), and only 20% as very knowledgeable. Generally, the findings suggest that the sample is normally distributed.

5.6.1.3 Investment Experience

The level of experience is another commonly agreed personal attribute that may explain the trading behaviour of an individual. Gervais and Odean (2001) point out that with more experience, people get to know better about their abilities and world around them. They further contend that, investors assess their own abilities through observing their successes and failures. This in turn leads to overconfidence, a cognitive bias that affects trading activity (Deaves et al., 2009, Glaser et al., 2010). We, therefore, adopted and rephrased the categorical question used by Deaves et al. (2010) to measure years of experience by asking respondents to indicate when they first bought stock. Our results in Table 5.6 show that the majority (57.5%) bought shares for the first time more than five years from the date of the survey. We also find that investors falling into the 1 to 3 years category of experience were 16.1% of the sample. Only 7.9% respondents had less than one-year investment experience.

5.6.1.4 Annual Income

It is logical to believe that there is strong association between participation in stock markets, and financial wealth and/or income. Put differently, the amount of disposable income available to an individual is a key determinant of the decision to invest in stocks. Grable (2000), for instance, contends that the propensity to take-risk increases with the amount of income. In a similar vein,

Graham et al. (2009) asserts that competence level increases with income, which in turn affects trading activity. The majority of Tanzania citizens are subsistent farmers, with little earnings to participate in stock markets. Therefore, it was interesting to examine the annual incomes of retail investors who trade at the DSE.

The results in Table 5.6 reveal that a large proportion (42.5%) of the respondents earn above 12 million TZS per annum. This observation is not surprising as the average monthly salary of many middle ranked government employees, who constitute the majority in our sample, is above one million TZS. The same is even greater for academicians and business sector employees, who account for 42.5% of the sample. Very few (8.2%) of the respondents indicated that their annual income was below one million TZS.

5.6.2 Results of the Factor Analyses

As discussed in sections 5.5.7.3 and 5.5.9.2, we carried out factor analysis to reduce the items of the psychological constructs to fewer linear components that exhibit the same attributes. The main aim was to identify the behavioural or psychological biases that explain the trading behaviour of retail investors at the DSE.

We employed 5-point Likert's items as measurement scales. As previously stated, we conducted the principal component analysis (PCA) for factor extraction on the items with oblique rotation (direct oblimin). The direct oblimin method is more appropriate in psychological studies since the factors in the population are likely to have strong correlation. The reliability of factor analysis depends on sample size. We used a sample of 280 observations to conduct factor analysis. This is consistent with what Hair et al. (2006) recommend as a preferable sample size. According to the authors, the most acceptable sample size in a factor analysis should have a ratio of ten to one (10:1). The ratio for our study was 28:1 (280 respondents/10 factors), far above the acceptable limit.

5.6.2.1 Domestic Stock Preference

As stated in section 5.5.8.1.2, we performed factor analysis on the eight items developed from the literature review. An inspection of the correlation matrix revealed that items DSP1, DSP5, and DSP7 had poor correlations with the rest of the variables. Additionally, examination of communalities showed that items DSP6 and DSP8 had values lower than the 0.5 cut-off. We, therefore, discarded these variables in order to comply with the PCA requirements, and rerun the analysis. The final factor solution led to one factor (see Table 5.7). The loadings of all items are

greater than 0.7 and satisfy the criterion of explaining 60% or more of the total variance. The KMO measure of sampling adequacy for the set of variables is 0.64 and the Bartlett's test of sphericity is significant (0.001). The Cronbach's alpha value is 0.66, which Kline (2000) recommended as acceptable for psychological studies. We retain the variable in the ensuing analysis, while being alert on the interpretation of the results.

Table 5.7: Scale Analysis for Domestic Stock Preference

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1
Scale_DOM	0.66	3	280	DSP3	0.836
				DSP2	0.737
				DSP4	0.713
Total Variance Explained					
Initial Eigenvalues Total					1.80
Initial Eigenvalues % of Variance (total)					60.12
Overall Cronbach's Alpha					0.66

5.6.2.2 Disposition Effect

Recall that in section 5.5.8.1.4, we mentioned that we measured this variable using factor analysis. Before carrying out the factor analysis, we inspected the correlation matrix of the items used to measure the construct. The results indicated that almost all items were strongly correlated at the 0.01 significance level. The results of the factor analysis appeared to be appropriate, as the KMO measure of sampling adequacy was 0.633, and the Bartlett's test of sphericity was significant (0.001).

Table 5.8: Scale Analysis for Disposition Effect

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1
Scale_DE	0.67	3	280	DEF3	0.835
				DEF2	0.789
				DEF1	0.708
Total Variance Explained					
Initial Eigenvalues Total					1.82
Initial Eigenvalues % of Variance (total)					60.70
Overall Cronbach's Alpha					0.67

Given the number of items, the factor solution extracted only one component that cumulatively explains 60.70% of the total variance (see Table 5.8). The internal consistency of scores on the three items is acceptable according to Kline (2000), with alpha value of 0.67.

5.6.2.3 Availability Bias

We conducted factor analysis in order to find out whether the constructs of availability bias produce some linear components with the same attributes as previous research suggests (Barberis and Thaler, 2003, Hirshleifer and Teoh, 2003, Hong et al., 2004, Barber and Odean, 2008). We used 15 items to measure the constructs.

5.6.2.3.1 Communalities and Sampling Adequacy Tests

The proportion of variance on a particular variable shared with all other variables or measures in the analysis is termed as communality (Hair et al., 2006, Malhotra, 2008). According to the authors, the communality values for each variable in the factor solution should be at least 0.5. They further, recommend a bare minimum of the average communalities in the range of 0.6. We adopted this cut-off point in this study. We started by examining the correlations between the variables involved in the analysis in conducting the factor analysis. There were substantial correlations in the matrix greater than 0.3. We also encountered cross loading and lower communality loading problems in several iterations of the PCA. We, consequently, removed six items from the list and computed the final analysis with the remaining nine items which were sufficiently large, to proceed with the factor analysis process. Similarly, the Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = 0.730 (middling) according to (Hair et al., 2006).

5.6.2.3.2 Rotation Matrix, Eigenvalue, and Scale Analysis

We used the eigenvalue approach to determine the number of factors. An eigenvalue shows the degree of variance associated with the factor. The literature suggests retaining in the model, only factors with an eigenvalue greater than 1.0 (Hair et al., 2006, Malhotra, 2008). The results of the final iteration displayed three components that have an eigenvalue greater than one. These components in combination, explain 65.61% of the total variance in each variable included in the final analysis. We retained these three factors. Table 5.9 presents the factor loadings after rotation.

The items in scale1 represent the tendency to overweigh recent salient information (recency bias). Scale2 represents reliance on experts, and scale3 represents social influence. According to Hair et al. (2006) the acceptable cut-off point for loading values is ±0.5. As depicted in Panel A of Table 5.9, the loadings of all the variables included in the components were greater than 0.5. We also examined the reliability of our scale. The Cronbach's alpha value for the entire availability bias scale is 0.75. The alpha values for the individual scales were well above the set minimum level. The values indicate a good internal consistency for the measure.

Table 5.9: Factor Analysis Results for Availability Bias

Panel A: Rotation Matrix, Eigenvalue, and Scale Analysis							
Component	**Cronbach's Alpha (α)**	**# items**	**Cases**	**Question Code**	**Factor**		
					1	**2**	**3**
Scale1		4	280	REC4	0.780	0.044	0.000
				REC3	0.768	-0.063	0.026
				REC6	0.738	0.081	-0.106
				REC2	0.697	-0.061	0.126
Scale2		2	280	ADR2	-0.028	0.912	0.028
				ADR3	0.029	0.897	-0.003
Scale3		3	280	ADR5	-0.051	-0.008	0.840
				ADR6	-0.001	-0.047	0.827
				ADR1	0.083	0.086	0.742
Total Variance Explained							
Initial Eigenvalues Total					3.00	1.79	1.11
Initial Eigenvalues % of Variance (total 65.61%)					33.38	19.94	12.30
Overall Cronbach's Alpha							**0.75**

Panel B: Summated Scale Correlation Matrix			
	Scale1	Scale2	Scale3
Scale1	1		
Scale2	0.251**	1	
Scale3	0.371**	-0.003	1

Note: ** denotes that correlation is significant at the 0.01 level (2-tailed)

5.6.2.3.3 Summated Scale Correlation Matrix

We also examined the correlation coefficients between the identified factors. As indicated in Panel B of Table 5.9, the correlation coefficients between the summated factors tell us that there is some degree of interrelationship. Notably, there is a moderately strong and positive correlation between recency bias and all other variables. However, we found that social influence has little or no relationship with expert influence.

5.6.2.4 Representativeness Bias

We performed factor analysis in order to confirm whether representativeness bias items produce some linear components with the same attributes as previous studies in behavioural finance suggest (De Bondt and Thaler, 1985, De Bondt and Thaler, 1987, Odean, 1999, Barber and Odean, 2000, Barber and Odean, 2001). We initially used 12 items to measure the influence of representativeness bias on the trading behaviour of retail investors.

5.6.2.4.1 Communalities and Sampling Adequacy Tests

Examination of the appropriateness of the scale for factor analysis showed that the majority of the items in the correlation matrix are related. The evaluation of communalities in several iterations, however, resulted in the removal of the following variables; SSN6, SSN11, SSN8, SSN7, SSN5, SSN12, SSN9, SSN2, and SSN1 that had loadings below the acceptable limit (i.e. <0.5). The

final PCA indicates that the Bartlett's test of sphericity ($\chi 2$ (3) = 160.29) was highly significant at $p<.001$. This measure tells us that there are significant relationships between the items included in the analysis. Further, the KMO value (0.672) falls in the range of mediocre. This finding verifies that the sample size is just about adequate. Both measures, therefore, demonstrate that it is appropriate to proceed with factor analysis.

Table 5.10: Factor Analysis Results for Representativeness Bias

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1
Scale4	0.71	3	280	SSN3	0.823
				SSN4	0.802
				SSN10	0.768
Total Variance Explained					
Initial Eigenvalues Total					1.91
Initial Eigenvalues % of Variance (total)					63.71
Overall Cronbach's Alpha					0.71

5.6.2.4.2 Rotation Matrix, Eigenvalue, and Scale Analysis

The analysis resulted into one component with an eigenvalue greater than 1 that accounts for 63.71% of the total variance. As displayed in Table 5.10, we retained this factor for further analyses. The matrix indicates the item's loading pattern after rotation in each of the suggested factors. Note that all variables have loaded well above the cut-off point of ±0.5. The items that cluster on this factor, labelled as scale4 represent extrapolation of past performance. Moreover, the Cronbach's alpha value is good (0.71), indicating that the scale is reliable.

5.6.2.5 Overconfidence Bias

As summarized in Table 5.3, we used 21 items in the factor analysis to establish whether the same pattern of the attributes of overconfidence bias emerges as suggested in the literature (Gervais and Odean, 2001, Beckmann and Menkhoff, 2008, Graham et al., 2009). The number of valid cases met the requirement for performing factor analysis.

5.6.2.5.1 Communalities and Sampling Adequacy Tests

The PCA requires the factor solution to explain at least half the variance of each original variable with a bare minimum of communality value of 0.50. The examination of the communalities and the pattern of factor loadings revealed that items IOC4 and BTA11 had values less than the acceptable cut-off point. We also found that items IOC3, BTA3, and BTA10 had a cross loading

problem. Therefore, we discarded these five items. With regard to the appropriateness of factor analysis, we found that the Bartlett's test of sphericity (χ^2 (120) = 1672.99) was highly significant at 0.001. Moreover, the overall KMO for the set of variables included in the final analysis was 0.871. The KMO values for the individual factors were .882, .500, .707, .500 and .500 for factor 1, factor 2, factor 3, factor 4, and factor 5 respectively. These values fall within the acceptable sample adequacy limits.

5.6.2.5.2 Rotation Matrix, Eigenvalue, and Scale Analysis

We computed PCA to obtain the eigenvalue for each component in the data. In our conceptual framework, we examined two forms of overconfidence biases namely; the better-than-average and illusion of control. In this analysis, five factors with eigenvalue greater than 1.0 emerged as indicated in Table 5.11 . The better-than-average bias resulted into three sub factors labelled scale5 representing perceived competence, Scale6 representing perceived trading knowledge, and scale9 representing perceived self-confidence. The illusion of control bias items clustered into two components labelled scale7 representing self-attribution and scale8 representing reaction to upcoming news.

Table 5.11: Factor Analysis Results for Overconfidence Bias

Panel A: Rotation Matrix, Eigenvalue, and Scale Analysis

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1	2	3	4	5
Scale5	0.86	6	280	BTA8	0.914	0.021	-0.040	-0.044	-0.076
				BTA6	0.808	-0.058	0.096	-0.040	0.015
				BTA7	0.780	0.071	0.105	0.057	-0.008
				BTA4	0.714	0.151	-0.134	0.038	0.044
				BTA9	0.598	0.023	0.112	0.259	-0.054
				BTA5	0.597	-0.107	0.138	-0.141	0.276
Scale6	0.69	2	280	BTA13	0.041	0.830	0.096	-0.066	0.078
				BTA12	0.150	0.753	0.084	0.116	0.003
Scale7	0.77	4	280	IOC5	-0.086	0.052	0.847	0.012	-0.062
				IOC6	-0.027	0.185	0.758	-0.066	0.049
				IOC7	0.160	-0.015	0.705	0.057	0.049
				IOC8	0.216	-0.261	0.569	0.184	0.073
Scale8	0.48	2	280	IOC1	0.086	-0.164	0.082	0.801	-0.061
				IOC2	-0.078	0.212	-0.037	0.751	0.161
Scale9	0.65	2	280	BTA1	0.056	-0.070	0.020	-0.003	0.865
				BTA2	-0.065	0.109	-0.025	0.067	0.809
Total Variance Explained									
Initial Eigenvalues Total					5.65	1.71	1.33	1.07	1.01
Initial Eigenvalues % of Variance (total 67.24%)					35.30	10.68	8.28	6.66	6.31
Overall Cronbach's Alpha									**0.86**

Panel B: Summated Scale Correlation Matrix

	Scale5	Scale6	Scale7	Scale8	Scale9
Scale5	1				
Scale6	0.302**	1			
Scale7	0.574**	0.287**	1		
Scale8	0.325**	0.216**	0.361**	1	
Scale9	0.328**	0.352**	0.270**	0.220**	1

Note: ** denotes that correlation is significant at the 0.01 level (2-tailed)

The combination of these five factors explained 67.24% of the total variance. The overall internal consistency of the instrument is great with Cronbach's alpha of 0.86. Panel A of Table 5.11 presents the Cronbach's alpha values for the individual scales. The values for scale6 and scale9 are relatively low, despite having high factor loadings. Kline (2000) recommends that $0.6 \leq \alpha < 0.7$ is acceptable; we retain these factors in the subsequent analyses, while being cautious of the shortcomings in interpretation of the results. However, the internal consistency for scale8 is unacceptably low. It was therefore, not included in further regression analyses.

5.6.2.5.3 Summated Scale Correlation Matrix

The five-factor solution suggests that four summated scales be constructed using the averages of the items' loadings. A bivariate correlation analysis between the summated scales reveals that there is a strong and positively significant interrelationship among the scales (refer to Table 5.11) In comparison to other pairs, we note that scale5 and scale7 are highly correlated. Overall, the correlations are less than 0.6 (Hair et al., 2006).

5.6.2.6 Ambiguity Aversion

We employed 14 variables to establish patterns that measure investor's tendency to perceive a situation or material as ambiguous.

5.6.2.6.1 Communalities and Sampling Adequacy Tests

We conducted factor analysis for the ambiguity aversion construct. The investigation of the correlation matrix revealed that the correlations of two variables (AMA9 and AMA10) were less than the recommended minimum of 0.3. We removed these variables from the analysis. The majority of the remaining variables had statistically significant relationships that permitted further analysis. We also found that communalities of items AMA1, AMA2, AMA3, AMA6, and AMA8 were below the acceptable limit. Therefore, we discarded these five items. A further examination of the appropriateness of factor analysis, showed that Bartlett's test of sphericity ($\chi 2$ (21) = 495.26) was highly significant at 0.001. Moreover, the overall KMO for the factor solution was acceptable. Similarly, the KMO values for the individual factors fell within the acceptable sampling adequacy requirement.

5.6.2.6.2 Rotation Matrix, Eigenvalue, and Scale Analysis

Table 5.12 presents how the individual variables of the ambiguity aversion construct loaded in the final rotated factor matrix. Three components represent the information of the seven items. The

first factor, labelled scale10 represents belief in principles. The second factor, labelled as scale11 represents need for adequate information. The last factor, labelled as scale12, represents wary of uncertainty. These three components explain 73.47% of the total variance.

Table 5.12: Factor Analysis Results for Ambiguity Bias

Panel A: Rotation Matrix, Eigenvalue, and Scale Analysis

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1	Factor 2	Factor 3
Scale10	0.7	3	280	AMA5	0.854	-0.112	0.025
				AMA4	0.851	0.069	-0.117
				AMA7	0.599	0.080	0.219
Scale11	0.81	2	280	AMA11	-0.019	0.925	-0.023
				AMA12	0.021	0.908	0.023
Scale12	0.7	2	280	AMA13	-0.064	0.020	0.903
				AMA14	0.089	-0.018	0.825
Total Variance Explained							
Initial Eigenvalues Total					2.60	1.52	1.02
Initial Eigenvalues % of Variance (total 73.47%)					37.20	21.72	15.54
Overall Cronbach's Alpha							**0.71**

Panel B: Summated Scale Correlation Matrix

	Scale10	Scale11	Scale12
Scale10	1		
Scale11	0.190**	1	
Scale12	0.410**	0.146**	1

Note: ** denotes that correlation is significant at the 0.01 level (2-tailed)

Moreover, we find that scale10 contributes more than half of the total variance explained (around 37%). This is not surprising. As most individuals amplify the possibilities of unfavourable events happening, they would prefer to follow the guiding principles that show them how to do things. In addition, the scale reliability analysis of the final factor solution reveals that the internal consistency was commendable. As depicted in Panel A of Table 5.12, the Cronbach's alpha values for each scale factor are 0.70 or higher. These factors are therefore, retained for further analyses.

5.6.2.6.3 Summated Scale Correlation Matrix

We computed the summated scales for the factor solution using the mean of the items' loadings. The results of a bivariate correlation analysis in Panel B of Table 5.12, reveal that the summated scales have a strong and positively significant relationship. Specifically, we find a close relationship between scale10 and scale12.

5.6.2.7 Regret Aversion

We performed PCA on 14 variables to establish whether the attributes of regret aversion bias exhibit some patterns suggested in the literature (Kahneman and Riepe, 1998).

Table 5.13: Factor Analysis Results for Regret Aversion

Panel A: Rotation Matrix, Eigenvalue, and Scale Analysis

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1	Factor 2	Factor 3
Scale13	0.78	3	280	RGA9	0.877	-0.085	-0.029
				RGA10	0.804	0.021	0.107
				RGA8	0.762	0.178	-0.002
Scale14	0.62	2	280	RGA14	-0.045	0.851	0.141
				RGA13	0.118	0.819	-0.115
Scale15	0.61	3	280	RGA2	-0.129	0.139	0.820
				RGA3	0.059	-0.058	0.756
				RGA5	0.247	-0.103	0.596
Total Variance Explained							
Initial Eigenvalues Total					2.88	1.36	1.09
Initial Eigenvalues % of Variance (total 66.62%)					35.97	16.99	13.66
Overall Cronbach's Alpha							**0.71**

Panel B: Summated Scale Correlation Matrix

	Scale13	Scale14	Scale15
Scale13	1		
Scale14	0.227**	1	
Scale15	0.422**	0.151**	1

Note: ** denotes that correlation is significant at the 0.01 level (2-tailed)

5.6.2.7.1 Communalities and Sampling Adequacy Tests

The investigation of the correlation matrix warranted proceeding with the PCA process. However, the final factor solution remained with eight items after dropping the other six (RGA12, RGA7, RGA11, RGA1, RGA4, and RGA6) due to communality problems.

Regarding the appropriateness of the factor model, we found that Bartlett's test of sphericity (χ^2 (28) = 508.74) was highly significant at 0.001. The overall KMO (0.731) for the set of variables included in the final analysis verified that the sample was adequate. The KMO values for the individual factors were all acceptable.

5.6.2.7.2 Rotation Matrix, Eigenvalue, and Scale Analysis

Examining the loading pattern of individual variables of regret aversion constructs, in the final rotated factor matrix in Table 5.13 shows that three components can represent the information of the eight items. The first factor, labelled as scale13 represents need for assurance. The second factor, scale14, represents a strong-willed/adamant individual. The last factor, scale15, represents fear of regret. The three components in combination explain 66.62% of the variance.

The scale reliability analysis of the final factor solution reveals relatively low, but acceptable reliabilities for scale14, and scale15, (Kline, 2000). The Cronbach's alpha value for scale13 was 0.78. We retain all factors for further analyses.

5.6.2.7.3 Summated Scale Correlation Matrix

Table 5.13 presents the summated scale results of a bivariate correlation analysis. We observe that there is a positive significant relationship between the variables. Specifically, we find a strong association between scale13 and scale15.

5.6.2.8 Loss Aversion

The scale to measure whether constructs of loss-aversion bias produce the same linear patterns with attributes as previous research suggests (Venkatraman et al., 2006, Waweru et al., 2008) involved three items.

5.6.2.8.1 Communalities and Sampling Adequacy Tests

The investigation of the correlation matrix showed that the number of variables with correlations greater than 0.3 were sufficient to proceed with PCA process. On iteration 1, we found variable "LOA1: After a prior loss, I become more loss averse" to have a communality loading of 0.465. This value less than the acceptable minimum of 0.5, we, therefore, removed the variable and repeated the analysis. In the final factor solution, we found that the probability associated with Bartlett's test of sphericity ($\chi 2$ (1) = 107.25) was less than 0.001. The overall KMO (0.500) for the set of variables included in the analysis satisfied minimum MSA requirement.

5.6.2.8.2 Rotation Matrix, Eigenvalue, and Scale Analysis

Table 5.14 shows that only one factor was extracted and that all variables loaded on that one component. We labelled the factor as scale16. The component cumulatively explains 78.31% of the total variance. The analysis of the scale reliability reveals that the Cronbach's alpha value for the scale is acceptable. We therefore, retain the factor for further analyses.

Table 5.14: Factor Analysis Results for Loss Aversion

Component	Cronbach's Alpha (α)	# items	Cases	Question Code	Factor 1
Scale16	0.72	2	280	LOA3	0.885
				LOA2	0.885
Total Variance Explained					
Initial Eigenvalues Total					1.57
Initial Eigenvalues % of Variance (total)					78.31
Overall Cronbach's Alpha					0.72

5.6.3 Results of Hypothesis Tests

The current study took place in the context of a frontier market, where there is paucity of behavioural research, and the investors are naive about stock investment matters. The aim of the second research question in this chapter, was to determine the strength of each of the identified factors in the preceding section, in explaining the trading behaviour of retail investors at the DSE. In this section, we employ the data analysis techniques described in sections 5.5.7 to test the hypotheses as proposed in section 5.3. The discussion in section 5.5.8 describes the measurement of the dependent variables and the demographic characteristics. Additionally, the influences of psychological factors were examined based on the summated scales of the components that emerged after performing PCA factor analysis in section 5.6.2.

5.6.3.1 Ordered Logistic Regression: Trading Frequency

In section 5.3, we presented the conceptual framework focused on the factors that influence investors' trading behaviour. Under this section, we revisit the research model presented in Figure 5.1, and concentrate on exploring the relative importance of the identified behavioural and demographic predictors in explaining trading frequency. Figure 5.5 summarizes the proposed relationships. In this regression, the outcome variable is Trading_Freq, containing a numerical code for how regularly the respondents trade at the DSE. As in Graham et al. (2009), we coded the data into three levels of trading frequency: 1 if "less than once a year"; 2 if "at least once a year, but not more than once a quarter" and 3 if "at least once a quarter but not more than once a month".

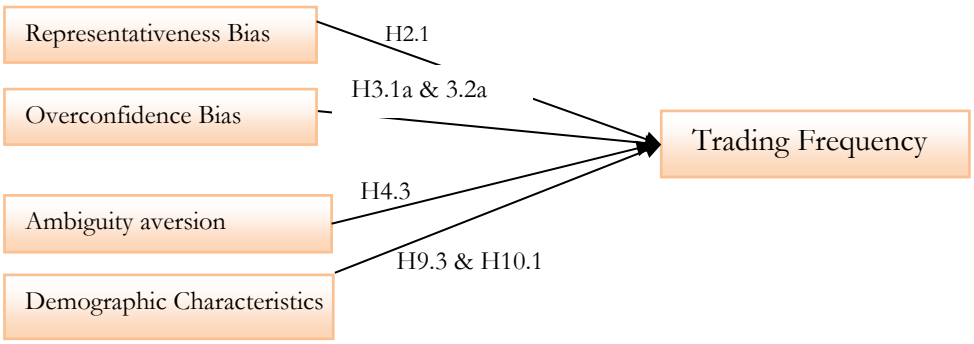

Figure 5.5 Determinants of Trading Frequency

We started by investigating the influence of representativeness bias. Recall, our factor analysis yielded only one factor in Table 5.10. Using ordered logit regression, we model trading frequency as a function of scale4 that represents sample size neglect.

Table 5.15: Determinants of Trading Frequency

Construct	Independent Variable	Estimate	Std. Error	Wald	df	Sig.
Panel A						
Representativeness Bias	[Trading_Freq = 1.00]	0.442	0.520	0.714	1	0.398
	[Trading_Freq = 2.00]	**2.447**	**0.550**	**20.069**	**1**	**0.000**
	Scale4	0.144	0.139	1.067	1	0.302
	R^2 = 0.004 (Cox & Snell); .004 (Nagelkerke); Mc Fadden .002 Test of Parallel lines: Chi-square 1.610 (1), p < .204					
Panel B						
Overconfidence Bias	**[Trading_Freq = 1.00]**	**1.583**	**0.791**	**4.008**	**1**	**0.045**
	[Trading_Freq = 2.00]	**3.728**	**0.821**	**20.638**	**1**	**0.000**
	Scale5	0.176	0.229	0.590	1	0.442
	Scale6	**0.482**	**0.140**	**11.864**	**1**	**0.001**
	Scale7	**-0.465**	**0.204**	**5.189**	**1**	**0.023**
	Scale9	**0.350**	**0.146**	**5.741**	**1**	**0.017**
	R^2 = 0.094 (Cox & Snell); .110 (Nagelkerke); Mc Fadden .050; Test of Parallel lines: Chi-square 7.014 (4), p < .135					
Panel C						
Ambiguity Aversion	[Trading_Freq = 1.00]	-0.909	0.807	1.269	1	0.260
	[Trading_Freq = 2.00]	1.117	0.810	1.904	1	0.168
	Scale10	-0.242	0.186	1.690	1	0.194
	Scale11	0.208	0.124	2.840	1	0.092
	Scale12	-0.132	0.159	0.683	1	0.409
	R^2 = 0.020 (Cox & Snell); .023 (Nagelkerke); Mc Fadden .010; Test of Parallel lines: Chi-square 7.414 (3), p < .060					
Panel D						
Demographic characteristics	**[Trading_Freq = 1.00]**	**-0.420**	**0.203**	**4.297**	**1**	**0.038**
	[Trading_Freq = 2.00]	**1.651**	**0.234**	**49.718**	**1**	**0.000**
	[Tradexp=.00]	**-0.684**	**0.290**	**5.550**	**1**	**0.018**
	[Tradexp=1.00]	**-0.824**	**0.317**	**6.777**	**1**	**0.009**
	[Tradexp=2.00]	0.000	.	.	0	.
	[income=.00]	-0.375	0.311	1.455	1	0.228
	[income=1.00]	0.192	0.345	0.309	1	0.578
	[income=2.00]	0.237	0.309	0.589	1	0.443
	[income=3.00]	0.000	.	.	0	.
	R^2 = 0.051 (Cox & Snell); .059 (Nagelkerke); Mc Fadden .026 Test of Parallel lines: Chi-square 4.759 (5), p < .446					

Table 5.15 shows the ordered log-odds regression coefficients (estimates), the Wald chi-square test, the standard errors of the individual regression coefficients, and the p-values (Sig.). The result in Panel A shows that scale4 has no significant influence on our outcome. Likewise, the probability of the chi-square value of the change in the -2log likelihood (-2LL), which is a test of the overall fit of the model; indicates that the model improvement is insignificant at the 5% level.

The results of the Pearson and Deviance goodness-of-fit specification tests, the respective p-values are 0.788 and 0.759, denote that observed data are consistent with the model we fitted to it. Moreover, we tested the assumption that the effect of predictors on the cumulative odds does not change from one to another. The result of the test of parallel lines failed to provide evidence against proportional odds assumption (p-value = 0.204). That is, the test validates the dependent variable can be treated as ordered as the model specification is consistent with the data.

We next examined the influence of overconfidence bias on trading frequency using the four factors that had adequate reliability in the factor analysis. The result in Table 5.15 Panel B, shows that the log-odds regression coefficient for scale5 is positive. However, the variable has no significant influence on the dependent variable, trading frequency. Scale6, scale7, and scale9, on the other hand, are significant. This means that, all else being equal, a one-unit increase in the scale6 scores would lead to a 0.482 unit increase in the ordered log-odds of trading "at least once a quarter but not more than once a month." Likewise, an increase in scale9 scores by one point, would result in the ordered log-odds of being in the "at least once a quarter but not more than once a month" category to increase by 0.35 while the other variables in the model are held constant. Both, scale6 and scale9, supports hypothesis *H3.1a*. A further review of the log-odds regression coefficients, however, reveals that the direction of the relationship for scale7 is not consistent with our prediction. Therefore, we do not support hypothesis *H3.2a*. Regarding the suitability of the model, we examined the -2LL value and goodness-of-fit specification tests. Both tests indicated that the model fit is acceptable. The result of the test of parallel lines validates that trading frequency can be treated as ordered, because the model specification is consistent with the data.

Presentation of the results of the relationship between the ambiguity aversion scales and trading frequency follows in Panel C. We first assess the ability of the model to improve the prediction of the outcome. The value of the change in -2LL (chi-square 5.514) is insignificant at the 5% level. Furthermore, the Pearson specification test (p-value = 0.08) indicates that the model is a good fit, while the Deviance test rejects this hypothesis at the 5% level. As presented in Panel C of Table 5.15, the log-odds regression coefficients have no significant influence on the trading frequency of investors. The test of proportional odds assumption, on the other hand, confirms that slope coefficients of the explanatory variables are the same across the dependent variable.

Assessment of the overall fit of the model in Panel D of Table 5.15 shows that the -2LL value is reduced from the base model value of 97.431 to 82.887. The associated chi-square 14.543 (5) indicates the improvement is significant at the 5% level, and that the model fit is acceptable. In addition, both the Pearson and Deviance specification tests validate that the model is good. Looking at the estimates and Wald statistics in Panel D, we find that the only demographic attribute that has a significant effect on trading frequency, is trading experience. The ordered estimates for those with fewer years of experience being in the frequent trading category are 0.684 (0-3years) and 0.824 (3-5years) respectively, less than those who have more experience. The results, however, does not support our hypothesized direction of the relationship, hence, we reject hypothesis *H9.3*. Moreover, the test of parallel lines indicates that the odds of change of one level

within our ordinal outcome, is the same across the predictors. Table 5.16 presents the summary of the results concerning trading frequency.

Table 5.16: Summary of Hypotheses Testing: Trading Frequency

Construct	Hypotheses	Independent Variable	Remarks	Sign of the Estimate	Conclusion
Representativeness Bias	H2.1	Scale4	Not Significant	+	Rejected
Overconfidence Bias	H3.1a	Scale5	Not Significant	+	Partially Accepted
		Scale6	**Significant**	+	
		Scale9	**Significant**	+	
	H3.2a	**Scale7**	**Significant**	-	Rejected
Ambiguity Aversion	H4.3	Scale10	Not Significant	-	Rejected
		Scale11	Not Significant	+	
		Scale12	Not Significant	-	
Demographic Characteristics	H9.3	Tradexp =.00 = 0 to 3 yrs	**Significant**	-	Rejected
		Tradexp = 1.00 = 3 to 5 yrs	**Significant**	-	
		Tradexp = 2.00 = Over 5yrs	0		
	H10.1	Income = .00 = < 4m	Not Significant	-	Rejected
		Income = 1.00 = 4 - 8m	Not Significant	+	
		Income = 2.00 = 8 - 12m	Not Significant	+	
		Income = 3.00 = Over 12m	0		

We carried out further analyses examining the existence of relationships between all predictors and the outcome variable. The inspection of the correlation matrix given in Table 5.17 reveals that only three variables - scale6, scale9 and tradexp, are significantly related to trading frequency.

Table 5.17: Correlation Matrix for Determinants of Trading Frequency

	DV	SCALE6	SCALE7	SCALE9	SCALE10	SCALE11	SCALE12	tradexp	income
DV	1								
SCALE6	0.252**	1							
SCALE7	-0.036	0.287**	1						
SCALE9	0.203**	0.352**	0.270**	1					
SCALE10	-0.084	0.109	0.539**	0.137*	1				
SCALE11	0.087	0.487**	0.401**	0.422**	0.190**	1			
SCALE12	-0.086	0.099	0.364**	0.114	0.410**	0.146*	1		
tradexp	0.177**	-0.081	-0.040	-0.015	-0.037	-0.079	0.040	1	
income	0.083	-0.036	-0.046	-0.024	0.097	-0.140*	-0.065	0.148*	1

Note: **, * denotes that correlation is significant at the 0.01 and 0.05 levels respectively (1-tailed).

We reran the ordered logistic regression by simultaneously entering the important predictors in the model, displayed in Table 5.18, to improve the model's prediction ability. However, we excluded scale7 due to lacking significant correlation with the dependent variable (see: Table 5.15).

Table 5.18: Predominant Determinants of Trading Frequency

Independent Variable	Estimate	Std. Error	Wald	df	Sig.
[Trading_Freq = 1.00]	2.141	0.557	14.773	1	0.000
[Trading_Freq = 2.00]	4.346	0.608	51.025	1	0.000
Scale6	0.482	0.135	12.799	1	0.000
Scale9	0.306	0.143	4.581	1	0.032
[Tradexp=0.00]	-0.953	0.295	10.436	1	0.001
[Tradexp=1.00]	-0.849	0.328	6.700	1	0.010
[Tradexp=2.00]	0.000	.	.	0	.

R^2 = .123 (Cox & Snell); .143 (Nagelkerke); Mc Fadden .067 Test of Parallel lines: Chi-square 4.464 (1), p < 0.347

As discussed above, the positive sign on the estimates of scale6 and scale9 implies that the ordered log-odds of excessive trading increase by the respective magnitudes, as hypothesized in *H3.1a*. On the other hand, we expected a negative influence for experience of investing in stock markets, on trading frequency. The results show that the inexperienced are less likely to excessively trade, compared to those who have a long experience in the market, hence hypothesis *H9.3* is rejected.

5.6.3.2 Multiple Regression Analysis: Domestic Stock Preference

In Figure 5.6, we revisit the research model presented in section 5.3 to illustrate how psychological biases influence the preference for domestic stocks (scale_DOM). The heuristic constructs (proposed hypotheses in brackets) are availability bias (*H1.1a & H1.2a*), ambiguity-aversion (*H4.1*), and regret aversion (*H6.1*).

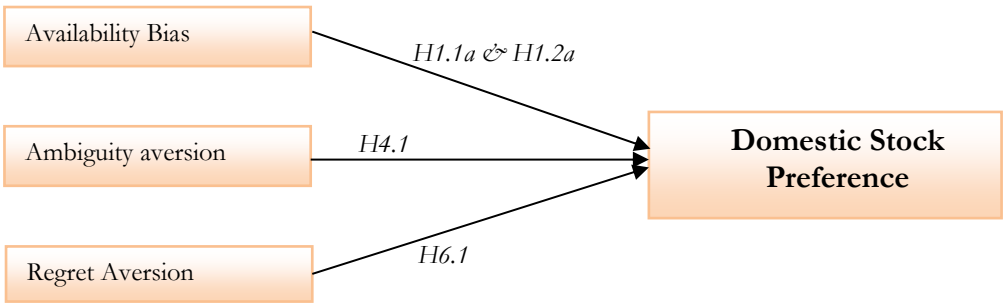

Figure 5.6 Determinants of Domestic Stock Preference

Table 5.19 displays the results of the multiple regression analyses. Panel A of the table reveals that the coefficient of scale1 is positive and very significant at 1% level. This implies that investors' preference for domestic stocks is highly influenced by recency bias and reliance on expert recommendation, supporting hypothesis *H1.1a*. On the other hand, scale3 (social influence) has a negative and insignificant relationship with domestic stock preference; while scale2 (reliance of experts) shows a significant positive relationship. Consequently, hypothesis *H1.2a* is partially

accepted because of scale3. With regard to the influence of ambiguity aversion, Panel B indicates that all the parameters of respective scales are positive and strongly related to preference for domestic stocks. We therefore, accept hypothesis *H4.1*. Two of the coefficients of the components of regret aversion are positive, supporting the proposed direction of the relationship. However, only scale15 (fear of regret) is a significant predictor at 1% level. Furthermore, Panel C shows that scale14 (p-value = 0.068) is negatively related to preference for domestic stocks. This does not support our hypothesized direction, and thus hypothesis *H6.1*, is partially supported.

Table 5.19: Determinants of Preference for Domestic Stocks

Construct	Independent Variable	Beta	t-value	Sig.	TOLE	VIF
Panel A						
Availability Bias	**Scale 1**	**0.333**	**5.607**	**0.000**	**0.799**	**1.252**
	Scale 2	**0.173**	**2.55**	**0.011**	**0.926**	**1.080**
	Scale 3	-0.020	-0.393	0.695	0.853	1.173
	Intercept	2.256	7.013	0.000		
	R^2 = 0.161, ANOVA: F(3) = 17.643, p < 0.000					
Panel B						
Ambiguity Aversion	**Scale10**	**0.144**	**1.959**	**0.051**	**0.815**	**1.227**
	Scale11	**0.163**	**3.425**	**0.001**	**0.958**	**1.044**
	Scale12	**0.183**	**2.920**	**0.004**	**0.827**	**1.209**
	Intercept	2.283	7.179	0.000		
	R^2 = 0.124, ANOVA: F(3) = 13.048, p < 0.000					
Panel C						
Regret Aversion	Scale13	0.054	0.851	0.395	0.795	1.259
	Scale14	-0.079	-1.834	0.068	0.945	1.058
	Scale15	**0.261**	**4.268**	**0.000**	**0.819**	**1.222**
	Intercept	3.176	11.903	0.000		
	R^2 = 0.089, ANOVA: F(3) = 9.011, p < 0.000					

Note: TOLE - Tolerance; VIF - Variance Inflation Factor

Assessment of goodness of fit of the models reveals that the explanatory power of the regressions, as measured by the coefficient of determination (R^2), seems relatively low. The value of R^2 for availability bias is 0.161; 0.124 for ambiguity aversion, and 0.089 for regret aversion. According to Hair et al. (2006), the cause of low explanatory power can be due to multicollinearity. The authors further contend that multicollinearity can also substantially affect the estimated coefficients and statistical significance of the variables. The reduction in predictive power depends on the extent of the existing associations between independent variables in a regression model. In addition, we examined variable collinearity using tolerance (TOLE) and its inverse, variance inflation factor (VIF). The VIF measures the extent to which variances of the estimated regression coefficients are inflated or not explained by the other explanatory variables (Hair et al., 2006). The VIF for the k^{th} independent variable is calculated as:

$$VIF_k = \frac{1}{1-R_k^2} \quad (5.1)$$

Whereas R_k^2 is correlation coefficient (R^2) obtained by regressing the k^{th} variable by all the remaining predictors. The acceptable value of the VIF is 10 or lower. For TOLE, it is 0.10 or higher. However, Hair et al. (2006) point out that when the sample size is small, it is safer to be restrictive. That is, the VIF values should be close to one. As indicated in Table 5.19, the TOLE and VIF results of preference for domestic stock are within the acceptable cut-off points, therefore, suggesting no evidence of multicollinearity. Another source of low values of R^2 is the presence of undetected outliers (Hair et al., 2006). In the current study however, this was addressed as the researcher thoroughly cleaned the data before starting the analysis process. Moreover, given our sample of 280 respondents and the number of independent variables, the observed R^2 values seem to be acceptable. This is because they satisfy the minimum requirements for detecting statistically significant relationships at a power of 0.80 with the significance level at 5% (Hair et al., 2006). The inspection of the correlation matrix given in Table 5.20 indicates that the regressands have reasonable significant relationships.

Table 5.20: Correlation Matrix for the Determinants of Preference for Domestic Stocks

	DV	Scale1	Scale2	Scale3	Scale10	Scale11	Scale12	Scale13	Scale14	Scale15
DV	1									
Scale1	0.374**	1								
Scale2	0.104*	0.371**	1							
Scale3	0.233**	0.251**	-0.003	1						
Scale10	0.234**	0.202**	-0.001	0.247**	1					
Scale11	0.247**	0.144**	0.066	0.108*	0.190**	1				
Scale12	0.260**	0.359**	0.150**	0.273**	0.410**	0.146**	1			
Scale13	0.145**	0.260**	0.121*	0.221**	0.328**	0.233**	0.338**	1		
Scale14	-0.055	-0.001	0.167**	-0.117*	0.043	0.086	0.015	0.227**	1	
Scale15	0.278**	0.258**	0.208**	0.121*	0.464**	0.275**	0.402**	0.422**	0.151	1

Note: **, * denotes that correlation is significant at the 0.01 and 0.05 levels respectively (1-tailed).

We also performed a forward stepwise regression analysis using SPSS version 22 to test the above hypotheses. Under this approach, only independent variables that significantly improve the model's prediction ability are retained. Since the estimation procedure aims at maximizing the incremental explained variance in each step in the process, the predictor that has the highest binary correlation (or partial correlation) is selected first (Hair et al., 2006). Subsequent selection is based on examination of partial correlations of the remaining predictors. Those with the highest values that are statistically significant are entered one by one until the optimal model is obtained.

Table 5.21 presents the findings of the stepwise model estimation. The result contains four predictors (scale1, scale11, scale15 and scale2) with R-squared value of .214. The adjusted R-squared of 0.202 is very close to the value of R-squared, suggesting that there is small predictive

power loss and no over-fitting of the model. The change in R-squared is significant at 5% level, thus supporting our observation. The estimated coefficients are all statistically significant at 1% level, except for scales2 (p-value 0.022).

Table 5.21: Determinants of Preference for Domestic Stocks: Stepwise Estimation

Construct	Independent Variable	Beta Coefficient	Beta	t-value	Sig.	TOLE	VIF
Availability Bias	Scale1	0.271	0.282	4.945	0.000	0.881	1.135
Ambiguity Aversion	Scale11	0.126	0.152	2.713	0.007	0.915	1.093
Regret Aversion	Scale15	0.142	0.148	2.587	0.010	0.874	1.144
Availability Bias	Scale2	0.151	0.128	2.309	0.022	0.93	1.075
	Intercept	1.556		4.619	0.000		
	R^2 = .214, ANOVA: F(4) = 18.685, p < .000						

Note: TOLE - Tolerance; VIF - Variance Inflation Factor

According to these results, we fully support hypothesis *H1.1a* while partially accepting hypotheses *H1.2a, H4.1*, and *H6.1*. Examination of the TOLE and VIF values confirms that multicollinearity has no substantial impact on the overall predictive ability of the independent variables.

5.6.3.3 Logit Regression: Portfolio Diversification

We revise the research model presented in section 5.3 to demonstrate that "availability bias," "overconfidence," "ambiguity aversion," "regret aversion" and "demographic characteristics" are useful predictors distinguishing investors based on the composition of their stock portfolios (see Figure 5.7). The dependent variable, stock portfolio diversion (Diver_DUM2), was measured as discussed in section 5.5.8.1.3. We coded "1 = a diversified portfolio" and "0 = concentrated".

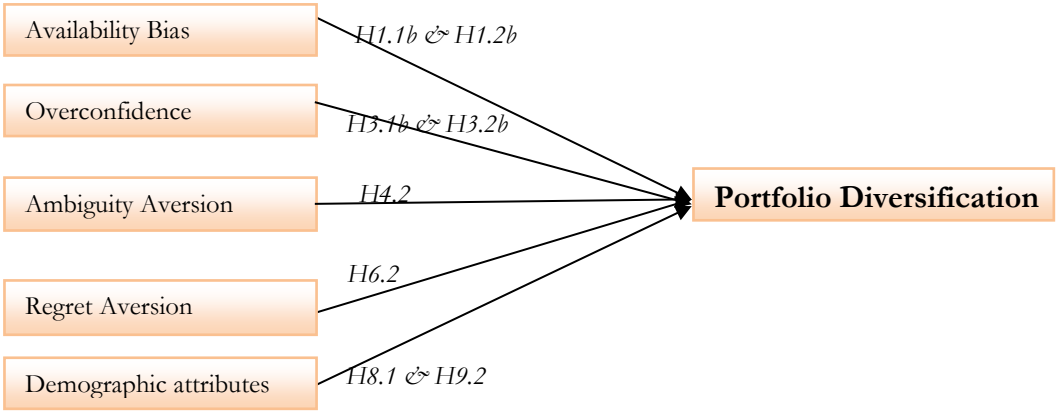

Figure 5.7: Determinants of Portfolio Diversification

As for the independent variables, we used the respective summated scales obtained in factor analysis (refer to section 5.6.2). Demographic characteristics were measured as previously

described in section 5.5.8.8. We employed binary logistic regression analysis to test the hypotheses in Figure 5.7. Our sample size of 280 cases satisfied the minimum requirement for running the logistic regression, which is 10 to 1.

Table 5.22 displays the summarized logistic regression results. The output in Panel A, shows that the probability of the model chi-square (6.207), which represents the fit of the overall model is 0.102. This implies that the final model is not predicting whether an investor is concentrated or diversified better than the baseline model. On the contrary, The Hosmer and Lemeshow test, shows that the model fit is acceptable.

In order for the logistic model to be useful in predicting group membership, it is recommended that there should be at least a 25% improvement over the rate of accuracy achievable by chance alone (Hair et al., 2006). Our final model shows no improvement in the predictive accuracy. The overall classification accuracy of 70.7% does not satisfy this criterion. Looking at the signs of the variables, we find that the coefficients of scale1 and scale2 are positive as expected. However, the probabilities of the Wald statistic for the individual independent variables are all greater than the level of significance of 0.05. Thus, we reject the hypothesized relationships for *H1.1a* and *H1.2a.*

Panel B of Table 5.22 presents the relationship between the overconfidence variables and the dependent variable. Assessment of the overall fit of the model shows that the -2log likelihood (-2LL) value is reduced from the base model value of 338.626 to 326.812. The associated chi-square 11.815 (5) indicates that the improvement is significant at the 5% level, and that the model fit is acceptable. This is also confirmed by the Hosmer and Lemeshow test. However, the overall classification accuracy of 71.8% is less than the proportional by chance accuracy criteria of 73.2% (1.25 x 58.6%), thus signifying a moderate improvement in the predictive accuracy. As expected, the significant positive coefficient of scale6 (perceived trading knowledge) suggests that investors who consider themselves above average are more likely to have their portfolio diversified. As this result supports our hypothesized direction, we accept *H3.1b.* The coefficient for scale7 is negative and insignificant, thus, we reject *H3.2b.*

The results in Panel C of Table 5.22 are more or less similar to those in Panel A. We find a statistically insignificant overall relationship between the predictors and the dependent variable (see the model -2LL). Furthermore, there is no change in the percentage predicted correct between the baseline and the proposed model, indicating that the model is not useful. An examination of the logistic coefficients reveals that they are all not significantly different from zero. Accordingly, the findings do not support hypothesis *H4.2.*

Table 5.22: Determinants of Portfolio Diversification

Construct	Independent Variable	Logistic Coefficient (B)	Wald	Sig.	Exponentiated Coefficient [Exp(B)]
Panel A					
Availability Bias	**Scale 1**	**-0.339**	**3.747**	**0.053**	**0.710**
	Scale 2	-0.095	0.399	0.528	0.910
	Scale 3	0.179	0.740	0.390	1.200
	Intercept	-0.120	0.015	0.902	0.890
	R^2 = 0.022 (Cox & Snell), .031 (Nagelkerke), Model Chi-square (4) = 6.207, p < 0.102, overall percentage correct = 70.7				
Panel B					
Overconfidence	Scale5	-0.015	0.000	0.954	0.985
	Scale6	**0.421**	**6.340**	**0.012**	**1.523**
	Scale7	-0.292	1.520	0.217	0.747
	Scale9	-0.185	1.230	0.267	0.831
	Intercept	0.209	1.560	0.211	1.232
	R^2 = 0.041 (Cox & Snell), .059 (Nagelkerke), Model Chi-square (5) = 11.815, p < 0.037, overall percentage correct = 71.1				
Panel C					
Ambiguity Aversion	Scale10	-0.065	0.090	0.762	0.937
	Scale11	0.077	0.300	0.585	1.080
	Scale12	-0.048	0.070	0.794	0.953
	Intercept	-0.687	0.560	0.456	0.503
	R^2 = 0.002 (Cox & Snell), .002 (Nagelkerke), Model Chi-square (5) = 0.465, p < 0.927, overall percentage correct = 70.1				
Panel D					
Regret Aversion	**Scale13**	**-0.365**	**3.910**	**0.048**	**0.694**
	Scale14	**-0.309**	**5.600**	**0.018**	**0.734**
	Scale15	0.301	2.650	0.103	1.351
	Intercept	0.228	0.080	0.774	1.256
	R^2 = .042 (Cox & Snell), .060 (Nagelkerke), Model Chi-square (3) = 11.941, p < .008, overall percentage correct = 72.1				
Panel E					
Demographic Attributes	Fin_liter		10.664	0.014	
	Fin_liter(1)	**-1.730**	**4.464**	**0.035**	**0.177**
	Fin_liter(2)	**-1.085**	**8.636**	**0.003**	**0.338**
	Fin_liter(3)	**-0.754**	**4.447**	**0.035**	**0.470**
	Tradexp		14.923	0.001	
	Tradexp(1)	**-0.994**	**7.368**	**0.007**	**0.370**
	Tradexp(2)	**-1.415**	**10.091**	**0.001**	**0.243**
	Intercept	0.281	0.898	0.343	1.325
	R^2 = .102 (Cox & Snell), .145 (Nagelkerke), Model Chi-square (5) = 30.040, p < .000, overall percentage correct = 71.8				

The assessment of the model fit in Panel D of Table 5.22 shows that chi-square statistic for the change in the value of -2LL from the base model is significant at the 1% level. However, the overall classification accuracy of 72.1% denotes a fair improvement in the predictive accuracy. The logistic coefficients for scale13 (-0.365) and scale14 (-0.309) are all significant at the 5% level based on the Wald statistic. These coefficients support the hypothesized relationship H6.2 that retail investors who exhibit regret aversion are less likely to have their portfolios diversified.

The results in Panel E of Table 5.22, present how demographic variables relate to the portfolio composition pattern of retail investors. The assessment of the goodness-of-fit reveals that the chi-square of the -2LL difference (30.040, p-value = 0.000) significantly improves the model estimation fit. The percentage predicted correct in the proposed model (71.8%) does not satisfy the minimum 25% classification accuracy criteria. Turning our attention to the logistic coefficients, we observe that predictors are statistically significant additions to the model. The logistic coefficients (B) are negative and therefore, the odds ratios are less than one. This means that the odds of the less-experienced investors and those who are not knowledgeable with stock investment matters to own better-diversified portfolios are lower than the odds of the same happening to the more-experienced and very knowledgeable investors. Hence, the results support *H8.1* and *H9.2*.

To examine the possibility of multicollinearity effects in the logistic regressions, we checked the standard errors. A Standard error that is larger than 2.0 (excluding the constant term) should raise an alarm for numerical problems (Hair et al., 2006). The standard errors of all the independent variables involved in the analyses above fall within the acceptable limits, implying there is no multicollinearity.

We also carried a stepwise estimation. Table 5.23 presents a final logistic model that contains four variables, including scale1, scale6, scale14, and trade experience (Tradexp). Based on Wald's statistic the estimated coefficients of the four independent variables are all statistically significant at the 1% level. The value of the -2LL dropped by 41.933 from the null model value of 338.626 to 296.693, indicating better model fit. This change is statistically significant at the 1% level. In addition, the Hosmer and Lemeshow test is non-significant; implying that the model fit is acceptable. The overall classification accuracy is 73.2%, equal to the proportional by chance accuracy criteria of 73.2% (1.25 x 58.6%), hence supporting the predictive accuracy of the model.

Table 5.23: Determinants of Portfolio Diversification: Stepwise Estimation

Independent Variable	Logistic Coefficient (B)	Wald	Sig.	Exponentiated Coefficient [Exp(B)]
Scale1	-0.461	7.305	0.007	0.631
Scale6	0.534	11.162	0.001	1.705
Scale14	-0.366	7.332	0.007	0.693
Tradexp		16.880	0.000	
Tradexp(1)	-1.183	9.970	0.002	0.306
Tradexp(2)	-1.427	9.944	0.002	0.240
Intercept	0.376	0.204	0.651	1.456

R^2 = 0.139 (Cox & Snell), 0.198 (Nagelkerke), Model Chi-square (5) = 41.993, p < 0.000, overall percentage correct = 73.2

5.6.3.4 Multiple Regression Analysis: Disposition Effect

In section 5.3, we presented several hypotheses regarding the tendency of retail investors to sell winners early while holding onto losing stocks for too long. The psychological biases and their respective hypotheses grouped under the disposition effect variable include; availability bias (H1.2c), representativeness bias (H2.2), overconfidence (H3.1c & H3.2c), loss aversion (5.1), and regret aversion (H6.3). The literature also documents that gender (H7.1) and trading experience (9.1) influence tendency to display disposition effect.

Recall that we carried out factor analysis for disposition effect in section 5.6.2.2 and for the respective psychological factors in section 5.6.2. Figure 5.8 presents the revised research model. The demographic attributes were dummy variables. We coded one for males and zero otherwise for gender. Likewise, for trading experience; we coded zero for the experience between zero to three years; one for three to five years; and two for more than five years.

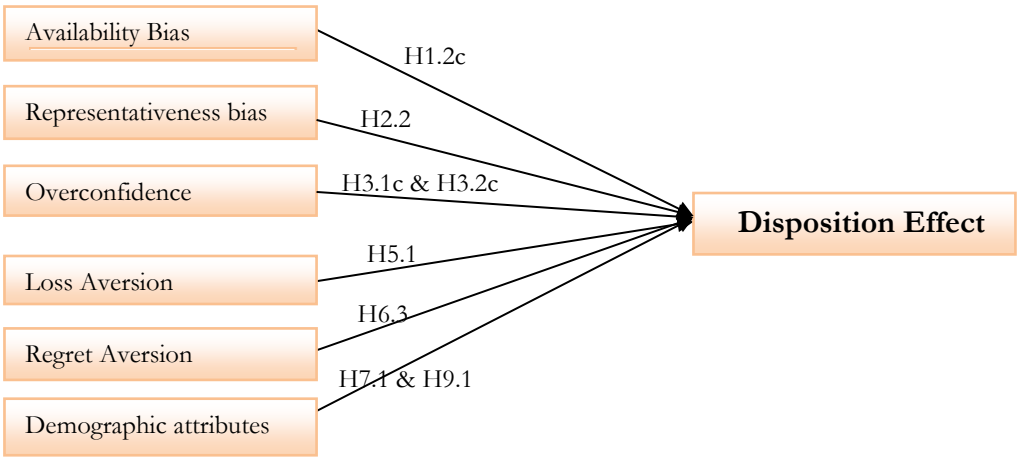

Figure 5.8 Determinants of Disposition Effect

In this section, a multiple regression analysis was performed to assess the relationship between the explanatory and response variables as shown in Figure 5.8. Table 5.24 displays the results. The findings show that the coefficients of scale2 and scale3; scale4, scale7, and scale16 are positive and strongly significant at 1% level. These observations are consistent with hypotheses, H1.2c, H2.2, H3.2c and H5.1 respectively. The evidence suggests recommendations from peers, extrapolation of past performance, self-attribution, and loss aversion, influence the buying or selling decisions of investors at the DSE.

We used three components in the regression analysis of the better-than-average form of overconfidence on disposition effect (refer to Panel C). The findings reveal that the coefficients of scale5 (perceived competence) and scale9 (perceived self-confidence) are positive, while the

coefficient for scale6 (perceived trading knowledge) is negative. However, only scale5 is a significant determinant of disposition effect, hence partially supporting H3.1c.

Table 5.24: Determinants of Disposition Effect

Construct	Independent Variable	Beta Coefficient	t-value	Sig.	TOLE	VIF
Panel A						
Availability Bias	**Scale2**	**0.304**	**4.317**	**0.000**	**1.000**	**1.000**
	Scale3	**0.139**	**2.787**	**0.006**	**1.000**	**1.000**
	Intercept	2.076	6.195	0.000		
	R^2 = 0.161, ANOVA: F(2) = 13.164, p < 0.000					
Panel B						
Representativeness Bias	**Scale4**	**0.413**	**7.557**	**0.000**	**1.000**	**1.000**
	Intercept	2.259	11.041	0.000		
	R^2 = 0.170, ANOVA: F(1) = 57.107, p < 0.000					
Panel C						
Overconfidence	**Scale5**	**0.351**	**4.123**	**0.000**	**0.629**	**1.590**
	Scale6	-0.054	-1.095	0.274	0.825	1.213
	Scale7	**0.258**	**3.427**	**0.001**	**0.653**	**1.532**
	Scale9	0.090	1.658	0.099	0.818	1.223
	Intercept	1.309	4.413	0.000		
	R^2 = 0.220, ANOVA: F(4) = 19.335, p < 0.000					
Panel D						
Loss Aversion	**Scale16**	**0.186**	**4.363**	**0.000**	**1.000**	**1.000**
	Intercept	3.215	23.737	0.000		
	R^2 = 0.064, ANOVA: F(1) = 19.038, p < .000					
Panel E						
Regret Aversion	**Scale13**	**0.397**	**7.110**	**0.000**	**0.795**	**1.259**
	Scale14	-0.061	-1.594	0.112	0.945	1.058
	Scale15	**0.317**	**5.888**	**0.000**	**0.819**	**1.222**
	Intercept	1.173	4.986	0.000		
	R^2 = 0.342, ANOVA: F(3) = 47.781, p < 0.000					
Panel F						
Demographic Attributes	Gender	-0.166	-1.563	0.119	0.994	1.006
	Tradexp1	-0.039	-0.257	0.797	0.690	1.450
	Tradexp2	-0.149	-1.243	0.215	0.691	1.447
	Intercept	3.975	31.948	0.000		
	R^2 = 0.016, ANOVA: F(3) = 1.489, p < 0.218					

Note: TOLE - Tolerance; VIF - Variance Inflation Factor

Panel E presents the results of the regression of regret aversion on disposition effect. We report that the coefficients of scale13 (need for assurance) and scale15 (fear of regret) are positive and significant at 1% level. On the contrary, scale14 (daring individual) has a negative and insignificant coefficient. Accordingly, H6.3 is partially accepted. Furthermore, Table 5.24 indicates that the two demographic variables of gender and trading experience have negative coefficients, and none of them is significant (refer to Panel F). These results suggest that the demographic attributes have insignificant differences on disposition effect, hence rejecting H7.1 and H9.1

The inspection of the coefficients of determination indicates that the percentages of total variations in the disposition effect explained by the regression models are relatively low. It is 16.1% for availability bias, 17.0% for representativeness bias, and 22.0% for overconfidence. The regression model for regret aversion has the highest R^2 values (34.2%), whereas the lowest value

is that of demographic attributes (6.4%). We checked for presence of the multicollinearity problem in all models. As Table 5.24 reveals, the TOLE and VIF values are within acceptable limits, suggesting no cause for concern.

Furthermore, we tested a stepwise estimation. The final regression output contains seven independent variables as presented in Table 5.25. Together the predictors explain almost 45% of the variance of disposition effect (the adjusted R^2 =0.434). In viewing the regression coefficients, we find that all variables except scale14 and gender have positive coefficients.

Table 5.25: Determinants of Disposition Effect: Stepwise Estimation

Construct	Independent Variable	Beta Coefficient (B)	Beta	t-value	Sig.	TOLE	VIF
Regret Aversion	Scale13	0.276	0.271	5.080	0.000	0.713	1.402
Overconfidence	Scale5	0.281	0.221	4.408	0.000	0.805	1.243
Regret Aversion	Scale15	0.211	0.211	4.059	0.000	0.750	1.333
Representativeness Bias	Scale4	0.186	0.186	3.688	0.000	0.799	1.252
Loss Aversion	Scale16	0.112	0.150	3.079	0.002	0.853	1.172
Demographic Attributes	Gender	-0.187	-0.105	-2.297	0.022	0.967	1.035
Regret Aversion	Scale14	-0.076	-0.100	-2.079	0.039	0.874	1.144
	Intercept	0.120		0.425	0.671		
	R^2 = 0.448, ANOVA: F(7) = 31.580, p < 0.000						

Note: TOLE - Tolerance; VIF - Variance Inflation Factor

The results for the variables with positive coefficients imply that the more prone to these psychological factors the investors are, the more they will exhibit the disposition effect. These results differ slightly from those presented in Table 5.24 above. Scale2, scale3 and scale7, which were positive and statistically significant in the previous table, are not included in the stepwise regression model. The final model includes gender and scale14, which were not statistically significant in the earlier estimations. To assess the impact of multicollinearity, we examine the tolerance and VIF values. Both diagnostic measures suggest that there is no multicollinearity problem in the results.

5.7 Discussion of the Findings

The second research question intended to measure how the identified behavioural factors influence the trading behaviour of retail investors at the DSE. In this sub-section, we discuss the findings of the hypotheses as presented in sub-section 5.6.3.

5.7.1 Trading Frequency

Consistent with the second research question, we developed six hypotheses related to trading frequency. A discussion of each hypothesis follows. We start with the predominant determinants previously presented in Table 5.18.

We investigate the relationship between the better-than-average variant of overconfidence and trading frequency (H3.1a). As per section 5.6.2.5, three factors (scale5, scale6 and scale9) were used to measure the better-than-average trait. In general, the evidence presented in Table 5.18, supports our conjecture that susceptibility to the better-than-average bias positively influences trading frequency. More specifically, except for scale5, the estimates of all other scales are positively significant. Graham et al. (2009) found that perceived competence (scale5) had both economical and statistical significant effects on trading frequency. The difference between our findings and those of Graham et al. (2009) could be based on the measurement of perceived competence. In our setting, percieved competence was generated from factor analysis, while Graham et al. (2009) used a self-reported approach to measure the same construct. The authors, however, admit that the approach can result to self-reported bias and endogeneity concern. Our empirical results, however, are consistent with the assertion that people who feel more knowledgeable and have self-confidence tend to trade frequently (Heath and Tversky, 1991; Graham et al., 2009; Nicolosi et al., 2009; Seru et al., 2010).

Recall that we hypothesized a negative influence of experience in stock market investments on trading frequency (H9.3). The estimates in Table 5.18 are not consistent with this hypothesis. We observe that as trading experience increases, trading frequency decreases significantly. The findings are consistent with prior studies. The literature documents that investors gain investing skills and knowledge through trading (Barber and Odean, 2000; Chen et al., 2007). Retail investors, trade actively during their early days, particularly after continual success because they perceive themselves as more knowledgeable and competent (Graham et al., 2009; Linnainmaa, 2011; Puetz and Ruenzi, 2011). With more experience however, overconfidence fades away as they acquire more trading skills. This enables them to become more realistic about their trading knowledge, capabilities and strategies (List, 2003; Chen et al., 2007). Our results, therefore, seem to support the claim that experienced investors do not trade actively because their intensive participation in the market helps them to adjust their trading accordingly.

Table 5.15 contains the results of all determinants of trading frequency. Hypothesis, H2.1, tests the positive influence of the representativeness biases as measured by scale4 on trading frequency.

The evidence presented in Table 5.15 Panel A, was not expected. Given that individual investors in frontier markets are considered naive, it would be expected to see them buy or selling shares based on performance clues of the companies. The result could imply that retail investors in Tanzania do not perform any analysis or investigation before they decide to trade. In addition, the finding could be influenced by the thin trading phenomenon, which is common in most underdeveloped markets like the DSE (refer also to Table 5.5). Moreover, the results are not consistent with those reported in previous studies (e.g. Odean and Barber, 1999; Barber and Odean, 2000, 2001; Deaves et al., 2009; Glaser and Weber, 2009).

Hypothesis, H3.2a, tests the positive effect of the susceptibility to illusion of control bias on trading frequency. As shown in section 5.6.2.5, we used scale7 to represent the illusion of control bias. Contrary to our conjecture, the evidence in Table 5.15, panel B, shows that a high level of illusion of control leads to low frequency of trading by individual investors at the DSE. Again, the possible explanation for the rejection of this hypothesis could be attributed to short-termism behaviour of the investors. That is, they invest in stocks for receiving dividends instead of trading in order to capitalize on price changes. Earlier research indicates that investors who suffer from self-attribution bias or illusion of control tend to trade frequently (Gervais and Odean, 2001; Statman et al., 2006; Deaves et al., 2010; Puetz and Ruenzi, 2011).

Some behavioural finance proponents posit that ambiguous-averse investors amplify the possibilities of unfavourable events happening (Huberman, 2001; Benartzi, 2001; Massa and Simonov, 2006). It was expected that since investors in most frontier markets are unsophisticated, they would avoid trading actively. Our results in Table 5.15, Panel C, reveal that hypothesis, H4.3, is not supported. The estimates of scale10, scale11 and scale12 are all not significant. These findings imply that although the investors display the ambiguity-aversion bias, it does not affect their decision to trade. Moreover, consistent with Graham et al. (2009), lack of skills and knowledge could also be attributed to the observed lack of relationship.

The last hypothesis dealt with investors' annual income (H10.1). We observe no significant change in trading behaviour between different levels of income. A possible explanation could be the fact that most of Tanzanian citizens have not appreciated the benefits of investing in stocks. This is evidenced by the very low number of the market participants, less than one percent of the population (Mrindoko, 2011; Andrew, 2014). Accordingly, the results are not in line with those reported in previous studies. Graham et al. (2009) for example, finds that competence level increases with income, and therefore, trading activity.

5.7.2 Preference for Domestic Stocks

As presented in Figure 5.6, three behavioural characteristics were examined in relation to investors' preference for domestic over foreign stocks. A total of six hypotheses were proposed. Our discussion starts with the main determinants as presented in Table 5.21.

Hypothesis, H1.1a, examines the positive influence of susceptibility to recency bias on preference for domestic over foreign stocks in the portfolio. The result supports this proposition in line with earlier research findings that point out that investors tend to extrapolate extreme recent stock performance (De Bondt and Thaler, 1985, 1987). In the context of the DSE, this should be more pronounced with domestic stocks, because they are most traded in. Moreover, these stocks catch their attention because people are familiar with them and they are always in the news (see also; Odean, 1999; Gervais et al., 2001; Barber and Odean, 2008).

We also test the effect of susceptibility to advocate-recommendation bias on preference for holding domestic over foreign stocks in the portfolio (H1.2a). This hypothesis is supported by scale2 only. As it was stated earlier, the DSE is still at nascent stage. Trading on cross-listed shares is very minimal. This evidence indicates that investment advisory services or stockbrokers play a big role, as investors place heavy reliance on their recommendations. This is consistent with prior studies (e.g. Shiller and Pound, 1989; Jegadeesh and Kim, 2006; Kliger and Kudryavtsev, 2010). It is not surprising to find that social interaction (scale3) has no significant impact. This is because a negligible proportion of Tanzanians own stocks of listed shares such that there is paucity of investor interaction opportunities (Mrindoko, 2011; Andrew, 2014).

Our results also provide strong support for hypothesis H4.1; that susceptibility to ambiguity-aversion has a positive influence on investor's preference for domestic stocks. All factors appear to be significant in Table 5.19. The result in Table 5.21 shows that scale11 is the most prominent. This implies that investors at the DSE do not hold cross-listed shares because they do not have enough information about them. They appear to have more knowledge about local stocks, and therefore, are able to control the portfolio returns, which is not necessarily correct. This finding is consistent with the evidence in (Huberman, 2001; Benartzi, 2001; Grinblatt and Keloharju, 2001a; Massa and Simonov, 2006).

The next hypothesis, H6.1, dealt with the susceptibility to regret aversion bias. Three factors were used to measure this construct (see Table 5.19). However, only scale15 supports our prediction (see, also; Table 5.21). The evidence is consistent with the assertion that investors avoid foreign stocks due to fear of regret. This finding complements the preceding observation that lack of

sufficient information aggravates the possibility of undesirable outcome (Fogel and Berry, 2006). This explains why retail investors at the DSE avoid buying shares of cross-listed companies and is consistent with evidence in Coval and Moskowitz (1999), who indicate that information-asymmetry drives preference for domestic over foreign stocks.

5.7.3 Portfolio Diversification

Figure 5.7 presents the behavioural constructs that were examined in relation to portfolio diversification. In the proposed model, eight hypotheses were developed. The stepwise results are presented in Table 5.23.

Consistent with proposition H1.1b, the logistic coefficient for scale1 is negative. The value of Exp (B) is 0.631. This implies that for an investor who is highly inclined to recency bias, the odd of not having a diversified portfolio is almost 37%. This result supports the conjecture that surveyed respondents who are prone to recency bias are less likely to have their portfolios diversified. The evidence is in line with the argument that only few stocks are traded in most frontier markets. This makes it possible for retail investors to actively trade on a small number of stocks that catch their attention and thus fail to diversify appropriately (Barber and Odean, 2008; Kliger and Kudryavtsev, 2010). This observation is also consistent with that of Waweru et al. (2008) who emphasized that institutional investors at the Nairobi Securities Exchange (NSE) trade in popular, attention-grabbing stocks in their portfolios.

As expected, the significant positive coefficient of scale6 (perceived trading knowledge) suggests that investors who consider themselves above average are more likely to have their portfolio diversified. The value of Exp (B) is 1.705, which implies that a one-unit increase in susceptibility to better-than-average bias increases the odds that investors will have diversified portfolios by almost 71%. The result is consistent with our hypothesis, H3.1b. Previous studies (e.g. Graham et al., 2009) indicate that people who perceive themselves to be skilful or knowledgeable on something feel competent and are willing to act on their own judgments. In addition, Goetzmann and Kumar (2008) show that there is a correlation between investment choices, which are consistent with overconfidence and insufficient diversification.

The 0.693 value of Exp (B) for scale14 is consistent with hypothesis *H6.2*. It implies that an increase in susceptibility to regret aversion bias decreases the odds that investors have diversified portfolios by almost 31%. A possible explanation for this tendency at the DSE is that investors feel safe with their current holdings. The evidence in Table 5.5 corroborates this claim. It shows that more than 87% of the responds either trade less than once a year or never trade at all. This

could also be due to the trend of appreciating prices for most of the local stocks since their IPO. Consequently, people are more likely to buy additional stocks of the same company rather than diversifying to another company's shares (see also, Odean, 1998a; Goetzmann and Kumar, 2008). This is consistent with Solnik (2008) who argues that while making a decision to maximize their utility, investors take into account the expected regret they might feel in case things go wrong.

The logistic coefficients for trading experience are negative. The Exp(B) values are 0.306 and 0.240 for Tradexp(1) and Tradexp(2) respectively. The findings suggest that the more experienced investors own better-diversified portfolios than their counterparts. More specifically, it implies that the odds of holding a diversified portfolio for an investor who has trading experience of up to three years are 0.306 times the odds of someone who has more than five years of trading experience. Likewise, the Exp (B) value for tradexp (2) denotes that the odds of holding a diversified portfolio is 76% lower for an investor with experience between three and five years than for someone who has more than five years of trading experience. Our results, hence, support hypothesis H9.2: in line with the assertion that experience makes the investor a strategic or systematic trader (Chen et al., 2007); reflects greater investing knowledge (Korniotis and Kumar, 2011); and leads to holding less-risky and better-diversified portfolios (Grinblatt and Keloharju, 2009).

Based on the results in Table 5.23, this study shows that hypotheses H1.2b, H3.2b, H4.2, and H8.1 are not supported. This implies that scales 2, 3, 5, 7, 9, 10, 11, 12, 15 and financial literacy are not effective determinants of portfolio composition at the DSE. The rejection of hypothesis, H1.2b is not consistent with the claim that social interaction influences investors' decisions (Hong et al., 2004, 2005; Kaustia and Knüpfer, 2012). The possible explanation for the finding could be that since very few Tanzanian citizens participate in stock investments (Elinaza, 2015), it is rare to find people/colleagues talking about their success stories or challenges of stock markets in Tanzania. Hence, it is more likely that investors select stocks to invest in based on their own judgements.

Hypothesis, 3.2b, is not supported because scale7 is insignificant. The sign of the estimate, however, corresponds to the assertion that when investors are prone to self-attribution, chances of holding fewer stocks are high (Daniel et al., 1998; Statman et al., 2006). The result for hypothesis, H4.2, somehow contradicts with hypothesis, H4.1. The literature posits that individuals who exhibit ambiguity aversion are also prone to familiarity and home biases (Massa and Simonov, 2006; Graham et al., 2009). Since retail investors at the DSE perceive that they need more information to be able to invest in cross-listed firms, it would be expected that they diversify

into stocks from local companies. The evidence in this study shows that all the three ambiguity-aversion bias factors are not important determinants of efficient portfolio composition.

The frequency percentages in Table 5.6 show that the awareness of stock investments (about 74% of the respondents) ranges between moderately to fairly knowledgeable. Our analysis, however, reveals that the level of financial literacy, measured by self-reported assessment of understanding of stock investment matters, does not affect the composition of stock portfolios at the DSE. That is, contrary to H8.1, there is no significant difference in odds of holding a diversified portfolio between respondents who rated themselves as very knowledgeable and those who rated themselves relatively lower. The evidence is not consistent with what is documented in the literature (see for example: Bhandari and Deaves, 2006; Graham et al., 2009; van Rooij et al., 2011).

5.7.4 Disposition Effect

Eight hypotheses were developed to test the relationship between several psychological and demographic factors and disposition effect. Provided below is the discussion of the findings as presented in sub-section 5.6.3.4.

Hypothesis, H2.2, predicted a positive influence of representativeness bias on disposition effect. The finding from this study supports this proposition. As stated earlier, there has been an appreciating trend for the majority of the share prices of listed companies since their IPOs. The present evidence, may suggest that past performance does not influence the trading behaviour of Tanzanian investors. If they were, we would expect them to realize these paper gains (Shefrin and Statman, 1985; Barber et al., 2007). Prior studies, however, show that there is a strong association between past performance and trading activity (Barber and Odean, 2000, 2001; Deaves et al., 2009; Glaser and Weber, 2009).

The study also hypothesised that susceptibility to better-than-average bias has a positive influence on the disposition effect (H3.1c). Our result partially supports the hypothesis since only one of the three factors appears to be a significant explanatory variable. It suggests that perceived competence (scale5) may be responsible for displaying the disposition effect. This concurs with the claim that investors who are overconfident tend to believe in the mean-reversion stock returns (see also, Chuang and Lee, 2006; Ivković et al., 2008; Ivković and Weisbenner, 2005; Massa and Simonov, 2006). Hypothesis, H6.3, tests the positive influence of susceptibility to regret-aversion bias on disposition effect. The estimates of the three coefficients are all strongly significant, except that the sign of scale14 is negative. We, therefore, partially accept the conjecture. This observation confirms what is documented in the literature that investors are inclined to sell when stock prices

rise because they want to avoid regret in case the prices fall in the near future (Barberis and Huang, 2001; Chen et al., 2007).

This study also hypothesized that, individuals who are susceptible to loss-aversion bias, tend to exhibit a higher degree of the disposition effect (H5.1). The coefficient of scale16 is positive and strongly significant. Our finding is consistent with previous works such as Kahneman and Tversky (1979), Odean (1998a) and Waweru et al. (2008), which emphasized that investors tend to react differently to equivalent situations depending on the context. More specifically, investors are inclined to take more risks after prior gains than following an earlier loss. This is because the penalty associated with a loss is emotionally felt more, compared to the mental reward of an equivalent gain (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991). Notwithstanding, Odean (1998a) posits that, although this behaviour is common with investors, it normally leads to bad decisions, which prove to be costly to their wealth.

Contrary to the above observations, the facts on the ground however, contradict the assertion by Shefrin and Statman (1985) and Odean (1998a). Trading at the DSE seems not to be motivated by the performance of stocks in the market. As stated earlier, investors do not hold on to losers, instead they apply the buy-and-hold strategy despite price appreciations. The majority of individuals participate in the market only on special occasions like during IPOs. That is why, like other frontier markets in Africa, the DSE suffers from thin trading. We noted earlier that, one of the possible explanations is that most of the retail investors in the market focus on the short-term returns in the form of dividends. It can be argued that, factors (e.g. end or beginning of year obligations) other than performance of the shares at the market, determine trading behaviour. This is consistent with Puetz and Ruenzi (2011) who also reported that market performance had no significant impact on an individual's trading activity.

With regard to gender differences in the degree of showing the disposition effect, the evidence supports hypothesis, H7.1. The result is in line with Beckmann and Menkhoff (2008) who showed that more women exhibited disposition effect.

5.8 Conclusions

The main objective of this chapter was to understand the role of psychological factors on the trading behaviour of retail investors from the context of a frontier market. Our first research question sought to identify the behavioural factors that influence an individuals' investment

decision-making. In order to address the weakness observed in most of the behavioural finance research that Graham et al. (2009) highlighted, the current study uses several psychological biases to investigate a particular trading behaviour. This was important because in real life, a number of biases work in tandem to influence attitudes and tendencies. Based on the decision-making behaviours described in earlier research from advanced markets, we have examined six popular behavioural biases that affect the investment decision making of individual investors (Barberis and Huang, 2001; Shefrin, 2002; Baker and Nofsinger, 2002; Kim and Nofsinger, 2003; Barberis and Thaler, 2003; Feng and Seasholes, 2005; Massa and Simonov, 2006; Glaser and Weber, 2007b; Graham et al., 2009). Following an extensive review of the literature, we developed a number of items for each behavioural construct. Next, we conducted the factor analyses. This process led to the identification of 16 scales representing the prominent behavioural biases that influence the trading decisions of individuals at the DSE (see section 5.6.2).

The second research question sought to identify the most prominent psychological factors that influence investors' trading behaviour at the DSE. We employed the ordered logistic regression to examine which factors better explain the frequency of trading by retail investors in the market. We find that trading frequency is positively accounted for by perceived trading knowledge, trading experience, and self-confidence aspects of better-than-average. These findings provide some empirical evidence to support hypotheses H3.1a and H9.3.

To establish the relationship between the psychological factors and the preference for domestic stocks, we performed multiple regression analyses. We find that placing undue weight on recent and easily available information, reliance on the recommendations of experts, need for adequate information and fear of regret are responsible for the investors' tendency to mainly hold local company shares than cross-listed ones. These findings provide full support for hypotheses H1.1a and H4.1, and partial support for H1.2a and H6.1.

To study the influence of psychological behaviour on the composition of investors' portfolio, we employed the logit regression method. The tests which were performed on the hypotheses demonstrate that higher levels of reliance on current salient features, perceived trading knowledge, regret aversion, and trading experience, are responsible for explaining the stock compositions of investors at the DSE. Based on these findings, we conclude that availability bias (H1.1b) and trading experience (H9.2) fully predict portfolio diversification. On the other hand, we find that overconfidence (H3.1b) and regret aversion (H6.2) biases somewhat play a role in determining this trading behaviour.

The fourth trading behaviour examined in this chapter is the disposition effect. Based on the findings, we conclude that reliance on recent salient features and expert recommendation, past stock performance, perceived competence and self-attribution predominantly determine the disposition effect. Others include; the need for assurance, fear of regret and aversion to loss realization.

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CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This thesis analyses the functioning of frontier stock markets. It contains three empirical chapters, each dealing with a different but related aspect of a well-functioning market. The essays aim to provide empirical evidence concerning: first, the existence of herding behaviour among investors in African frontier markets; second, the effect of corporate governance mechanisms on firm performance; and third, the influence of psychological factors on retail investors' trading behaviour at the DSE. The first and third essays are both related to investors' decision-making behaviour. The first essay focuses on whether investors imitate each other's actions and/or base their decisions on the actions of others by examining secondary data (stock returns). The third essay extends the first one by investigating how the behaviour of individual investors impacts on their trading decisions. Several behavioural biases are examined using primary survey data.

The strength of corporate governance mechanisms is an integral part of investment decision-making process. One of the reasons that led the EA countries to embark on economic reforms and improvement of the governance practices was to enhance the performance of listed firms and attract more foreign investors. The second essay, therefore, examines whether the internal governance mechanisms of firms listed in EA exchanges affect firms' performance. This study uses secondary data from a sample of 47 non-financial companies. Part of the data was handpicked from the companies' financial statements while market related data was obtained from the Bloomberg database. The rationale for undertaking these studies has been provided in the respective empirical chapters of the thesis.

6.2 Summary of the Main Findings

The findings of the first essay regarding herding behaviour (chapter 3) can be summarized as follows. The empirical evidence for the whole period confirms that herding behaviour is present in the overall sample. This finding proposes that the tendency to herd is more likely to happen in less-developed markets due to the absence of sophisticated investors and lack of well-developed infrastructure and institutional frameworks. Moreover, the findings show that investors primarily herd when they trade in small capitalization stocks. This could imply that small cap stocks are more risky, or investors are motivated to herd more in this category of stocks because they are less informed. The study however provides no evidence to support the proposition that investors in the African FEMs display herding behaviour during extreme market conditions except during

periods of high volatile returns for Kenya (both equal- and value-weighted estimations) and Uganda (value-weighted). In addition, the essay shows that, generally, the JSE has no impact on herd formation in other markets (except for small capitalization stocks in Botswana and Namibia). The explanation for this observation is that many companies in these markets are also cross-listed on the JSE. Another notable result is that during the financial crisis period; there is robust evidence of herding in the Ghanaian and Zambian markets only (both equal- and value-weighted estimations).

The second essay (chapter 4) examines the impact of corporate governance mechanisms on firm performance. Seven hypotheses were developed. The results provide conflicting conclusions depending on the measure of firm performance employed. The study finds that the size of the board has a positive impact on the market values of firms but negatively affects operating performance. Board diversity variables (i.e. foreign directors, civil servants, and education level), on the other hand, have no effects on the market values, but positively influence operating performance. With regard to the ownership structure, the essay reveals that foreign ownership and institutional ownership do not have any effect on the market values of the firms listed in EA exchanges. Ownership by the largest shareholders (or strategic investor), in contrast, appears to destroy firm performance as measured by Tobin's Q. The study, however, shows that the presence of institutional investors and largest owners has a positive effect on the operating performance (ROA) of the EA listed firms.

The third essay (chapter 5) investigates the influence of psychological factors on investors' trading behaviour. Generally, empirical evidence confirms that investors at the DSE are prone to several behavioural biases. The study identified 16 factors representing those biases. The findings show that the following factors - perceived trading knowledge, self-confidence aspects of better-than-average, and trading experience – predict trading frequency. Moreover, the tendency to prefer domestic than foreign stocks, is explained by placing undue weight on current and easily available information, reliance on the recommendations of experts, need for adequate information and fear of regret. Meanwhile, higher levels of reliance on recent salient features, perceived trading knowledge, regret aversion, and trading experience, are responsible for determining how diversified the investors are. On the other hand, the study shows that reliance on recent salient features and expert recommendation, past stock performance, perceived competence and self-attribution are main determinants of the tendency to display disposition effect. Others include; the need for assurance, fear of regret and aversion to loss realization.

6.3 Implications of the Results and Recommendations

The following sub-sections present the implications of the results and recommendations for each essay in this thesis.

6.3.1 Essay on the Existence of Herding Behaviour among Investors

The results of the first essay have important implications to a wider range of stakeholders in stock markets. For policy-makers and regulators, the findings serve as an eye opener with regard to status of herd formation in respective markets. This should help them in setting appropriate mechanisms for dealing with herding behaviour whether present or not, in order to protect the markets and subsequently avoid erroneous reactions from investors. Furthermore, the overall significant herding documented in our sample markets, implies that the markets are not effectively efficient and can possibly result into mispricing of securities. This is contrary to the purpose of promoting and facilitating the development of orderly, fair, and efficient capital markets and securities industry in Africa. Regulators, therefore, need to consider putting appropriate measures (e.g. enhancing transparency and investor's trust) with the aim of containing herding in order to prevent the occurrence of destabilizing outcomes that may possibly arise.

The findings bear important implications to investors as well since herding behaviour can lead them to make sub-optimal decisions. The presence of herding suggests that it would be challenging for both institutional and individual investors in designing investment strategies to optimize portfolio allocations. These findings therefore, provide useful trading strategic inputs when considering the widely documented diversification benefits accruing from investing in these markets. It would require investors to hold larger portfolios and an appropriate combination of positions in order to achieve a balanced exposure with the same risk as that of the market.

6.3.2 Essay on the Effect of Corporate Governance Mechanisms on Performance

The findings from the second essay have implications to a broad range of stakeholders, including investors, policy makers, and researchers. For the investors, our research has provided evidence that the market valuation measure of performance (Tobin's Q) does not fit with the ownership structure and board diversity variables. However, all variables on corporate governance mechanisms (except for foreign ownership) seem to put weight on the accounting based measure, the return on assets. These findings produce some useful insights for potential foreign investors to include companies from this region in their portfolios. That is, as a result of the ownership structure of most of the listed firms in these exchanges, corporate governance mechanisms are

mainly aligned with the interests of the few shareholders owning the majority of the shares. Thus, raising concerns on the adequacy the governance practices protects the interests of minority shareholders.

To the other shareholders, the implication of the findings in this essay is that internal monitoring mechanisms of the firms listed in the EA markets have proven to be weak. Thus, it is the right time to consider other external monitoring mechanisms of the firms, e.g. through activist groups, to complement the monitoring provided by the boards and the block holders. This may help to shake-up the boards to exercise their monitoring role more diligently and hence maximize the values of the firms.

The findings also have considerable practical implications to the block-owners (i.e. the largest/dominant shareholders and institutional investors). The evidence in this study seems to support the entrenchment argument. That is, concentrated owners may maximize their own utility by expropriating resources at the expense of firm performance (Morck et al., 1988; McConnell and Servaes, 1990; Claessens et al., 2000; La Porta et al., 2000, 2002). Block-owners, therefore, need to be sensitive to both operating performance and the market value of the firms. This is because they are better positioned to determine the appropriate mix of governance mechanisms, e.g. increasing their representation in the board and hence influencing the decision processes (Mak and Li, 2001), removing poor performing managers, or selling shares to withdraw their interest in the firm (Gillan and Starks, 2005).

The boards of directors also need to focus on both aspects of firm performance because they have under their control a bundle of control mechanisms. For example, they can set up tight management controls when performance is declining, but also increase incentives when the firm performance raises (see also; Ward et al., 2009).

For the regulatory authorities and policy makers, the evidence from this study has a significant implication if they are concerned about how to attract foreigners into the EA equity markets. The findings suggest that there is still a gap between the requirements of the laws, codes, guidelines and practices of corporate governance in the region. These results substantiate the claim in the literature that the problem in frontier markets is the existence of legal and regulatory systems, but that the implementation and enforcement of the same is weak (Rossouw, 2005; Wanyama et al., 2009; Claessens and Yurtoglu, 2013; Wanyama et al., 2013). Therefore, given the fact that ownership is highly concentrated, the regulators and policy-makers need to address this issue and deal with the legal and regulatory weaknesses, to provide protection to minority shareholders.

6.3.3 Essay on the Influence of Psychological Factors on Trading Behaviour

The findings from the third essay support the view that retail investors at the DSE are prone to several psychological biases. This has a number of practical implications. Firstly, the evidence indicates that intermediaries and practitioners (e.g. stock brokers) need to consider the psychological factors that are closely related with the investors' trading behaviour in the provision of their advices. For example, the results show that recent salient features (availability bias) have a significant impact on the composition of portfolios (i.e. preference for domestic stocks and insufficient diversification) by retail investors at the DSE.

Secondly, the findings from this study may be useful to regulatory authorities as well. Efforts have been made by policy makers and regulators to address the low participation of retail investors in the market. Most of these efforts have focused on awareness raising campaigns aiming at mobilizing more Tanzanians to effectively participate in the capital markets. Our research results have revealed several psychological factors such as recency bias, better-than-average bias, regret aversion and loss aversion as responsible for most of the trading behaviour that investors at the DSE exhibit. Prior studies have proven that falling into these traps may be costly to investors (Odean and Barber, 1999; Barber and Odean, 2000; Barber et al., 2009a). Based on the evidence from the current study, we would suggest that the regulators incorporate modules that address these human-errors when designing training and awareness raising programs.

Thirdly and consistent with the literature, we argue that the cultural background may also play a role in shaping the trading behaviour of the DSE retail investors (Grinblatt and Keloharju, 2001a; Waweru et al., 2008). It was earlier mentioned that before the financial sector reforms were implemented, Tanzania was a socialist country. During the period of a socialist political system, there were negative attitudes towards private investments. Most of the companies were state-owned. Since change in societal norms is slow, it can be argued that the socialist mentality is responsible for the very small number of participants in the market. Accordingly, the findings from this study indicate that regulators need to create the stock investment culture among the citizens. This should go together with broadening the range of products and services, and promotion of a savings culture. The results also show that investors need more information because they are scared of uncertainty. Regulators, therefore, need to create a more transparent market to enhance its credibility and investors' confidence. This can be achieved through putting emphasis on proper financial disclosure and compliance to best corporate governance practices. Consequently, the market will attract more companies to raise capital, and more investors, which in turn will increase the market depth and liquidity.

Fourthly, the retail investors should also recognise the multiple behavioural factors that affect their investment decisions. As mentioned earlier, our results have shown that a lot of investors believe they know better than the rest, perhaps because they are well educated. The literature has documented that many investors have lost fortunes after repeatedly making these systematic mistakes (Shefrin, 2002; Barber et al., 2009a; Barber et al., 2009c). The evidence from this study should help investors to be aware of these psychological biases so that they are honest and realistic about themselves when making investment decisions. In fact, various authors indicate that some of these behavioural traps can be avoided by learning or training (Gervais and Odean, 2001; Bhandari and Deaves, 2006; van Rooij et al., 2011). Setting some trading rules like selling when a share drops by a certain percentage, and not selling until after a given period of time can also be useful in avoiding these pitfalls. We further recommend that, when need arises, investors should seek advice from professionals or competent people, although this does not guarantee that they will make a fortune. This is because just like retail investors, the experts (e.g. analysts or stock brokers) also fall prey to the same biases as well.

6.4 Limitations and Recommendations for Further Research

The following sub-sections present the limitations and recommendations for further research for each essay in this thesis.

6.4.1 Essay on Exploring the Existence of Herding Behaviour

The main limitation of our study in the second essay is that it is based on the dispersion of returns in order to detect presence of herding behaviour. We are aware, however, that there are a battery of tests and methodologies in the literature that can be employed to investigate this phenomenon. As a recommendation for further study, it would be interesting to use other methodological approaches to study similar markets and compare the conclusions. In addition, since there was insufficient data in the African markets (Smith et al., 2002; Ntim et al., 2011), it is recommended that a follow up study be carried out to explore the factors that may have contributed to whether or not a stock market exhibited herding behaviour.

6.4.2 Essay on the Effect of Corporate Governance Mechanisms on Performance

The study variously contributes to the body of literature on frontier markets. However, it has a few limitations. The dataset covered all the 47 non-financial companies listed in the three exchanges in the EA stock exchanges. In total, we have 482 firm-year observations covering a period of 14 years. Compared to studies conducted in developed markets this sample size is

relatively small. Moreover, the sample size dictated the choice of the statistical analysis method. It would therefore, be desirable to replicate the present study after some time to increase the number of observations and establish consistency of the results. This should also give room for using other reliable econometric approaches that capture the dynamic nature of the corporate governance relationship (see, for example, Wintoki et al., 2012).

Availability of data is another limitation faced in conducting this study. The researcher did not examine some of the internal corporate governance mechanisms such as age of directors, tenure, directors' independence, and managerial ownership, to mention a few. This was mainly because some companies do not disclose this information in their annual reports, which was the main source of this information (recall that the data were handpicked). Future studies could consider incorporating these variables, by obtaining this information direct from the respective companies or the stock exchanges records.

Another possible limitation is the dominance of Kenyan companies in the dataset. This over-representation might have led to some biasness in the estimations. Since the aim of the study was to gain understanding of the corporate governance practices from the EA region, this caveat should be considered when interpreting the results.

6.4.3 Essay on the Influence of Psychological Factors on Trading Behaviour

We mentioned earlier that, the current study contributes to the literature on behavioural finance and the frontier markets, on various dimensions. However, it has a few limitations. Firstly, this study used field data. We developed some new items to measure a number of psychological constructs following an extensive literature review. Although our findings supported the applicability of most of the tests performed in the Tanzanian context; we recommend further research be carried out in order to establish the reliability of these scales in behavioural finance research.

Secondly, this study used a combination of non-probabilistic sampling approaches. Although the sample size met the statistical criterion to proceed with the analyses, there is still potential for producing biased results. Therefore, future research should consider the possibility of using probabilistic sampling methods and a larger sample size for comparison purposes and to address inherent biases from this study's sampling approach.

Third, our study used self-reported measures of trading frequency. Graham et al. (2009) point out that the approach is subject to self-reported bias, particularly when the respondent does not want

to honestly disclose other attributes. Future studies therefore, should consider the possibility of obtaining a sampling frame from the DSE central depository systems (CDS) and use the clients' accounts to establish the trading frequencies and portfolio composition.

Lastly, the DSE has been operating for more than 17 years. This study has pointed out that the participation of individuals in the market is, however, very low. Thus, there is a need to carry out a scientific inquiry to establish why people are not attracted to investing in shares of companies trading at the DSE.

We acknowledge also that we have not examined other aspects of psychological biases in this study. These include miscalibration, the base rate neglect, mental accounting and anchoring and adjustment. The reason is that the measures we developed were not comprehensive enough to capture these aspects. Future research should consider developing other survey items that can be used for this purpose.

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APPENDICES

APPENDIX 1: SUMMARY STATISTICS BY INDUSTRY CATEGORIZATION

Variable		N	Mean	Std Dev	Min	25th	50th	75th	Max	Skewness	Kurtosis	N	Mean	Std Dev	Min	25th	50th	75th	Max	Skewness	Kurtosis
		Panel A: Agriculture Industry										Panel B: Automobiles & Accessories Industry									
Dependent variables																					
Return on Assets	roa	58	0.10	0.11	-0.04	0.02	0.08	0.16	0.38	1.06	3.91	32	0.07	0.05	-0.01	0.04	0.06	0.09	0.24	0.00	1.34
Tobin's Q	tq	58	1.17	0.96	0.60	0.60	0.72	1.09	3.72	1.81	4.90	32	1.08	0.42	0.60	0.83	0.99	1.19	2.48	1.74	6.32
Independent variables																					
Largest shareholder	big	58	0.47	0.13	0.12	0.36	0.49	0.53	0.67	-0.79	3.88	32	0.42	0.20	0.15	0.32	0.34	0.69	0.77	0.49	1.98
Foreign ownership	fown	58	0.25	0.25	0.00	0.02	0.07	0.56	0.64	0.41	1.34	32	0.23	0.11	0.02	0.17	0.18	0.32	0.61	1.12	4.91
Institutional ownership	inst	58	0.57	0.19	0.06	0.55	0.64	0.70	0.89	-0.96	2.78	32	0.48	0.28	0.08	0.17	0.61	0.74	0.83	-0.37	1.41
Board size	bsize	58	7.36	2.02	3.00	6.00	7.50	9.00	11.00	-0.25	2.49	32	8.91	1.40	7.00	8.00	9.00	9.50	14.00	1.32	6.69
Proportion of foreigners in the board	bfgn	58	0.33	0.17	0.00	0.18	0.33	0.44	0.67	-0.25	2.18	32	0.16	0.13	0.00	0.00	0.19	0.24	0.38	0.10	1.88
Proportion of civil servants in the board	civ	58	0.02	0.04	0.00	0.00	0.00	0.00	0.13	1.82	4.44	32	0.10	0.08	0.00	0.00	0.11	0.17	0.22	-0.04	1.74
Proportion of members with masters or higher	ed	58	0.11	0.17	0.00	0.00	0.00	0.20	0.55	1.35	3.54	32	0.18	0.18	0.00	0.04	0.13	0.31	0.67	0.99	3.04
Control Variables																					
Firm size	fsize	58	2.26	1.40	-1.14	2.01	2.69	3.27	3.75	-1.19	3.20	32	3.20	0.75	1.83	2.58	3.02	3.96	4.33	0.08	1.79
Sales growth	sgr	58	0.09	0.17	-0.22	0.00	0.08	0.19	0.47	0.13	2.83	32	0.12	0.17	-0.17	-0.01	0.12	0.21	0.47	0.39	2.79
Leverage	lev	58	0.07	0.09	0.00	0.00	0.02	0.09	0.32	1.43	3.74	32	0.18	0.12	0.00	0.10	0.15	0.27	0.41	0.16	2.12
Profitability	prof	58	0.09	0.09	-0.05	0.02	0.08	0.13	0.33	0.90	3.75	32	0.06	0.04	-0.01	0.03	0.06	0.08	0.17	0.60	4.07
		Panel C: Construction and Allied Industry										Panel D: Energy and Petroleum Industry									
Dependent variables																					
Return on Assets	roa	97	0.12	0.10	-0.04	0.06	0.09	0.16	0.38	0.95	3.21	58	0.06	0.07	-0.04	0.02	0.04	0.08	0.38	2.02	8.94
Tobin's Q	tq	97	1.61	0.74	0.63	1.05	1.39	1.92	3.72	1.16	3.91	58	1.00	0.26	0.64	0.85	0.94	1.09	2.04	1.64	6.54
Independent variables																					
Largest shareholder	big	97	0.48	0.14	0.20	0.36	0.48	0.58	0.74	-0.09	2.23	58	0.51	0.16	0.12	0.46	0.51	0.65	0.71	-1.10	3.82
Foreign ownership	fown	97	0.33	0.30	0.00	0.03	0.22	0.63	0.84	0.34	1.41	58	0.16	0.24	0.00	0.01	0.06	0.16	0.94	2.03	6.10
Institutional ownership	inst	97	0.54	0.31	0.01	0.27	0.67	0.78	0.97	-0.57	1.85	58	0.47	0.34	0.00	0.12	0.66	0.79	0.94	-0.21	1.26
Board size	bsize	97	10.77	2.85	6.00	9.00	10.00	13.00	20.00	0.44	2.93	58	11.43	3.77	4.00	8.00	12.00	14.00	19.00	-0.01	2.24
Proportion of foreigners in the board	bfgn	97	0.28	0.25	0.00	0.06	0.25	0.50	1.00	0.67	2.75	58	0.25	0.28	0.00	0.00	0.13	0.50	0.80	0.55	1.65
Proportion of civil servants in the board	civ	97	0.10	0.11	0.00	0.00	0.09	0.17	0.38	0.83	2.65	58	0.17	0.18	0.00	0.00	0.19	0.29	0.50	0.57	2.15
Proportion of members with masters or higher	ed	97	0.37	0.16	0.08	0.27	0.36	0.44	0.80	0.41	2.92	58	0.47	0.14	0.25	0.38	0.44	0.57	0.80	0.82	2.64
Control Variables																					
Firm size	fsize	97	2.61	1.83	-2.09	1.66	2.82	4.12	5.23	-0.47	2.31	58	3.55	3.28	-2.96	3.93	4.82	5.96	6.73	-1.08	2.42
Sales growth	sgr	97	0.13	0.16	-0.22	0.04	0.13	0.22	0.47	0.02	2.91	58	0.12	0.19	-0.22	0.03	0.14	0.23	0.47	0.09	2.58
Leverage	lev	97	0.15	0.18	0.00	0.00	0.06	0.29	0.54	0.87	2.36	58	0.31	0.15	0.00	0.19	0.32	0.43	0.54	-0.12	1.90
Profitability	prof	97	0.10	0.09	-0.05	0.05	0.07	0.15	0.33	0.74	2.97	58	0.04	0.06	-0.05	0.02	0.03	0.06	0.33	2.03	10.50

		Panel E: Manufacturing and Allied Industry										Panel F: Commercial and Services Industry									
Dependent variables																					
Return on Assets	roa	127	0.17	0.12	-0.04	0.08	0.16	0.23	0.38	0.25	2.17	98	0.12	0.12	-0.04	0.04	0.09	0.20	0.38	0.83	2.86
Tobin's Q	tq	127	1.86	0.97	0.60	1.16	1.57	2.38	3.72	0.71	2.32	98	1.84	0.98	0.79	1.02	1.43	2.54	3.72	0.78	2.16
Independent variables																					
Largest shareholder	big	127	0.52	0.18	0.15	0.35	0.53	0.66	0.75	-0.48	2.12	98	0.51	0.17	0.15	0.35	0.51	0.63	0.77	-0.25	2.00
Foreign ownership	fown	127	0.41	0.34	0.00	0.07	0.25	0.75	0.90	0.09	1.26	98	0.28	0.25	0.00	0.04	0.30	0.51	0.70	0.30	1.53
Institutional ownership	inst	127	0.53	0.35	0.00	0.17	0.60	0.88	0.94	-0.38	1.55	98	0.48	0.35	0.00	0.03	0.51	0.81	0.92	-0.27	1.45
Board size	bsize	127	10.88	3.27	5.00	9.00	11.00	13.00	22.00	0.40	3.30	98	10.80	3.83	4.00	8.00	10.50	14.00	18.00	0.13	2.05
Proportion of foreigners in the board	bfgn	127	0.27	0.22	0.00	0.09	0.25	0.44	0.86	0.48	2.29	98	0.31	0.19	0.00	0.11	0.36	0.47	0.59	-0.34	1.82
Proportion of civil servants in the board	civ	127	0.15	0.16	0.00	0.00	0.10	0.20	0.50	1.13	3.26	98	0.14	0.16	0.00	0.00	0.11	0.22	0.50	0.97	2.91
Proportion of members with masters or higher	ed	127	0.36	0.25	0.00	0.18	0.30	0.53	0.91	0.53	2.34	98	0.44	0.29	0.00	0.20	0.33	0.71	1.00	0.41	1.85
Control Variables																					
Firm size	fsize	127	2.26	2.24	-2.96	0.70	2.64	4.09	5.54	-0.58	2.36	98	2.66	2.24	-2.46	2.04	2.86	3.77	6.42	-0.87	3.62
Sales growth	sgr	127	0.08	0.15	-0.22	0.00	0.08	0.17	0.47	-0.03	3.24	98	0.08	0.16	-0.22	0.02	0.11	0.15	0.47	0.11	3.54
Leverage	lev	127	0.14	0.17	0.00	0.00	0.09	0.26	0.54	0.96	2.71	98	0.17	0.19	0.00	0.00	0.09	0.34	0.54	0.75	2.13
Profitability	prof	127	0.13	0.11	-0.05	0.04	0.12	0.22	0.33	0.14	2.10	98	0.10	0.11	-0.05	0.04	0.06	0.16	0.33	0.82	2.95
		Panel G: Telecommunication and Technology Industry																			
Dependent variables																					
Return on Assets	roa	12	0.11	0.06	0.00	0.07	0.12	0.15	0.21	-0.38	2.74										
Tobin's Q	tq	12	2.10	0.86	0.87	1.55	2.00	2.67	3.72	0.32	2.29										
Independent variables																					
Largest shareholder	big	12	0.54	0.16	0.40	0.40	0.43	0.72	0.74	0.35	1.17										
Foreign ownership	fown	12	0.10	0.11	0.02	0.04	0.06	0.12	0.41	2.16	6.90										
Institutional ownership	inst	12	0.39	0.38	0.01	0.01	0.39	0.75	0.76	0.00	1.00										
Board size	bsize	12	11.00	2.80	7.00	8.50	11.00	14.00	14.00	-0.21	1.54										
Proportion of foreigners in the board	bfgn	12	0.35	0.11	0.18	0.28	0.35	0.45	0.50	0.01	1.84										
Proportion of civil servants in the board	civ	12	0.16	0.10	0.00	0.10	0.18	0.21	0.36	0.04	2.67										
Proportion of members with masters or higher	ed	12	0.36	0.12	0.20	0.26	0.32	0.46	0.54	0.23	1.56										
Control Variables																					
Firm size	fsize	12	4.20	2.02	2.07	2.20	4.30	6.11	6.23	-0.01	1.02										
Sales growth	sgr	12	0.09	0.16	-0.22	0.05	0.09	0.15	0.47	0.36	4.13										
Leverage	lev	12	0.18	0.12	0.00	0.12	0.16	0.30	0.38	0.16	2.04										
Profitability	prof	12	0.10	0.05	0.00	0.07	0.12	0.14	0.18	-0.64	2.57										

Notes: This table provides summary statistics for the data employed throughout the analysis. Data for ownership and board characteristics were hand-picked from the published annual reports of the respective companies. The data for year-end market prices, and accounting variables, were obtained from the Bloomberg database. Table 4.2 provide the definitions and operationalization of the variables. The whole sample descriptive statistics' information is presented in Table 4.4.

APPENDIX 2: CONTENT VALIDATION QUESTIONNAIRE

Questionnaire Cover Letter

Dear respondent,

My name is Gabriel Komba, a PhD student at Hull University (UK). Prior research has demonstrated that investors are prone to cognitive and emotional biases, which culminate into errors in processing informational signals when making decisions. In line with this observation, I am investigating the role of psychological factors on investment decision-making behaviour by retail investors. The study will be conducted at the Dar es Salaam stock exchange (DSE), which according to the FTSE classification falls under the frontier markets category.

Unlike many previous studies in behavioural finance where psychological biases had to be proxied, the current study intends to observe directly the influence of the same through survey responses. Due to scant studies using survey approach, there is a need to develop from scratch, a reliable instrument for data collection. The first stage involved the development of the initial inventory of items constructed from a thorough literature review, and others adopted from previous psychological studies and reworded to suit the current study. They are 179 in total. The next stage requires screening the generated items to eliminate any ambiguous, double-barrelled, redundant, and leading statements from the list (content validation).

I am hereby writing to request you, as an expert in the field of behavioural finance or psychology or capital markets, to participate in the process of developing the survey instrument by completing the **content validation questionnaire** below. I have given a brief definition of each construct followed by the associated items measured on a three-point scale: *"1 = not necessary"; "2 = Useful but not essential"; and "3 = essential"*.

Using the scale, please indicate, by circling the number that best corresponds with your assessment, how appropriate the listed items are, to capture the different dimensions of the constructs in question. I will also appreciate very much for any additional comments and suggestions that you may wish to provide (e.g. rewording, proposing a new item, etc.).

Many regards,

Gabriel

The contact details of the researcher are: Gabriel Komba, Hull University Business School, University of Hull, g.komba@2010.hull.ac.uk or the researcher's supervisor Dr. Yilmaz Guney, Hull University Business School, University of Hull, Email: y.guney@hull.ac.uk tel. 01482-463079.

(Sections 1 and 2 Omitted)

Section 3: Use of Heuristic Theories

Heuristics are part of cognitive biases. They are experience-based "mental shortcuts" or "rules of thumb" that people learn or develop to enable them make judgment processes less complex, ease, and fast. This content validity questionnaire comprises the generated items for examining the following biases and their different forms: availability bias, representativeness bias, overconfidence, ambiguity aversion, and anchoring and adjustment.

Section 3.1: Availability Bias

Definition: Availability bias describes the behaviour whereby individuals make judgment based on how easily one can remember, or predict, or imagine an event using the most readily available set of information. This study examines three characteristics that affect the availability of recalled instances.

301. Familiarity (FAM) - refers to the degree of being knowledgeable about something			
a) I prefer to buy Tanzanian companies' stocks than of foreign companies because the information of local stocks is more available	1	2	3
b) I do not like to invest my money in unfamiliar investments because they are risky	1	2	3
c) I would rather have in my stock portfolio just a few companies that I know well than in many companies that I know little about	1	2	3
d) I invest in companies I know well because I believe I am capable of anticipating the returns	1	2	3
e) Newspaper advertising encourages me to trade at the DSE	1	2	3
f) When choosing which stock to buy, I tend to consider stocks that famous people, e.g. celebrities, buy	1	2	3
g) I would buy the stock that the president buys	1	2	3
h) I do not like the unknown	1	2	3
i) I like to invest in the top and renowned companies	1	2	3
j) My decision to buy or sell stock is somehow influenced by the extent of media coverage about the particular company's stock in question	1	2	3
k) I am more likely to buy or sell shares by recalling how frequently a particular company has reported good performance.	1	2	3
l) I am more likely to be influenced by promotional campaigns to participate in stock investment	1	2	3
m) I do not like changes	1	2	3
n) I have a tendency of trying to buy goods or products that are frequently advertised in the media (e.g. in TV, newspapers, etc)	1	2	3
o) Assume you are working with a listed company at the DSE. Given the option to invest some of your money in [your employer's] shares, will you take this take the opportunity?	1	2	3
p) When there are many stock options to choose from, I will consider stocks that popular	1	2	3
q) I prefer familiar goods	1	2	3
r) TV and radio advertising encourages me to trade at the DSE	1	2	3
s) I do not like to trade away from your current ownership positions (e.g. selling your share)	1	2	3
t) I favour investments that are geographically close or familiar	1	2	3
u) I know the calibre of senior management of the companies I buy the shares	1	2	3
v) I know the nature of business of the companies I buy their shares	1	2	3
302. Recency Bias (REC) - is the tendency of being prone to the influences of recent experiences and more salient events when making judgments			
a) What happens last prevails in the mind, and influences my perceptions	1	2	3
b) Recent achievements by local peers (e.g. co – worker, friends etc.) can be useful in determining my decision to engage into something or not	1	2	3
c) First impressions are most important for forming your beliefs	1	2	3
d) I can easily recall information that has arrived recently	1	2	3

e)	Do you think you can decide (continue) to trade at the DSE following a high abnormal trading volume on a particular companies stock?	1	2	3
f)	I usually focus on the more recent results of a particular type of business when deciding whether to invest in it or not.	1	2	3
g)	When making a choice, I like to "cherry – pick" things with best results	1	2	3
h)	Preconceptions tend to exert undue influence in the way I interpret events	1	2	3
i)	Massive returns in recent times can influence my participation at the DSE	1	2	3
j)	Market-related news e.g. stock price movements, form the basis of my investment decisions	1	2	3
303. Advocate Recommendation (ADR) - refers to the tendency of making decision based on other's recommendations				
a)	I believe the information I get from my close friends and relatives as reliable source or reference for my decisions	1	2	3
b)	I normally act on professional advice	1	2	3
c)	I would rather rely on expert advice than basing my decision on personal analysis on matters that are very sensitive.	1	2	3
d)	By relying on experts advices, I enhance the efficiency of my decisions	1	2	3
e)	I am a kind of a person who like to learn new things from my colleagues, friends, relatives, and neighbours	1	2	3
f)	Suppose you have some money to invest and you hear about a great business tip from your neighbour who is known to have entrepreneurial sense. Will you invest into that business based on the neighbour's tip, and who is usually right about these things?	1	2	3
g)	Rarely, I buy things based on suggestions provided by sources I trust to be well informed.	1	2	3
h)	Decisions of friends significantly influences my decisions to participate in a particular business or social event	1	2	3
i)	How important are colleagues for you as source of information?	1	2	3
j)	If I know a counsellor or specialist, whose recommendations to others in the past, resulted in the most (least) success, I will surely ask for (not to ask for) his advice.	1	2	3
k)	I normally consult family members, neighbours, colleagues, or friends on things I do such as social matters, investments, and business	1	2	3
l)	I usually get/become interested to do something (e.g. reading a newspaper; investing) if people who are close to me recommend it	1	2	3
m)	I admire the abilities of my friends in making satisfying purchases	1	2	3
n)	My friends think that I should trade (or continue to trade) at the DSE	1	2	3
o)	My colleagues think that I should trade (or continue to trade) at the DSE	1	2	3
p)	My family members think that I should trade (or continue to trade) at the DSE	1	2	3
q)	How important are other market participants for you as source of information?	1	2	3
r)	Stocks that investors choose more always provide higher returns	1	2	3

Section 3.2: Representativeness Bias

Definition: The representativeness bias is a cognitive bias wherein people make judgments based on how well the available data share similar features with the phenomenon, object or the parent population in question

304. Base-rate neglect (BRN) - occurs when people make judgment by ignoring prior relevant information (e.g. statistical data) in favour of a specific data.				
a)	I only invest in popular company's shares	1	2	3
b)	I buy "hot" stocks	1	2	3
c)	I consider a company that has quality management, as an excellent investment.	1	2	3
d)	An IPO that is advertised and discussed in newspapers, on television, etc. all the time is a good long term investment	1	2	3
e)	I buy stocks whose prices are expected to increase more than others	1	2	3
f)	I consider a company that enjoy rapid earnings growth, as an excellent investment.	1	2	3
g)	I buy stocks of big companies	1	2	3
h)	I consider a company that has high sales growth, as an excellent investment	1	2	3
i)	I know the prospects of the business of the companies you bought their shares	1	2	3
305. Sample-size neglect (SSN) - occurs when people erroneously assume that generalized or firm conclusions may be drawn from a small-sample informational inputs				
a)	I use trend analysis to make investment decision for all stocks that you invest	1	2	3
b)	I know the past dividend payout for the companies I buy the shares	1	2	3
c)	I avoid stocks that have performed poorly in the recent past	1	2	3
d)	I consider recent past returns to be representative of what investors should expect in the future	1	2	3
e)	I are very likely to go for, and pay a high price for stocks that have performed very well in the recent past	1	2	3
f)	I investigate the track record of the broker before you make a purchase	1	2	3
g)	I am normally able to anticipate the end of good or poor event such as market returns at the DSE	1	2	3
h)	A financial analyst who has recommended good stocks for a number of times, he is talented because a bad or mediocre analysts cannot do that	1	2	3
i)	I consider stocks with *poor* **(strong)** performance during the past three to five years as *losers* **(winners)**	1	2	3
j)	I look at the success of an analyst's past few recommendation when trading in stocks	1	2	3

k)	I am overly pessimistic about a stock whose returns for the past three years have shown a losing trend (performed poorly).	1	2	3
l)	I examine past returns when deciding which stock to buy	1	2	3
m)	I buy stocks that have recently increased in price	1	2	3
n)	A history of consistent pattern of earnings growth of a particular stock, is an indication that the value of the stock will keep on growing in the future	1	2	3
o)	When buying shares, my focus is always on the most recent price performance of the share in question	1	2	3
p)	The second sequence is more likely to occur than the first sequence - HHHTTT or HTHTTH	1	2	3

Section 3.3: Overconfidence

Definition: Overconfidence bias is a cognitive bias, which describes that peoples are excessively confident about the accuracy of their beliefs, knowledge, and judgments.

307. Better-than-Average Effect (BTA) – is a tendency to inaccurately evaluate ones skills and personal attributes as better than those of his peers				
a)	When I make plans, I am almost certain to make them work	1	2	3
b)	I often have doubts about the purchase decisions I make	1	2	3
c)	I frequently agonize over what to buy	1	2	3
d)	I often wonder if I have made the right purchase selection	1	2	3
e)	How do you assess your own performance in stock investment – compared to other investors? ***Response categories range from 1= much worse to 5=much better***	1	2	3
f)	I could succeed at making profit from my stock investment, even though many other investors would fail	1	2	3
g)	Too often the things I buy are not satisfying	1	2	3
h)	I will be able to achieve most of the goals that I have set for myself.	1	2	3
i)	When facing difficult tasks, I am certain that I will accomplish them	1	2	3
j)	In general, I think that I can obtain outcomes that are important to me	1	2	3
k)	I believe I can succeed at most any endeavour to which I set my mind	1	2	3
l)	I will be able to successfully overcome many challenges	1	2	3
m)	I am confident that I can perform effectively on many different tasks	1	2	3
n)	Compared to other people, I can do most tasks very well	1	2	3

o)	Even when things are tough, I can perform quite well	1	2	3
p)	I (will) feel comfortable to trade on stocks on my own	1	2	3
q)	Learning to trade on stock markets was easy for me	1	2	3
r)	I clearly understand how to trade at the stock exchange market	1	2	3
308. Illusion of Control (IOC) – occurs when people believe that their skills are capable of influencing or controlling the outcomes in situations where chance matters most than what abilities may warrant				
a)	I never buy securities or funds that will underperform in the future	1	2	3
b)	I am not able to identify securities or funds with above-average performance in the future	1	2	3
c)	Most of the published business news related to companies listed at the DSE does not surprise me at all	1	2	3
d)	I consider yourself to have great skills and ability to cope with and predict future events	1	2	3
e)	If I were to bet, I would prefer to bet in a context where I consider myself knowledgeable or competent than in a context where I feel ignorant or uninformed.	1	2	3
f)	I generally do better in situations I understand than in situations where I have less knowledge	1	2	3
g)	If I were to participate in a game of chance that involves dice, I would feel most in control when I roll the dice myself.	1	2	3
h)	The chances of winning a lottery (e.g. bingo) are high when I choose the number by myself than when a computer-generated number is used.	1	2	3
i)	If my stock investment returns over the last period have increases, it is mainly because of the combination of the control that I exercise over the outcome and a random chance	1	2	3
j)	I am certain of accurately predicting the outcomes of the things you do	1	2	3
k)	I could accurately predict when would other investors decide to buy/sell shares	1	2	3
l)	I am usually able to protect my personal interests	1	2	3
m)	My life is determined by my own actions	1	2	3
n)	I can pretty much determine what will happen in my life	1	2	3
o)	When I make plans, I am almost certain to make them work	1	2	3
p)	When I get what I want, it is usually because I worked hard for it	1	2	3
q)	I believe that my your good past performance in stock trading is a result my hardworking	1	2	3

Section 3.4: Ambiguity Aversion (AMA)

Definition: Describes people's attitude to prefer the selection of events whose outcome probabilities are clearly known to the vague ones

309. AMA				
a)	What we are used to is always preferable to what is unfamiliar	1	2	3
b)	I like parties where I know most of the people more than ones Where all or most of the people are complete strangers	1	2	3
c)	There is really no such thing as a problem that can't be solved	1	2	3
d)	A good job is one where what is to be done and how it is to be done are always clear	1	2	3
e)	A person who leads an even, regular life in which few surprises or unexpected happenings arise, really has a lot to be grateful for	1	2	3
f)	In the long run it is possible to get more done by tackling small, simple problems rather than large and complicated ones	1	2	3
g)	An expert who doesn't come up with a definite answer probably doesn't know too much	1	2	3
h)	Ambiguity makes life intolerable	1	2	3
i)	I am just a little uncomfortable with people unless I feel that I can understand their behaviour	1	2	3
j)	There is a right way and a wrong way to do almost everything	1	2	3
k)	I would rather bet 1 to 6 on a long shot than 3 to 1 on a probable winner	1	2	3
l)	The way to understand complex problems is to be concerned with their larger aspects instead of breaking them into smaller pieces	1	2	3
m)	I get pretty anxious when I'm in a social situation over which I have no control	1	2	3
n)	Practically, every problem has a solution	1	2	3
o)	It bothers me when I am unable to follow another person's train of thought	1	2	3
p)	I have always felt that there is a clear difference between right and wrong	1	2	3
q)	My mind can't be relaxed if I don't know what will happen tomorrow	1	2	3
r)	Nothing gets accomplished in this world unless you stick to some basic rules	1	2	3
s)	I always want to know what the future has in store for me	1	2	3
t)	Vague and impressionistic pictures really have little appeal to me	1	2	3
u)	Before an examination, I feel much less anxious if I know how many questions will be	1	2	3
v)	If I were a scientist, I would be bothered by the belief that my work would never be completed (because science will always make new discoveries)	1	2	3
w)	The best part of working a jigsaw puzzle is putting in the last piece	1	2	3
x)	Sometimes, I rather enjoy going against the rules and doing things I'm not supposed to do	1	2	3

y) I do not like to work on a problem unless there is a possibility of coming out with a clear-cut and unambiguous answer	1	2	3
z) I like to fool around with new ideas, even if they later on turn out to be a total waste of time	1	2	3
aa) Perfect balance is the essence of good composition	1	2	3
bb) Uncertainty keeps me from sleeping soundly	1	2	3
cc) I have all the relevant information I need to make my investment decision	1	2	3
dd) I have sufficient information to make a sound investment decision	1	2	3
ee) I need more information to make a good investment decision	1	2	3
ff) I do not like things to be uncertain and unpredictable	1	2	3

Section 3.5: Anchoring and Adjustment (AAA)

Definition: Refers to the tendency of making a decision, such as a quantitative estimation, by relying too heavily to an anchor (reference) point

310. AAA			
a) I rely on your previous experience in the market for my next investment	1	2	3
b) I believe a higher price is associated with higher quality	1	2	3
c) I forecast the changes in stock prices in the future based on the recent stock prices	1	2	3
d) I refer to benchmarks in my decisions	1	2	3

Section 4: Use of Prospect Theory

Definition: Prospect theory describes how people make choices under the condition of risk and uncertainty. According to the theory, individuals assign value to outcomes (i.e. gains or losses) and their decisions base on perceived gains rather than perceived losses.

401. Regret Aversion (RGA) - describes the tendency of people avoiding taking decisive judgments in fear of emotional (bad) feeling that they may experience in response to an undesirable outcome			
a) No one likes to lose	1	2	3
b) I am very likely to regret actions I have taken (or even failures to act) that I perceive as being "out of character" for me	1	2	3
c) If the price of an asset I wanted to sell declines after a purchase, I will hold instead of selling it	1	2	3
d) If I followed someone's recommendations in straying from my normal path, and get bad outcome I easily turn into resentment and anger	1	2	3
e) I feel at ease to acknowledge my past mistakes	1	2	3
f) I get very distressed if I believe I could have anticipated and prevented a poor outcome	1	2	3
g) It hurts less if I believe the failure could not have been predicted	1	2	3
h) When I sell an asset whose price has risen, I get a pleasant feeling of having made a good decision in the original purchase	1	2	3
i) An optimal decision is of little use to I if I cannot live comfortably with uncertainty	1	2	3
j) An advisor fail to give good advice should be blamed	1	2	3
k) I can tolerate someone who make mistakes	1	2	3
l) I get upset when I find that the decision I made has resulted to a bad outcome	1	2	3
m) I avoid making poor decisions	1	2	3
n) I feel more sad for the opportunities you missed than for the attempts that failed	1	2	3
o) I would rather be safe than sorry	1	2	3
p) I want to be sure before I purchase anything	1	2	3
q) I avoid risky things	1	2	3
r) I avoid selling shares that have decreased in value and readily sell shares that have increased in value	1	2	3
s) I feel more sorrow about holding losing stocks too long than about selling winning stocks too soon	1	2	3
t) If stocks I purchased losses I don't to wait to claim my losses	1	2	3
u) I consider investing to be safe	1	2	3

402. Mental accounting (MTA) - refers to how people think about and make decisions when faced with concurrent events.			
a) I tend to treat each element of my investment portfolio separately	1	2	3
b) I ignore the connection between the different investment possibilities	1	2	3
c) If two out of ten stocks in my investment portfolio fall significantly in their value, I regard it as an overall loss of my investment	1	2	3
403. Loss Aversion (LOA) - refers to the tendency for people feeling that losses cause a greater feeling of pain than a pleasure caused by equivalent gains			
a) I am very likely to sell something if it experiences price increase than price decrease	1	2	3
b) I feel very painful when I lose 1m shillings than the pleasure for gaining the same	1	2	3
c) It is very likely to lose money when making investments	1	2	3
d) I would worry about the consequences when making investment decision	1	2	3
e) I worry of incurring a great loss when making investment decision	1	2	3
f) In case of loss positions in my investment I generally wait for a price rebound instead of selling those securities	1	2	3
g) After a prior gain, I am more risk seeking than usual	1	2	3
h) After a prior loss, I become more risk averse	1	2	3
i) If stocks I purchased losses I prefer to wait to claim my losses	1	2	3

APPENDIX 3: QUESTIONNAIRE

Cover Letter

Dear Participant,

My name is Gabriel Komba, a PhD student at Hull University (UK). I am conducting a study entitled: "The influence of psychological factors on investment decisions" at the Dar es Salaam stock exchange (DSE) in Tanzania, which according to the FTSE classification falls under the frontier markets category. The study intends to investigate the role of psychological factors on investment decision-making behaviour by retail investors. More specifically, the study examines whether investors in the frontier market are inclined towards psychological biases when making investment decisions. In addition, the study investigates which of the biases predominantly affects investors' behaviour.

The study includes individual investors like you, who have invested in shares of companies trading at the DSE. You and other respondents were randomly selected from the register of shareholdings of the central depository system (CDS) of the DSE. I would therefore, like to invite you to be part of this study. Your participation is very important in that, it will enable the researcher to collect investors' opinion to identify the dominant behavioural factors, and their impact on stock investment behaviour and performance at the DSE. In addition, the study is significant to the government regulatory bodies in Tanzania in general and other stakeholders in particular. The information you provide will assist the government regulatory bodies like the DSE, to segment investors into various behavioural groups based on their biases; understand the investment preferences and profiles of the investors; and the related policy implications. For brokers and financial service providers, the findings of the study will enable them to understand well their consumers, and hence be able to provide more personalized advices.

Participation however, is voluntary, that is, you can at any time, decide not completing the questionnaire. The questionnaire can take up to 40 minutes of your time to complete. I would like to assure you that you would not be required to incur any expenses by being involved in this study. Either, the information you provide will strictly be kept confidential. The results of the study will be used research purposes and may be reported in scientific and academic journals.

The researcher will be responsible for storage and retention of the original data. The information provided will be processed electronically, preserved in electronic devices such as flash disks and

computer in order to provide backups for the collected data. On the other hand, printed versions of the data will be handled carefully and stored in a safe place.

Please complete and return the attached Consent Form before you complete the questionnaire. Thank you in anticipation of your involvement.

Yours sincerely,

Gabriel Komba

The HUBS RESEARCH ETHICS COMMITTEE

CONSENT FORM: SURVEYS

I *(optional),*

.....

of .....

certify that I am at least 18 years old and hereby agree to voluntarily participate in this study entitled: *The influence of psychological factors on investors trading behaviour*, being conducted at University of Hull by: **Gabriel Komba** and I understand that the purpose of the research is to investigate the role of psychological factors on investment decision-making behaviour by retail investors at the DSE. More specifically, the study examines whether investors in the frontier market are inclined towards psychological biases when making investment decisions. In addition, the study investigates which of the biases predominantly affects investors' behaviour at the DSE.

I understand that:

1. Upon receipt, my questionnaire will be coded and my name and address kept separately from it.

2. Any information that I provide will not be made public in any form that could reveal my identity to an outside party i.e. that I will remain fully anonymous.

3. Aggregated results will be used for research purposes and may be reported in scientific and academic journals.

4. Individual results will not be released to any person except at my request and on my authorisation.

5. That I am free to withdraw my consent at any time during the study in which event my participation in the research study will immediately cease and any information obtained from me will not be used.

Signature *(compulsory)*:.....

Date:.....

The contact details of the researcher are: Gabriel Komba, Hull University Business School, University of Hull, g.komba@2010.hull.ac.uk; **OR** School of Business, Mzumbe University, P. O. Box 6, Mzumbe; Email: gkomba@mzumbe.ac.tz; Mob: +255 713 314456; **OR**

The Researcher's Supervisor: Dr. Yilmaz Guney, Hull University Business School, University of Hull, Email: y.guney@hull.ac.uk tel. 01482-463079; **OR** The School Dean, Prof. Ganka D. Nyamsogoro, School of Business, Mzumbe University, P. O. Box 6, Mzumbe; Email: gdnyamsogoro@mzumbe.ac.tz; Mob: +255 716 616009;

The contact details of the secretary to the HUBS Research Ethics Committee are Karen Walton, Hull University Business School, University of Hull, Cottingham Road, Hull, HU6 7RX. Email: k.a.walton@hull.ac.uk tel. +44 (0) 1482-463646.

Survey Instrument

Section 1: Investor's Demographic Characteristics

1. What is your gender? *(Please select one)* Male □ Female □
2. Please indicate which category best describes your annual income (in Tanzanian Shilling). *(Please select one)*
   Less than 1,000,000 □ 4,000,001 – 8,000,000 □ More than 12,000,000 □
   1,000,000 – 4,000,000 □ 8,000,001 – 12,000,000 □
3. What is your self-assessment about stock (share) investment matters? *(Please select one)*
   Moderately knowledgeable □ Not knowledgeable at all □ Fairly knowledgeable □ Not very knowledgeable □ Very knowledgeable □

Section 2: Information about Your Stock Investment Decisions

1. When was your first time to buy a stock/share of a company?
   0 – 1 year □ 1 to 3 years □ 3 to 5 years □ More than 5 years □ Or in year _____
2. In general how often do you trade (buy and sell shares) at the DSE? *(Please select one)*
   At least once day □ Less than once a year □ Never □ At least a once weak, but not more than once a day □ At least once a year, but not more than once a quarter (i.e. three months) □ At least once a quarter, but not more than once a month□ At least once a month, but not more than once a week □
3. Please indicate ***AS APPROPRIATE***, in which of the following the companies have you invested?
   East African Breweries Limited **(EABL)** □ CRDB Bank Public Limited Company **(CRDB)** □ Tanzania Tea Packers Limited **(TATEPA)** □ Tanzania Cigarette Company Limited **(TCC)** □ Tanga Cement Company Limited **(SIMBA)** □ Swissport Tanzania Limited **(SWISSPORT)** □ Tanzania Portland Cement Company Limited **(TWIGA)** □ Tol Gases Limited **(TOL)** □ Kenya Commercial Bank Limited **(KCB)** □ National Microfinance Bank Plc **(NMB)** □ Kenya Airways Limited **(KA)** □ Dar Es Salaam Community Bank **(DCB)** □ Precision Air Services PLC **(PAL)** □ African Barrick Gold PLC **(ABG)** □ Tanzania Breweries Limited **(TBL)** □ Nation Media Group Limited **(NMG)** □ Jubilee Holdings Limited **(JHL**) □

Section 3: Psychological Factors

Please express your feelings and opinions by indicating your preferred statement towards participation in stock market investments/trading. Tick one box against each statement. **Key: 1** = Strongly disagree; **2** = Disagree; **3**=Neutral; **4**=Agree; **5** = Strongly agree).

Domestic Stock Preference (DOM)	
I prefer to buy Tanzanian companies' stocks than of foreign companies because the information of local stocks is more available	1☐ 2☐ 3☐ 4☐ 5☐
I do not like to invest my money in unfamiliar investments because they are risky	1☐ 2☐ 3☐ 4☐ 5☐
I would rather have in my stock portfolio just a few companies that I know well than in many companies that I know little about	1☐ 2☐ 3☐ 4☐ 5☐
I invest in companies I know well because I believe I am capable of anticipating the returns	1☐ 2☐ 3☐ 4☐ 5☐
I like to invest in the top and renowned companies	1☐ 2☐ 3☐ 4☐ 5☐
I am more likely to buy or sell shares by recalling how frequently a particular company has reported good performance.	1☐ 2☐ 3☐ 4☐ 5☐
If I was working for a company listed at the DSE, and was given the option to invest some of my money in [my employer's] shares, I would have taken the opportunity.	1☐ 2☐ 3☐ 4☐ 5☐
If I know the nature of business of the companies I buy the shares	1☐ 2☐ 3☐ 4☐ 5☐
Recency Bias (REC)	
I can easily recall information that has arrived recently	1☐ 2☐ 3☐ 4☐ 5☐
I think I can decide (continue) to trade at the DSE following a high abnormal trading volume on a particular companies stock	1☐ 2☐ 3☐ 4☐ 5☐
I usually focus on the more recent results of a particular type of business when deciding whether to invest in it or not.	1☐ 2☐ 3☐ 4☐ 5☐
When making a choice, I like to "cherry – pick" things with best results	1☐ 2☐ 3☐ 4☐ 5☐
Massive returns in recent times can influence my participation at the DSE	1☐ 2☐ 3☐ 4☐ 5☐
Market-related news e.g. stock price movements, form the basis of my investment decisions	1☐ 2☐ 3☐ 4☐ 5☐
Advocate Recommendation (ADR)	

I believe the information I get from my close friends and relatives as reliable source or reference for my decisions	1☐ 2☐ 3☐ 4☐ 5☐
I normally act on professional advice	1☐ 2☐ 3☐ 4☐ 5☐
By relying on experts advices, I enhance the efficiency of my decisions	1☐ 2☐ 3☐ 4☐ 5☐
I am a kind of a person who like to learn new things from my colleagues, friends, relatives, and neighbours	1☐ 2☐ 3☐ 4☐ 5☐
Suppose you have some money to invest and you hear about a great business tip from your neighbour who is known to have entrepreneurial sense. Will you invest into that business based on the neighbour's tip, and who is usually right about these things?	1☐ 2☐ 3☐ 4☐ 5☐
Decisions of friends significantly influences my decisions to participate in a particular business or social event	1☐ 2☐ 3☐ 4☐ 5☐
I normally consult family members, neighbours, colleagues, or friends on things I do such as social matters, investments, and business	1☐ 2☐ 3☐ 4☐ 5☐
Other market participants' are not very important to me as a source of information.	1☐ 2☐ 3☐ 4☐ 5☐
Stocks that investors choose more always provide higher returns	1☐ 2☐ 3☐ 4☐ 5☐
Sample-size neglect (SSN)	
I use trend analysis to make investment decision for all stocks that I invest	1☐ 2☐ 3☐ 4☐ 5☐
I know the past dividend payout for the companies I buy the shares	1☐ 2☐ 3☐ 4☐ 5☐
I avoid stocks that have performed poorly in the recent past	1☐ 2☐ 3☐ 4☐ 5☐
I consider recent past returns to be representative of what investors should expect in the future	1☐ 2☐ 3☐ 4☐ 5☐
I am very likely to go for, and pay a high price for stocks that have performed very well in the recent past	1☐ 2☐ 3☐ 4☐ 5☐
I am normally able to anticipate the end of good or poor event such as market returns at the DSE	1☐ 2☐ 3☐ 4☐ 5☐
I consider stocks with *poor* **(strong)** performance during the past three to five years as *losers* **(winners)**	1☐ 2☐ 3☐ 4☐ 5☐
I look at the success of an analyst's past few recommendation when trading in stocks	1☐ 2☐ 3☐ 4☐ 5☐
I am overly pessimistic about a stock whose returns for the past three years have shown a losing trend (performed poorly).	1☐ 2☐ 3☐ 4☐ 5☐
I examine past returns when deciding which stock to buy	1☐ 2☐ 3☐ 4☐ 5☐

A history of consistent pattern of earnings growth of a particular stock, is an indication that the value of the stock will keep on growing in the future	1☐ 2☐ 3☐ 4☐ 5☐
When buying shares, my focus is always on the most recent price performance of the share in question	1☐ 2☐ 3☐ 4☐ 5☐
Better-than-Average Effect (BTA)	
I assess my own performance in stock investment as much better compared to other investors.	1☐ 2☐ 3☐ 4☐ 5☐
I could succeed at making profit from my stock investment, even though many other investors would fail	1☐ 2☐ 3☐ 4☐ 5☐
I will be able to achieve most of the goals that I have set for myself.	1☐ 2☐ 3☐ 4☐ 5☐
When facing difficult tasks, I am certain that I will accomplish them	1☐ 2☐ 3☐ 4☐ 5☐
In general, I think that I can obtain outcomes that are important to me	1☐ 2☐ 3☐ 4☐ 5☐
I believe I can succeed at most any endeavour to which I set my mind	1☐ 2☐ 3☐ 4☐ 5☐
I will be able to successfully overcome many challenges	1☐ 2☐ 3☐ 4☐ 5☐
I am confident that I can perform effectively on many different tasks	1☐ 2☐ 3☐ 4☐ 5☐
Compared to other people, I can do most tasks very well	1☐ 2☐ 3☐ 4☐ 5☐
Even when things are tough, I can perform quite well	1☐ 2☐ 3☐ 4☐ 5☐
I feel comfortable to trade on stocks on my own	1☐ 2☐ 3☐ 4☐ 5☐
Learning to trade on stock markets was easy for me	1☐ 2☐ 3☐ 4☐ 5☐
I clearly understand how to trade at the stock exchange market	1☐ 2☐ 3☐ 4☐ 5☐
Illusion of Control (IOC)	
I never buy securities or funds that will underperform in the future	1☐ 2☐ 3☐ 4☐ 5☐
Most of the published business news related to companies listed at the DSE does not surprise me at all	1☐ 2☐ 3☐ 4☐ 5☐
I consider myself to have great skills and ability to cope with and predict future events	1☐ 2☐ 3☐ 4☐ 5☐
I generally do better in situations I understand than in situations where I have less knowledge	1☐ 2☐ 3☐ 4☐ 5☐

My life is determined by my own actions	1□ 2□ 3□ 4□ 5 □
I can pretty much determine what will happen in my life	1□ 2□ 3□ 4□ 5 □
When I make plans, I am almost certain to make them work	1□ 2□ 3□ 4□ 5 □
When I get what I want, it is usually because I worked hard for it	1□ 2□ 3□ 4□ 5 □
Ambiguity aversion (AMA)	
What we are used to is always preferable to what is unfamiliar	1□ 2□ 3□ 4□ 5 □
A good job is one where what is to be done and how it is to be done are always clear	1□ 2□ 3□ 4□ 5 □
I am just a little uncomfortable with people unless I feel that I can understand their behaviour	1□ 2□ 3□ 4□ 5 □
There is a right way and a wrong way to do almost everything	1□ 2□ 3□ 4□ 5 □
Practically, every problem has a solution	1□ 2□ 3□ 4□ 5 □
I have always felt that there is a clear difference between right and wrong	1□ 2□ 3□ 4□ 5 □
Nothing gets accomplished in this world unless you stick to some basic rules	1□ 2□ 3□ 4□ 5 □
I always want to know what the future has in store for me	1□ 2□ 3□ 4□ 5 □
The best part of working a jigsaw puzzle is putting in the last piece	1□ 2□ 3□ 4□ 5 □
Uncertainty keeps me from sleeping soundly	1□ 2□ 3□ 4□ 5 □
I have all the relevant information I need to make my investment decision	1□ 2□ 3□ 4□ 5 □
I have sufficient information to make a sound investment decision	1□ 2□ 3□ 4□ 5 □
I need more information to make a good investment decision	1□ 2□ 3□ 4□ 5 □
I do not like things to be uncertain and unpredictable	1□ 2□ 3□ 4□ 5 □
Regret Aversion (RGA)	
No one likes to lose	1□ 2□ 3□ 4□ 5 □
If the price of an asset I wanted to sell declines after a purchase, I will hold instead of selling it	1□ 2□ 3□ 4□ 5 □

I get very upset if I believe I could have anticipated and prevented a poor outcome	1□ 2□ 3□ 4□ 5 □
When I sell an asset whose price has risen, I get a pleasant feeling of having made a good decision in the original purchase	1□ 2□ 3□ 4□ 5 □
I get upset when I find that the decision I made has resulted to a bad outcome	1□ 2□ 3□ 4□ 5 □
I don't care when I make poor decisions	1□ 2□ 3□ 4□ 5 □
I feel more sad for the opportunities I missed than for the attempts that failed	1□ 2□ 3□ 4□ 5 □
I would rather be safe than sorry	1□ 2□ 3□ 4□ 5 □
I want to be sure before I purchase anything	1□ 2□ 3□ 4□ 5 □
I avoid risky things	1□ 2□ 3□ 4□ 5 □
I avoid selling shares that have decreased in value and readily sell shares that have increased in value	1□ 2□ 3□ 4□ 5 □
I feel more sorrow about holding losing stocks too long than about selling winning stocks too soon	1□ 2□ 3□ 4□ 5 □
If stocks I purchased losses I don't to wait to claim my losses	1□ 2□ 3□ 4□ 5 □
I consider investing investing in shares not safe	1□ 2□ 3□ 4□ 5 □
Loss Aversion (LOA)	
I am very likely to sell something if it experiences price increase than price decrease	1□ 2□ 3□ 4□ 5 □
It is very likely to lose money when making investments	1□ 2□ 3□ 4□ 5 □
I worry of incurring a great loss when making investment decision	1□ 2□ 3□ 4□ 5 □
In case of loss positions in my investment I generally wait for a price rebound instead of selling those securities	1□ 2□ 3□ 4□ 5 □
After a prior loss, I become more risk averse	1□ 2□ 3□ 4□ 5 □
If stocks I purchased losses I prefer to wait to claim my losses	1□ 2□ 3□ 4□ 5 □

==========Thank You Very Much for Participating==========

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