DETERMINANTS OF INITIAL PUBLIC OFFER UNDERPRICING: THE MODERATING ROLE OF MARKET CONDITIONS IN AFRICAN SECURITIES EXCHANGE ASSOCIATION MEMBER STOCK MARKETS

BY:

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DECLARATION

Declaration by the Candidate

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DEDICATION

To

My late father

David Yego Cheboi

My Family: Tallai, Kongato, Kobilo

And my children

For Inspiration, Love and Support

ABSTRACT

Firms continually make financing decisions in the course of business operations. One of these is the issuing of equity to the public through an Initial Public Offer (IPO). Despite the extensive research on the subject of IPOs, little attention has been given on the possible interaction between market conditions and the determinants of IPO underpricing. The general objective was to establish the determinants of IPO underpricing and the moderating effects of market conditions in African Securities Exchange Association (ASEA) member countries securities market. The specific objectives were to determine: the effect of transaction volume, offer size, investor oversubscription and listing delay on IPO underpricing and to establish the moderating effect of market conditions on the relationship between transaction volume, offer size, investor oversubscription and listing delay on the level of underpricing of IPOs. The study was based on market timing theory and the theories associated with information asymmetry namely the winner's curse theory, ex-ante uncertainty and signaling theory to explain what determines IPOs underpricing. The study used stratified random sampling to sample three countries, South Africa, Egypt and Kenya. The study used cross-sectional research design. Data was collected for all firms that issued IPOs in Nairobi Securities Exchange, Egyptian Exchange and Johannesburg Stock Exchange for a period of fifteen years (1996 to 2011). Data on IPOs offered per year per country was derived from the respective stock markets and financial information was collected from firm formation documents, prospectus and financial statements. The results showed that transaction volume, investor oversubscription and market condition had a positive and significant effect on IPO underpricing while listing delay had a negative and significant effect on IPO underpricing. Offer size was not significant. Furthermore, a hot market condition was found to have enhancing and significant interaction effects on transaction volume, offer size and investor oversubscription. There was no interaction on listing delay. This study contributes to theory by centering market condition on the empirical testing of market timing theory as well as the influence of share allotment on the reduction of the winners curse. The study recommends to issuers to take into consideration the market condition before issuing shares in an IPO as it enhances the impact of transaction volume, offer size and investor oversubscription on IPO underpricing. Further to this, the study recommends to policy more stringent scrutiny of offers made during a hot market to protect investors from possible impropriety occasioned by their enthusiasm as evidenced by investor oversubscription. The study suggests future research to investigate the allotment methods used in other developing markets in relation to the winners curse. The study further recommends inquiry on the impact of cold market condition on the determinants of IPO underpricing and an investigation on the events surrounding the transition from hot to cold markets to better understand and utilize the prediction capability of the noticeable indicators.

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DEFINITION OF TERMS

Buy and Hold Investors: These are investors who buy an IPO and keep it in the portfolio over a specified period of time, ranging from one to five years. The market changes may not influence the decision to sell the held stocks. The stocks will be sold at the end of the holding period.

Cold Market: This refers to a period where a pattern is seen in the primary market with low initial returns and low volume of new listings.

Due-diligence: This is a detailed and extensive evaluation of the IPO firm. The main purpose is the valuation of the firm to determine if the offer price truly reflects the value of the firm or is over/underpriced.

Flipping: This is selling shares in the immediate aftermarket that have been received in an initial allocation. This constitutes the supply of shares in the first day of trading. Higher flipping is associated to high first day trading volume.

Hot Market: This refers to a period where a pattern is seen in the primary market with high initial returns which are associated with a high volume of new listings.

Primary Equity market: This is a market for sale of shares for the first time to the public. The cash resulting from this sale will be received by the issuing firm. The shares traded may be either primary shares or secondary shares.

Prospectus: This is a document that is produced by a company that wants to offer its shares to the public. It is meant to provide a description of the issuing firm and acts as a marketing tool for the firm.

Seasoned Equity issue: This is the issue of shares to the public after an IPO. This occurs when a firm issues more shares to the public in the primary market. The shares will result in capital flow to the issuing firm.

Underpricing of IPO: These are IPOs offered where the price set is lower than the market price or the price at which the shares subsequently trade in the aftermarket.

Underwriter: This is a firm that administers the public issuance of shares. They help in setting the offer price and if the offer is a firm commitment offer, the underwriter

will carry the burden of ensuring that all shares are sold. They are paid underwriting fees.

Initial Public Offering (IPO): IPOs occur when a company offers shares to the public for the first time. These shares are offered in the primary market and will change the company from being a private company to a publicly traded one.

Intrinsic value: This is the true value of a firm and by extension the shares offered. It equals the book value of equity plus the present value of the expected future free cash flow.

Debt tax shield: This is the tax benefits of debt, given that debt interest is tax deductible which lowers tax liability.

Costs of financial distress: These are costs associated with a firm's failure to meet financial obligations. The direct costs include costs of insolvency and distress prices for assets liquidated.

Interaction term: This is the product of the moderator and the exogenous variables. The moderator in this study was market condition

Process: A macro developed by Andrew F. Hayes that enables SPSS to accommodate different analysis models of moderation and mediation. The process has a total of 76 models.

Growth Investors: Investors who are inclined to buy shares that present greater potential for capital gain of shares.

Income Investors: Are investors who are inclined to prefer shares which provide better opportunities for dividend earnings and low opportunities for capital gains.

LIST OF ABBREVIATIONS

ASEA	African Security Exchange Association
CMA	Capital Markets Authority
CRSP	Center for Research in Security Prices
CSEF	Centre for Studies in Economics and Finance – University of Naples
EMDB	Emerging Markets Database
IFC	International Finance Corporation
IPO	Initial Public Offering
SEO	Seasoned Equity Offering
NSE	Nairobi Securities Exchange
JSE	Johannesburg Stock Exchange
EGX	Egyptian Exchange
SPSS	Statistical Package for Social Sciences

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CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the background of the study, statement of the problem, research objectives and hypotheses, significance of the study and the scope of the study.

1.1 Background of the Study

Financing of a firm's investments and operations can be made through internal and external sources. Internal sources include retained earnings, while external sources include either debt or equity. The mix of equity and debt forms a firm's capital structure. Depending on the firm's choice of financing and capital structure, the firm can either issue debt or equity. These options have benefits and costs as expressed in the trade-off theories. Modigliani & Miller (1963) presented the debt tax shield (tax benefits of debt) as a trade off with the cost of financial distress (Bankruptcy costs). The seminal paper by Jensen & Meckling (1976) presented the agency cost of equity and debt and Myers & Majluf (1984) presented the pecking order of financing that ranks in order of priority the preferred sources of finance. These are internal equity, followed by debt and finally external equity. This order of preference is motivated by information asymmetry between managers and investors resulting in adverse selection.

A number of reasons have been advanced by different studies on why firms go public. Brau (2010) gives several plausible explanations as to why firms go public. The first reason is to overcome borrowing constraints. When firms go public, they increase their investments by lowering the proportions of debt. This implies that a firm will generate more funds which can be used to finance debt. This broadened capacity will increase the firm's bargaining power, which can help lower the cost of debt.

Myers (1984) and Myers & Majluf (1984) presented the pecking order of financing which ranked sources of financing into: internal equity, debt financing and finally external equity. This line of thought indicates that outside investors take the issue of external equity as a negative signal since there is information asymmetry. The management will therefore do their best to grow the firm using internal equity (retained earnings). If internal equity is not sufficient, then debt or external equity can be used. The pecking order hypothesis postulates that managers will issue equity after exhausting retained earnings and debt capacity. This notion works on the assumption that firms need more finance at every instance of their existence. Information asymmetry's assumption in the pecking order hypothesis has been confirmed by studies on capital structure decision of (Goyal & Frank 2003; Leary & Roberts 2005b and Bharath *et al.,* 2008).

Pagano *et al.,* (1988) argued that access to source of finance other than from financial institutions or from venture capitalists may be the most valued benefit of going public. The decision to go public is anchored on the drive to establish market price for subsequent sell-out Pagano *et al.,* (1998). The idea that founders may want to harvest or exit has generated several studies to verify or otherwise reject this notion. Mello & Parsons (1998) and Zingales (1995) assert that, IPO insiders are motivated to go public in order to establish market price for their firm. This will be followed by selling out the firm in the hope that it would fetch a higher price. This implies that firms going public will transfer ownership and control fairly quickly post issue. Pagano *et al.,* (1998) tested the sellout hypothesis by predicting a high incidence of control transfer shortly after the firm goes public. They found that about 14% of their IPO sample sells out the controlling stake to an outsider within three years after an IPO. A variant of the same

argument is the use of IPO as a vehicle for venture capitalists exit, providing an attractive harvest strategy. This argument is supported by a large portion of European IPOs in the 1980s and early 1990s. Ljungqvist (1997) reports that 23% of IPOs in Germany contained secondary shares. Further, 2/3 of IPOs in Portugal contained secondary shares. Secondary shares in this case refer to equity already issued to founders being offered to the public.

Chemmanur & Fulghieri (1999) pointed out that firms go public is to allow for more dispersion of ownership. Firms that go public broaden their ownership base. This disperses ownership away from the insiders as measured by the number of shareholders. Pagano *et al.,* (1998) report that the number of shareholders increases dramatically for Italian firms when they go public. Mikkelson *et al*., (1997), reports that US firms' ownership retention is 44% while Brennan & Franks (1997) found that UK firms reports 35% ownership retention. This dispersion can be associated with diversification motive of a firm. If a firm goes public due to the drive to diversify, it can do this by directly divesting from the firm and investing in other securities or assets; or indirectly by having the firm raise new equity during a primary issue and by acquiring stakes in other firms. Pagano (1998) stated that we should expect riskier firms to go public and controlling shareholders to sell a large chunk of their shares during the issue or soon thereafter in the secondary market.

Once a firm has decided to go public, the next question and perhaps the most important of all is the establishment of an offer price. This is crucial especially where the new issue is an Initial Public Offering (IPO). The firm should set and receive the right price for the stock. Pricing of equity during an IPO will trigger issues of mispricing of shares. Equity mispricing is the deviation from intrinsic value. This is a direct consequence of

different valuations by the firm and the market. Studies have confirmed presence of underpricing due to differences in valuation between the firm and the market (Beatty & Ritter 1986; Slovin *et al.,* 2000; Lounghran & Ritter 2004; Aggarwal *et al.,* 2008; Brau & Fawcett 2006a and Banerjee *et al.,* 2012). The publicly traded firms depend on investor perception to win confidence in buying their shares. Mispricing of shares can result in either underpricing or overpricing. Underpricing occurs when the closing price of the shares on the closing day of the first day of trading in the securities market is higher than the offer price.

Under-pricing has been witnessed at different levels in different market conditions. These conditions have been captured by many researchers using different terminologies. Ibbotson & Jaffe (1975), Ritter (1980), Aggarwal & Rivoli (1990), Uddin (2008) and Banerjee *et al.,* (2012) among others referred to this phenomenon the "Hot" and "Cold" market conditions. Aggarwal & Rivoli (1990) termed it "Fads" in the offering market, Daily *et al.,* (2003) called it cyclicality in the market and Pastor & Veronesi (2005) described it as IPO waves. All these researchers presented a market pattern where a period is characterized by high initial return coupled with high IPO volume, referred in this study as "HOT" market condition.

The complement of the "HOT" market is "COLD" market condition which is characterized by low initial return coupled with low IPO volume, in terms of the number of issues and capital marshaled. One denominator in both the Hot and Cold market conditions is the presence of underpricing. Daily *et al.,* (2003) noted that unanticipated result is the ubiquity of findings across independent variables of potential moderation. The researcher indicated that irrespective of the independent variables, virtually all the analyses reflect a common theme being the presence of unidentified moderating

influences. Daily *et al.,* (2003) indicated that cyclicality may also tamper with the magnitude of observed relationships in the IPO studies. This is noted as a reflection for further research and points to the need for investigation on the possibility that cyclicality or market conditions may tamper with the magnitude of observed relationships underpinning the view that market condition can be a moderating variable on the relationship between the determinants of IPO underpricing and the level of underpricing. This study is premised on the need to establish the determinants of IPO issue underpricing and decipher whether the market conditions moderate the relationship between the determinants and IPO underpricing in a developing market.

1.1 The African Stock Markets in ASEA

The area of focus is the African Stock Markets which are members of African Securities Exchange Associations (ASEA) as of 2012. ASEA was founded in 1993, as a non-profit organization limited by guarantee in Kenya. ASEA aims at establishing systematic mutual cooperation, exchange of information as well as harmonization of market standards, to enable its members to attain a greater role in the competitive global market environment, ASEA Handbook, (2005).

The member security markets include: Botswana Stock Exchange, Bolsa de Valores de Cabo Verde(Cape Verde), Bourse Regionale des Valeurs Mobilières, Bourse de Tunis, Casablanca Stock Exchange, Dar-esSalaam Stock Exchange, Douala Stock Exchange, Egyptian Exchange, Ghana Stock Exchange, Johannesburg Stock Exchange, Khartoum Stock Exchange, Libyan Stock Market, Lusaka Stock Exchange, Malawi Stock Exchange, Mozambique Stock Exchange, Nairobi Securities Exchange, Namibian Stock Exchange, Nigerian Stock Exchange, Rwanda Stock Exchange, Sierra Leone

Stock Exchange, Stock Exchange of Mauritius, Uganda Securities Exchange and Zimbabwe Stock Exchange. The ASEA member countries are all emerging economies which have received little attention in past studies related to IPO issue process. This association is unique as it gives opportunity for interactions between stock markets within member securities markets to enhance growth and development.

The ASEA stock markets possess similar unique characteristics to other African developing stock markets. The investors in these markets incur high cost of acquisition of information which enhances the differences between informed and uninformed investors Yartey & Adjasi, (2007). The African stock markets account for a paltry 3 percent of global listings, which is made worse by the negative growth rate of listing as at the end of 2009 CMA (2009). The net effect of new listings and de-listings was -76 companies which accounts for -4 percent growth rate. On underpricing, new listings depict greater underpricing as documented in many studies (Bundoo, 2007; Boudriga *et al.,* 2009; Tenai *et al.,* 2011; Smit & Nene, 2013). There is also both functional and operational inefficiency which has been depicted by poor brokerage services, slow settlement and operational procedures e.g. in some markets it takes one month to execute a single transaction as opposed to real time trading in the developed markets CMA (2009).

In spite of all these glaring weaknesses in the African stock market operations, there is an increasing interest in Africa as potential investment destination KPMG (2014). The main drivers of this attention is the slowing down of growth rates of developed markets due to their maturity. Additionally and perhaps the most important is the maturity of African democracy which has resulted to creation of enabling environment for

investment, as well as the ever increasing population which is expected to support consumption coupled with vast and significantly underutilized resources KPMG (2014). A study in ASEA market would give a fair opinion of the average results of the African context.

1.2 Statement of the problem

The motivation to issue equity through an Initial Public Offering (IPO) is to raise finance for expansion and growth. The firm in its quest to raise finance endeavors to offer the shares in the best price possible. The establishment of best price is dependent on valuation of the firm. Koop & Li (2001) argue that valuation plays an important role when setting the price of company's equity prices. Valuation should be determined by the market's future expectations of the firm's profitability which may result in valuation yielding prices that are equivalent to its intrinsic value. This means that the market value of the stocks should be equivalent to the issue price on the first day of trading, with the exception of the impact of irrational investors which should be minimal to the overall market behavior resulting in low first trading day returns, if not non-existent.

However, studies by Beatty & Ritter (1986); Ritter (1998); Slovin *et al.,* (2000); Lounghran & Ritter (2004) and Engelen & Essen (2007) have shown that the market's and the company's valuations do not correspond, thus leading to underpricing. Indeed, IPOs underpricing has been widely researched over the years and the results have been inconclusive in terms of what determines underpricing. Holmén & Högfeldt (2004) presented a study of the Swedish underpricing, Burrowes & Jones (2004) document the U.K. underpricing and Loughran & Ritter (2004) the U.S. market's underpricing. Other studies by Koop & Li (2001) and Loughran & Ritter (2004) focused on other continents and in all the studies the consensus has been the existence of IPO underpricing. The

determinants forwarded has been as wide ranging as the number of studies with little focus on Africa.

A number of studies have documented the presence of "Hot" and "Cold" market conditions (Ibbotson & Jaffe, 1975; Ritter 1980; Aggarwal & Rivoli, 1990; Daily *et al.*, 2003; Uddin, 2008 and Banerjee *et al.,* 2012). A hot market refers to a pattern where high initial returns are associated with a period of high volume of new listings and a cold market is a pattern where low initial returns are associated with a period of low volume of new listings (Ritter, 1998) which constitute market conditions in this study. Although studies have focused on the determinants of IPO underpricing with a varied number of determinants from markets outside developing countries and Africa, the moderating effects of market conditions has not been studied. Given suggestions made by prior studies like Daily *et al.,* (2003) who identified this literature gap by wondering whether cyclicality or market conditions could tamper with the magnitude of observed relationships between IPO underpricing and the various exogenous variables. Market conditions could meddle the impact of the various determinants on IPO underpricing which underpins market timing theory to this study.

Africa has received little attention on the studies related to IPO underpricing. The volatility of market conditions in Africa made this study best suited for ASEA, an African setting. This study sought to establish the determinants of IPO underpricing and the moderating effects of market conditions in the African context.

1.3 Research objectives

1.3.1 General objective

The general objective was to establish the determinants of IPO underpricing and the moderating effect of market conditions on IPO underpricing.

1.3.2 Specific objectives

1. To determine the effect of transaction volume on IPO underpricing.
2. To establish the effect of offer size on IPO underpricing.
3. To determine the effect of investor oversubscription on the level of IPO underpricing.
4. To determine the effect of listing delay on IPO underpricing.
5. To determine the effect of market condition on IPO underpricing

6a. To establish the moderating effect of market conditions on the relationship between transaction volume and the level of underpricing of an IPO.

6b. To establish the moderating effect of market conditions on the relationship between offer size and IPO underpricing.

6c. To establish the moderating effect of market conditions on the relationship between investor oversubscription and IPO underpricing.

6d. To establish the moderating effect of market conditions on the relationship between listing delay and IPO underpricing.

1.4 Hypotheses

H_{01} Transaction volume has no significant effect on the level of underpricing of IPO.

H_{02} Offer size has no significant effect on the level of underpricing of IPO.

H_{03} Investor Oversubscription has no significant effect on the level of underpricing of IPO.

H_{04} Listing delay IPO has no significant effect on the level of underpricing of IPO.

H_{05} Market condition has no significant effect on the level of underpricing of IPO.

H_{06a} A market condition does not moderate the relationship between Transaction volume and IPO underpricing.

H_{06b} A market condition does not moderate the relationship between Offer size and IPO underpricing.

H_{06c} A market condition does not moderate the relationship between Investor Oversubscription and IPO underpricing.

H_{06d} A market condition does not moderate the relationship between listing delay and IPO underpricing.

1.5 Significance of the Study

This study examined the IPO issue price puzzle for the period 1996 to 2011, thereby expanding the time frame for this inquiry. Studies by (Tenai *et al.,* 2011 and Boudriga *et al.,* 2009) used a shorter time frame, this was expected to update the literature on the current happenings in the primary market and more so in the developing primary securities market of Africa. As a follow up of Daily *et al.,* (2008) recommendation for further inquiry, the study sought to determine whether market conditions moderate the determinants of IPO underpricing.

This research is important in understanding the operations of equity markets in the developing countries for firms who wish to issue equity sometime in its life. Firms should consider market conditions as a primary determinant of when to issue shares, as results suggest the best time to ensure success of offering is during a hot market condition. Of equal importance is the role played by the offer size in establishment of offer price that will not be severely underpriced. Firms should ensure that they appraise the market properly to establish the absorption capacity of the market so as to avoid a case of oversupply of the shares which diminishes the offer price.

The findings of the study extended market timing theory by quantifying the impact of market conditions in decisions related to timing the market during IPO issues. The

model used in the study puts market conditions at the center of the IPO issue process. The study also identified the determinants that are sensitive to market conditions being investor oversubscription transaction volume and offer size. These three determinants are central on predicting investor behavior.

Of equal significance was the value of information content of the research findings to the development of policy and practice in primary capital market to investment consultants, regulatory bodies and researchers. The investors and potential investors will find the results of this study informative in their quest to have insight into the primary equity market with special attention to the effect of market conditions on pricing of IPOs. This study will certainly strengthen the existing body of knowledge by providing some empirically tested insight in the African IPO issue context.

1.6 Scope of the Study

The study focused on the moderating effect of market conditions on the level of underpricing of IPOs. The determinants of interest were transaction volume, offer size, investor oversubscription, and listing delay. The firm specific characteristics that have possible confounding effects were controlled. These firms were in three ASEA member countries. The study was delimited to firms found in Kenya, Egypt and South Africa who issued IPOs between 1996 and 2011, meaning that any other type of issue and IPOs done outside the said period were excluded. Firms that successfully issued an IPO but were not listed in the stock market were excluded for incomplete information.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The relevant literature was reviewed in this chapter. The chapter gives a description of the theories explaining the underpricing of IPOs. A review of previous studies was done in order to develop the hypotheses, identify and explain the variables of the study. A conceptual framework was provided at the end of the chapter.

2.1 Theoretical Perspectives

Over time different theories and hypotheses have been put forward to explain the underpricing of IPOs. Different researchers have attempted to group these theories and hypothesis into broad categories with minimal success. However, Ljungvist *et al.*, (2006) presented a formidable grouping of related theories based on asymmetric information. The central theory that links market conditions to underpricing is the market timing theory. However the theories explaining underpricing of IPOs are clustered in theories based on asymmetric information.

2.2 Market Timing Theory

The equity market timing theory posits that managers are able to identify times when the firm is overvalued; hence the managers are likely to issue equity to take advantage of the opportunity to lower the cost of capital. Lucas & McDonald (1990) developed the information asymmetry model where managers postpone their equity issue if they are fully aware that they are currently undervalued, and speed up equity issue process when they know that the firm is overvalued. The practice of market timing has been labeled by different researchers using terms like exploitation of the "Windows of opportunity" by Aggrawal & Rivolli (1990); Ritter (1991); Loughran & Ritter (1995)

and who called the tendencies to overvalue firms “Fads”, creating room for market timing. This overvaluation is on the demand side of IPOs which is contrary to rational expectations.

Successful timing of the equity market lowers the firm’s cost of equity at the time of issue and this will benefit the existing shareholders at the expense of new shareholders. If managers are able to time the equity market, then the proxies for mis-valuation should be correlated with the timing of the IPO issuance decision. Some attempts have been made to document a relation between proxies for valuation and IPO issuance. Loughran & Ritter (1995) used post issuance returns as an indirect proxy for valuation and document greater equity issuances during periods of relatively high market values, where market values are assumed to be negatively correlated with ex-post returns.

This theory explains why IPO issue volume and returns are clustered together. The inference of these three labels of market timing is interestingly intertwined. The managers will postpone the issue of IPOs due their perceived undervaluation. This leads to reduced volume of offer and this scenario is what is commonly referred to as the cold market. On the contrary if the investors depict “fads” in the market, the firm will be overvalued which will trigger the managers to issue IPOs. The managers will see windows of opportunity in the equity issuance process. These increased IPOs will trigger positive sentiment in the market triggering more IPOs and higher demand. The aggregate of these events results in the hot market condition, otherwise referred to as the bullish market. This study sought to confirm or otherwise reject the relevance of this theory in a developing market context.

2.3 Information Asymmetry

Insiders will possess intimate inside knowledge of the firm's operations. As insiders' they will have access to more information about the firm than the investors and underwriters. They can share this information with other players in equity market, or withhold it if they believe that it is in their best interest to do so. This unequal access to, and distribution of information between issuers and investors is known as information asymmetry. This disparity creates uncertainty among the parties about firm value, which results in differences in valuation of the firm, hence underpricing. There are several theories developed around information asymmetry relating to pricing of primary equity offering. They include the winner's curse Rock, (1986); Ex-ante Uncertainty, Beatty & Ritter, (1986); signaling hypothesis, Welch (1989).

2.3.1 Winners Curse

Rock (1986) hypothesized that investors are grouped into two; informed and uninformed investors and underwriters. This information is about the value of the firm. The informed investors have superior information on the true value of the shares on offer, compared to the uninformed that have inferior information on true value of shares on offer. The cost of information for the informed investor is high. The informed investor only subscribes to IPOs whose offer price is less than the market value in order to compensate them for the production of information through security analysis, while the uninformed investor will equally subscribe to both the attractive (underpriced) offers and the unattractive (overpriced) offers. In the attractive offers, the uninformed investor will be crowded out by the informed investor while in the unattractive offers; they will be allocated a large portion of the unattractive offer.

Uddin (2008) stated that the allocation of large portion if not all of the unattractive offers is because the informed investor will not submit their purchase orders for the unattractive share thus leaving the uninformed investors. As a consequence of this scenario, the uninformed investor is a winner in the sense that they have attained their goal of subscribing the shares on offer. They are cursed in the sense that they paid an extra amount of money for the securities which are not worthy. If the same trend persists, it means that the uninformed investor will persistently lose money and will therefore hold back on future subscriptions. This will force the underwriters to underprice the offers in order to compensate the uninformed investor due to winners curse as well as to compensate the informed investors for their production of information. Beatty & Ritter (1986) indicated that IPO firms have to underprice to compensate for losses experienced by uninformed investors due to the winners curse, so that the expected return of the uninformed investor is non-negative. This implies that there is a positive relationship between the risk of a firm and the initial returns of the IPO Beatty & Ritter (1986). Other studies that have confirmed presence of the winners curse include (Michealy & Shaw, 1994; Lee *et al.*, 1996; Chowdhry & Sherman, 1996).

2.3.2 Ex-ante Uncertainty

Ritter (1984) originated the ex-ante uncertainty model and Beatty & Ritter (1986) formalized it. This model originated from the winners curse model. The winners curse model opines that the investors can be grouped into two, the informed and the uninformed. This means that there is a difference in information held by the two groups of investors and consequently their valuation of the intrinsic value of the offer is different. Ex-ante uncertainty is defined as the uncertainty about the offering value once it starts trading. Beatty & Ritter (1986) argued that potential investors have to engage in security analysis to identify the offers' true value. This analysis is costly which will

increase the investors cost of doing business, hence the investor will choose to invest only when the offer price is sufficiently low to recover cost of security analysis as well as to make profit in relation to the true value of the security. The greater the uncertainty of firm value, the higher the demand for a lower offer price. This is meant to compensate the uncertainty of firm value and leave more money on the table as a compensation for the winners' curse. This can be summarized as "the greater the Ex-ante Uncertainty, the higher the anticipated IPO underpricing", Beatty & Ritter (1986). This position has received overwhelming support by many studies (Beatty & Welch, 1996; Dunbar, 2000; Uddin, 2001 and Ljungqvist, 2006).

2.3.3 Signaling Theory

Ibbotson (1975) originated the signaling model of underpricing and was further refined by Allen & Faulhaber (1989) and Welch (1989). Ibbotson (1975) brought in the concept of pricing intended to "leave a good taste in investors mouths", so that issuers can raise equity at higher share prices in the seasoned or subsequent issue. There are two types of firms in the world; 'good' (high quality firms) and 'bad' (low quality firms). Allen & Faulhaber (1989) demonstrated that the firm has the best information on its present value, risk and its future value than investors. When going public, good firms want to signal their good quality with a low IPO price (hence is a "money burning" signal) while the bad firms will want to immitate the good firms by signalling that they are good while essentially they are bad. Only 'good' firms are able to bear the cost of underpricing. 'Bad' firms will not be able to cope with the loss. They will either choose to stay private or go bankrupt attempting to go public, Demenint (2013).

In a subsequent offering the cost of signaling quality is recovered by good firms, while bad firms cannot afford to signal. Welch (1989) indicates that 'good' firms will separate

themselves from the ‘bad’ firms (commonly phrased as a separation of men from boys) so as to be able to recoup the losses after their IPO performance with a a highly priced and succesful subsequent issue. The separation is instigated by the inability of bad firms to marshall the needed resources to sustain profitability to recoup initial loses from IPO underpricing. There is also a possibility that the quality of the firm is discovered before the subsequent equity offering, Englen & Essen (2007). The benefit to the bad firm is lost and the cost is higher through a higher level of underpricing which requires more resources in order to immitate the good firm. Welch (1989), observes that the issuing prices at the first seasoned equity offering after an IPO are on average three times higher than the IPO prices. This observation confirms the strive to recover the losses of underpriced IPO as a signal for quality of the firm. Therefore, the model provides an explanation for the IPO pricing as an equilibrium signal of firms quality, Allen & Faulhaber (1989).

The general perception in the discussion above is that the IPO underpricing is a signal for preparation for a larger more successful subsequent issues. The question to ask then is how do firms not intending to make a subequent issue benefit from underpricing of its IPO. Underpricing, although money burning will result in higher valuation of the issuer stock in the market post issue compared to the valuation at pooling equilibrium. This makes it possible for firms to benefit from signalling in the IPO. This is in agreement with Banerjee *et al.*, (2012).

2.4 IPO Pricing Methods

IPO pricing is the process of establishing offer price of an IPO. There are different methods used by both the issuer and the underwriters to set the offer price. These methods are book-building, auction, fixed price offering and hybrid offerings. The

book-building method is the most widely used method for setting IPO price. Recently, since the emergence of internet bidding, auction method has gained preference. There has been a debate in finance literature on the optimal method of pricing. The following section, will explain the different methods of pricing, followed by a brief comparison of the various methods.

2.4.1 Book-Building Pricing Method

This is the most frequently used pricing method for the majority of IPOs. Sherman (2001) observed that, in the pre-offering market stage the underwriting bank surveys the market for indications of interest of potential investors by conducting road shows. The underwriter sets an indicative price range that reflects the market's valuation of the offer in the view of the underwriter. Tenai *et al.*, (2011) indicated that during the road show, lasting approximately two weeks, the underwriter collects the purchase price offers from investors and the quantity of shares requested. This is how "the book" is built. Subsequently, the investment bank generates a demand curve of the submitted bids and sets the final offer price. The challenge is the task of persuading investors to reveal truthful information about the value of the firm, due to the fact that investors know that this information has an effect on the offer price. The underwriting bank then allocates the shares among investors at its own discretion (Benveniste *et al.*,1989).

When the underwriter can allocate shares, the method used will most likely be the firm commitment offering which reduces tremendously the risk of issuing equity. This will outweigh the additional cost of higher underpricing. Cornelli and Goldreich (2001) in their study on IPOs priced through bookbuilding indicated that there is significant evidence of investment bankers extracting price information from investors through the book-building process. Jenkinson & Jones (2004) presented results that book-building

is mainly used as a way of allocating stock to longer-term investors. Longer-term investors are often buy-and-hold investors who will prevent the share price from decreasing in the immediate aftermarket due to reduced flipping.

2.4.2 Fixed-Price Method

As the name suggests, fixed-price offerings are priced without consulting investor demand or offer prices as is the case for book-building, with price discovery mainly taking place in the aftermarket. Demenint (2013) indicated that the offer price is set around one week prior to the IPO date and is announced and elaborated in the prospectus. The shares are then allocated among investors who bid on the day before the IPO on a pro rata basis. The main advantage of fixed price offerings is low cost and the relative ease of executing the offer.

The investors know, in advance, the actual price they pay in case they obtain a proportion of the shares. The main drawback of fixed price method is the fact that the set price cannot be pretested for optimality, only knowing the optimality or otherwise in the aftermarket. Welch (1992) posits that fixed price offering can cause an informational cascade as investors who observe the actions of previous investors can revise their beliefs about the value of the issue. This is why issuers have to underprice their shares, to create positive informational and price cascades.

2.4.3 Auction Pricing Method

This method of IPO pricing was used extensively in the tech-firms IPOs of Google, Face-book among others during the internet bubble. The allocation of shares in an auction is based on bids, not taking any previous relationship into account between the investor and the underwriter. According to Demenint (2013), the auction by which the IPO shares are sold can play an important role in eliciting information from the market

participants about their valuation of the stock. In a uniform price auction, the underwriter sets a minimum acceptable offer price, around one week before the IPO date. The Investors are expected to bid for a price or quantity of shares as per their assessment. After the bids are collected, a demand curve is generated and an offer price is set equal for every successful investor. The shares are then allocated, amongst the investors who placed a bid between the offer price and the maximum price, on a pro rata basis.

2.4.4 Hybrid Pricing Method

This is a recent development of the determination of offer price where a firm uses a combination of available methods. The more preferred pricing method combinations are of fixed priced offering to retail investors and book-building method for institutional investors (Sherman, 2001). The institutional investors will reveal their information during the book-building phase which will be used to set the price. The retail investors are uninformed, thereby obtaining a fair allocation of the shares of a firm via the fixed price offering, in spite of not participating in the price-setting process. Hybrid offerings in recent times occur sequentially, where a public offer follows the book-build offering, then when the price is set, the retail investors are then issued shares on fixed price offering. However, the current setting has been the use of the two methods simultaneously, as this method solves the timing difficulties experienced with sequential offerings.

2.5 IPO Issue Pricing

IPO issue pricing has been a subject of interest for the majority of IPO studies conducted in the past. The process of offering a firm's stock to the general public through an IPO is complex and lengthy. Once a firm has secured the services of a lead

underwriter (Investment bankers), compliance procedures are instituted for instance in Kenya the CMA requirements must be met before any marketing endeavors start. Once these requirements are met, the firm will roll out a marketing plan which is punctuated by road shows. These road shows are intended to bring on board the prospective investors (largely prominent institutional investors) via presentations in major towns and one-on-one meetings with targeted investors such as mutual/hedge fund managers (Ritter, 1998). These presentations focus on the firm's operations, products and services, and management.

The road show is designed to gauge the anticipated demand for the firm's stock and serves as a key input in the investment banker's determination of the price at which the firm's stock will initially trade. The decision on final offer price rests with the firm managers and the underwriters. The price setting activity is a critical decision point for firm management because once the price has been set, shares cannot be offered to the initial investors at any other price regardless of the level of demand (Gordon & Jin, 1993). It is this initial stock price that forms the basis for establishment of underpricing. The process of establishing an IPO offer price is varied from market to market. There are however, certain commonalities relating to regional markets. In emerging markets of Africa, the common practice is the use of book-building and in some cases fixed price offering. These methods will be discussed in more detail in the next section. Whichever method is chosen, it almost always results in underpricing.

2.5.1 IPO Underpricing

Underpricing is a frequently documented anomaly in the primary market. Tenai *et al.*, (2011) defined underpricing as the percentage change between the price at which the firm's stock was offered (offer price), and the stock's first trading day closing price.

This anomaly was first investigated by Ibbotson (1975) and Ibbotson & Jaffe (1975). Ibbotson tabulated IPO initial underpricing for the period 1960 to 1969 and found the level of underpricing to be 11.4 percent. In his second paper together with Jaffe in the same year they found an average underpricing of 16.83 percent for the years 1960 to 1970. Both their measurements considered the difference between the offer price and the first trading day closing price as a fraction of the offer price. Ritter (1998) presented underpricing in terms of initial returns on first day of trading. The difference between the offer price and market price in the secondary market on the first day of trading gives the value of initial return.

The initial return for a cross section of countries was done by Lounghran & Ritter (1994), which was confirmed by Ritter 1998. This study covered a total of 33 countries in the world except Africa. The lowest initial return was seen in Europe, with France showing initial return of 4.2 percent and the highest was seen in Asia with China having the highest initial return of 288 percent. Loughran & Ritter (2004) did a study for the years 1980 to 2003 and found that there was a sharp swing on the level of underpricing starting at 7 percent in 1980, then increasing to 15 percent in the period 1990 to 1999, extremely high initial returns of 65 percent for the renown internet bubble period of 1999 to 2000 and reverting back to 12 percent in the post-bubble period of 2001 to 2003. Wang (2010) studied the IPO market in the Chinese market for the period 1990 to 2009. The measure of underpricing used was consistent to Ibbotson and Jaffe study and found the market's overall underpricing was 236.7 percent. This was consistent with the findings of Ritter (1998) study that showed extremely high initial return for the Chinese IPOs. Tenai *et al.*, (2011) studied the Kenyan IPO market and showed that all the companies surveyed were underpriced; averaging 49.44% with the highest underpricing was recorded at 236.13 percent. This method of tabulating underpricing

was consistently used in other studies (Rock, 1986; Ritter & Welch, 2002 and Daily *et al.,* 2003).

The second method used to tabulate underpricing is an improvement to Ibbotson approach. Kooli & Suret (2004) stated that Ibbotson's approach would be valid in a market where there is no time gap between the application closing date and the first day of trading. The time lag is short for USA, Canada and European markets, at an average of less than 7 days but longer for the emerging markets ending up to three months. This lengthened time lag makes it prudent to adjust for market return in the raw initial returns. Carter *et al.,* (1988) computed the raw initial return as the percentage difference between the first CRSP reported closing price and the offer price. The raw initial return was adjusted for the contemporaneous return on the market index. The market-adjusted initial return (MAIR) is computed using the value-weighted CRSP Index. The mean MAIR is 8.08 percent. Kooli & Suret (2004) presented a summary of studies that used the same methodology to measure initial returns. These studies were done by Graves *et al.,* (1996) who measured the level of underpricing for U.S. IPOs during the period of 1975-1985, using the non-adjusted and the market adjusted measures and found that there is no significant difference between the mean of the underpricing calculated by the two approaches. This was consistent given the case of U.S where the time gap between the offering and the listing is short.

Mok & Hui (1998) analyzed Chinese IPOs and found that taking account of the overall market effect would yield a substantial difference in the results if the time gap is large. This was validated by the results for the non-adjusted IPO underpricing for A-shares which was 362.3%, which was higher than the adjusted IPO underpricing for the same shares (which was 289.2%). The time gap for A-shares is 307 days. For B-shares new issues, where the time gap is only 20 days, the non-adjusted IPO underpricing is 26.2%

and the adjusted IPO underpricing is 24.9%. Uddin (2008) did a study of Malaysia and Singapore IPOs. The initial return in the Malaysian market stood at an average of 93.31 percent while for Singapore market was 31.73 percent. The average listing time lag for the two markets was 115 days in Malaysia and 19 days in Singapore. This is consistent with the findings of Mok & Hui (1988) in the Chinese market. The same methodology to measure initial returns was used in other studies (Aggarwal & Rivolli, 1990; Aggarwal, 1993; Aggarwal *et al.,* 2008; Sohail & Raheman, 2009; Boudriga*et al.,* 2009 and Banerjee *et al.,* 2012).

2.6 Determinants of IPO Underpricing

The determinants of IPO underpricing are as varied as the number of studies done in the field of IPO underpricing. The guiding factors on the choices made on the variables to incorporate in this study are informed by the presence of these variables in a developing market, and more specifically African setting. Variables like underwriter reputation, type of pricing, Auditor reputation, venture capital equity and retained equity may not play a critical role in an investors decision to buy shares in an IPO hence may not increase the explanatory power of the predictors. The following factors were investigated to establish their predictive power on the level of underpricing.

2.6.1 Transaction Volume

This is the trading volume on the first day of trading. Ofek & Richardson (2003) showed that high initial returns occur when institutions sell IPO shares to retail investors on first day. This means that there will be a higher trading volume considering the fact that institutional investors are largely bulk buyers of equity. Boubaker (2011) found a positive and significant association between transaction volume and underpricing, contrary to Gao (2010) findings that transaction volume is negatively and significantly

correlated to underpricing. Cukur & Gumrah, (2012) indicated that trading volume may provide evidence of investors' interest on the new issue. This was used as a proxy for investor sentiment. The study employed the average 21 days pre-market trading volume. The study found a positive and significant relationship.

2.6.2 Offer Size

Cukur & Gumrah, (2012) stated that the increase in shares on offer may result in insufficient demand which may lead to price adjustment by the underwriters. This may prompt the underwriters to lower the price to attract investors. This means that the market will be experiencing excess supply in the pre-offer period. The net effect is lower post offer demand hence a decrease in initial returns and consequently lower degree of underpricing. The logarithm of gross proceeds was used as a proxy for offer size. A different explanation of the same results was articulated in Miller & Reilly (1987) and Clarkson & Merkley (1994) which indicated that the size of offer is negatively correlated with the pricing level. Kooli & Suret (2002) confirmed these findings by linking offer size to risk. They indicated that smaller IPO is riskier than larger IPO ceteris paribus. Aggarwal *et al.,* (2008) found the issue size is negatively related to initial return. Therefore the general consensus is that, a larger IPO is less underpriced than a smaller IPO. This variable has been measured consistently using the natural logarithm of the shares offered multiplied by the offer price, albeit differing results.

2.6.3 Investor Oversubscription

This is the amount of shares over-subscribed during the offer period. Oversubscription is a measure of investor demand which is associated with investor sentiment or "fads". Tenai *et al.*, (2011) indicated that investor sentiment is a belief about future cash flows

and investment risks that is not justified by facts at hand. This increases the amount of shares requested which in most cases surpasses the number of shares on offer. Investor oversubscription ratio is a proxy for IPO demand. The demand for IPO can be manipulated by the issuing firm or underwriters through leakage of information that hints that the offer price is low, Chowdhry & Sherman (1996). Boudriga *et al.,* (2009) found that oversubscription ratio is negatively related to initial return. Gao (2010) thinks that there are "fads" in the securities markets which contradicts the assumption of the rational expectations models in the literature. Aggarwal *et al.,* (2008) included the oversubscription ratio to test whether a positive relation exists between investor demand and IPO returns. The results of the study found that oversubscription ratio is a strong predictor of initial returns by a marginal unit of 0.18 % and is significant at 1%. This was found to be consistent with the results obtained by other studies (Hanley, 1993 and Cornelli & Goldreich, 2001).

2.6.4 Listing Delay

Listing Delay is defined as the number of days separating the closing day of subscriptions and the listing day of the IPO, Boubaker (2011). The results of the study indicated that the increased delay in trading the stocks increases the level of underpricing which is seen in higher returns. The listing time lag is associated with higher uncertainty of the offer. These findings were confirmed by Tian (2003) who indicated that the listing delay by an extra day increases the initial return by 0.4% in the Chinese market. Chowdhry & Sherman (1996) stated that the listing delay creates market illiquidity for the shares bought. The subscribers will require compensation for the illiquidity with price discounts.

The opportunity cost and investment risk is increasing as the length of the lag increases. Investors should ask for extra premiums for their investment, Ganon & Zhou (2009).

Uddin (2008) indicated that if there is a long time lag between the fixing of offer price and listing of stock, the given discount on offer may become irrelevant. This is because the investors may revise their expectations of future earnings which change their valuation of the offer, requiring higher discount due to market changes. This is because there is a possibility of changes in market conditions, from "hot" market conditions to "cold" market conditions which fundamentally changes the level of underpricing. This was empirically established in Uddin (2008) where the IPOs were grouped into four subsamples, based on the market conditions when the offer was done in relation to the market conditions when listing was done. The scenarios are listed using abbreviations where Hot market is initialed H, and Cold initialed C. The two initials were used to indicate the period of offer and period of listing hence availed the following: HH (Hot-Hot), HC (Hot-Cold), CH (Cold-Hot), and CC (Cold-Cold). The results showed a significant change in initial returns for any scenario compared to the IPOs that were offered and listed in the same period. This variable was also used in other studies (Chowdhry & Sherman, 1996; Loughran *et al.*, 1994, Chan *et al.*, 2004, Boudriga *et al.*, 2009).

2.7 The Moderating Effect of Market Conditions

2.7.1 Hot or Cold Market Conditions

A hot market refers to a pattern where high initial returns are associated with a period of high volume of new listings and a cold market is a pattern where low initial returns are associated with a period of low volume of new listings (Ritter, 1998). The market condition not only affects the number of IPOs going public but also the amount and volatility of IPOs' initial returns. In hot markets, initial returns are high whilst in the cold market, initial returns are subdued (Sundarasen, 2012). Many studies have established that firms are able to successfully time their offerings when the market is

optimistic about IPOs. This optimism has resulted in classification of the market into Hot or Cold markets conditions. Ibbotson & Jaffe (1975) documented this pattern for the 1960 to 1970 period in the US market. Ritter (1984) confirmed the existence of a hot market for the 1960 to 1982 period. He found a 15 month "Hot issue" period starting January 1980 and extending through March 1981, where IPO initial return of 48.4 percent was seen compared to 16.3 percent during the Cold issue period for the rest of the period 1977 to 1982. A possible explanation for this occurrence was based on Rock (1986), model of the Winners Curse.

Rock's model implies that riskier firms should have higher initial returns than firms that are easier to evaluate. The relationship between risk and returns is illustrated in figure 1 by showing a positive relation between risk and return. This will then set the stage for a wave of issues creating Hot Issues Period. If the firms which offer their securities at one period are considered risky, then the net effect will be average high initial returns. This will trigger further issues by the risky firms and higher initial returns will be seen. Banerjee (2012) indicated that the hot period is attested by low quality firms going public in a move to take advantage of the prevailing market receptive conditions.

Aggarwal & Rivoli (1990) thought that 'fads' occur in the hot issue market because during this period, investors are over-optimistic and irrational about the growth potential of the IPO firms. Issuers will time their IPOs during these periods in order to take advantage of the "windows of opportunity" created by the hot market conditions. This window of opportunity is triggered by the IPO price of one firm which serves as a feed-back mechanism to other IPOs since it can reveal information about a certain common value factor about the prospects for a specific industry and therefore change

the perceived value of other firms, Kooli & Suret (2002). The revelation of this common value factor may explain the clustering phenomenon, as evidenced by hot issue markets. Lowry and Schwert (2001) postulate that initial returns were negatively and significantly correlated with past IPO volume and that there was a positive and significant correlation with future IPO volume. Ibbotson *et al.,* (1988) did another study to verify his earlier findings covering the period between 1960 and 1987 which provided further evidence to support the existence of this phenomenon. Derrien & Womack (2005) suggested that current market conditions play an important role in determining an IPO underpricing. Undeniably, in hot markets, investors may be excessively optimistic about a firm's prospects, resulting in the aftermarket equilibrium price to be higher than the prevailing levels. Additionally, market conditions not only affect the number of successful offerings but also the amount and the variability of IPO underpricing.

Pastor & Veronesi, (2005) presented a different articulation of Hot and Cold markets, by defining them as IPO waves caused by sufficiently large improvements in market conditions. During the cold market conditions, a "backlog" of private firms waiting for market conditions to improve forms. After a sufficiently large improvement in market conditions, many of these firms go public. The resulting IPO waves typically last several months, as all private firms rarely go public at exactly the same time because they differ in the time to expiration on their patents as well as in their firm-specific profitability. Following a study by Helwege & Liang (2004), Pastor & Veronesi, (2005) calculated 3-month centered moving averages in which the number of IPOs in each month is averaged with the numbers of IPOs in the months immediately preceding and following that month. They defined "hot markets" as those months in which the moving

average falls into the top quartile across the whole simulated sample. There were 4,116 IPO waves whose length ranges from 1 to 17 months, with a median of 3 months. During the IPO waves returns were seen to increase tremendously and decline after the wave. Initial return before the wave was seen to decline. Findings of these studies, point to the fact that if high average initial returns indicate that the sentiment is especially high or market conditions are better than expected then more companies are likely to go public. As more firms go public, the uncertainty surrounding the true value of these firms decreases, thus causing average initial returns to decrease, ending the hot market run and introducing the transition period of normal market conditions followed by the Cold market run. Hot market conditions are usually short lived as compared to Cold market conditions. Loughran *et al.*, (1994), conducted a study based on the stock market for 15 countries and noted a trend in annual volume and underpricing of IPOs. He attributed the trend to the inflation-adjusted level of the stock market. This was supported by Ritter & Welch (2002), who concluded that market conditions are the most important factor in the decision to go public. When market conditions worsen, stock prices drop and IPO volume declines because private firms choose to wait for more favorable market conditions before going public.

Brailsford *et al.,* (2004) analyzed the time series behavior of the initial public offerings (IPOs) using an equilibrium model of demand and supply that incorporates the number of new issues (volume), average underpricing, and general market/economic conditions (the proxy for market conditions is measured as the monthly return on the S&P 500 index). He developed a model based on the US market, using monthly data over a period of 40 years. The results revealed a strong autocorrelation between past volume, stock market conditions and past underpricing levels with future volume. Similarly, Derrien (2005) documented that individual investor's demand is strongly correlated to market

condition prevailing at the time of the offering. Large individual investors demand leads to high IPO prices and large initial returns. These large initial returns are costs paid by issuers to elicit private information from investors. They also documented that the initial returns are affected by noise trader sentiments. This was re-enforced by the work of McKenzie (2007), whose study based on 38 international stock exchanges re-enforced that general market conditions affected the trends in listing activity. Similar findings were found by Yung *et al.,* (2008); whereby exogenous shocks to the economy cause time-varying adverse selection to the IPO market, which in turn is positively related to underpricing.

To test the magnitude of influence of market conditions on the IPO underpricing, direct effects were determined through finding out the relationship between dependent variable and independent variables and the impact of the introduction of the variable as interactions. The moderating variables are introduced to establish the impact of its introduction on the already established relationship between the dependent variables and independent variable.

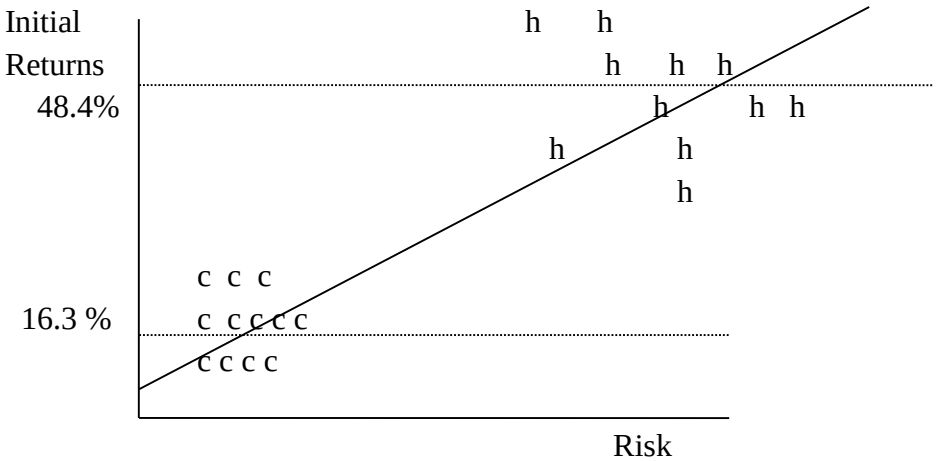

Figure 2.1 Relationship between Risk and Returns
Source: Ritter, 1985

This figure illustrates the changing returns with changes in risk composition. Higher risk is seen in the greater dispersion of high returns for the 1980-81 hot market period, while at lower risk levels the returns are lower but with lower dispersion for the cold 1977-82 period.

2.8 Conceptual framework

IPO underpricing is the endogenous variable which was measured using market adjusted initial returns. The exogenous variable were five namely; listing delay, investor oversubscription, offer size, transaction volume and market condition which coupled to become the moderating variable. This study tested whether market conditions moderates the impact of the exogenous variables on IPO underpricing. Market conditions were measured using a dummy variable for hot or cold market conditions. Firm age, firm size, industry and country were controlled to normalize the results for better and more reliable inference. This relationship between variables is shown conceptual framework in figure 2.2.

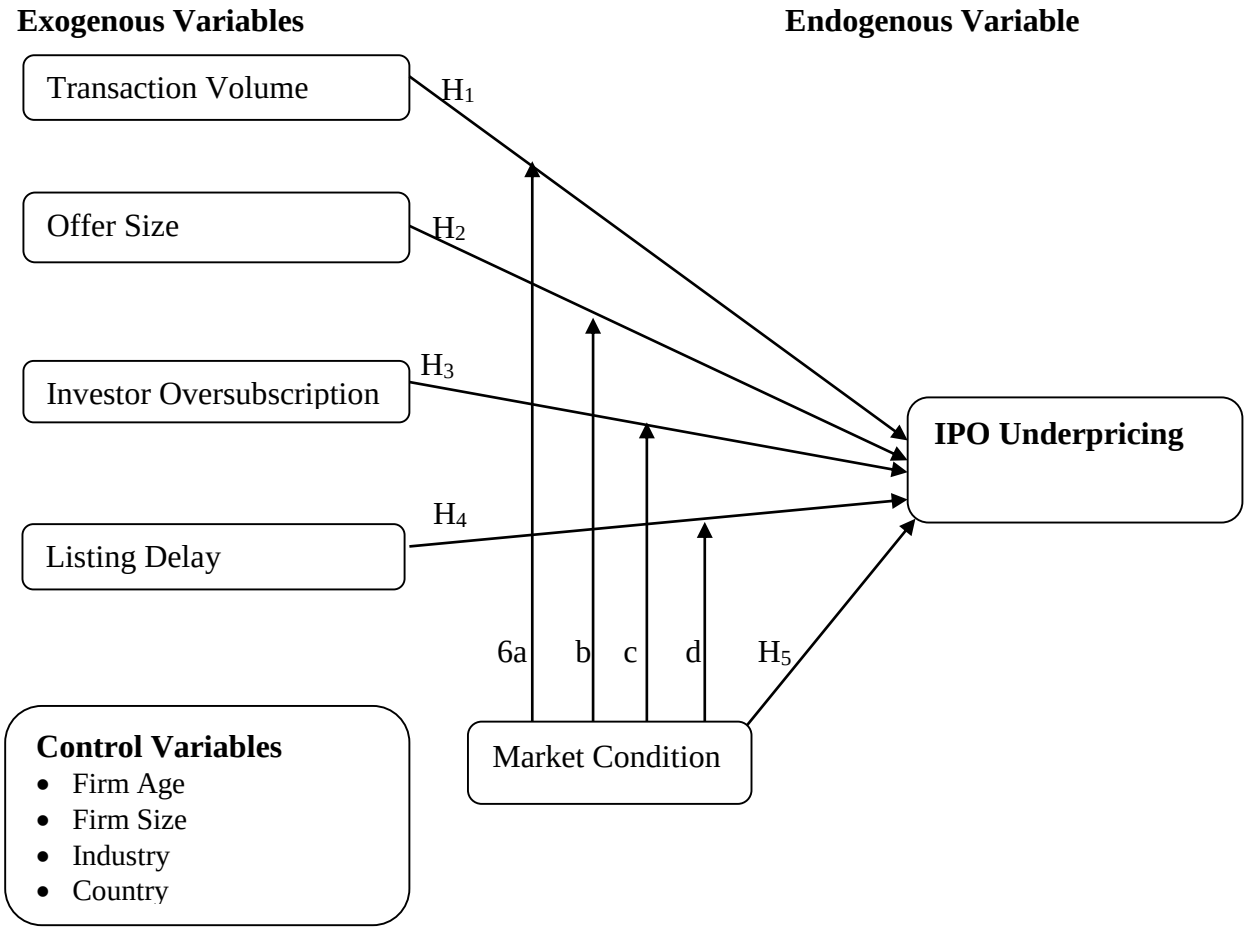

Figure 2.2: Conceptual framework
Source: Survey study, 2015.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology of the study that includes: research design, target population, data sources and measurement of variables, techniques and models that was used to analyze data.

3.1 Research design

A research design is a plan that specifies the methods and procedures for data collection and analysis for purposes of answering a research question. It provides a framework for the collection, measurement and analysis of data. There are several research designs that one can use depending on the nature of the study requirements. This can range from cross-sectional design, longitudinal design, experimental design, case study design or correlation design. This study used cross-sectional research design. This study examined several IPOs and observed their changes in price in relation to the identified exogenous variables and market conditions. This was tested on the closing price of the first trading day. A cross-sectional study entails the collection or examination of data across various segments of a population. Since the period of interest is fifteen years (1996 to 2011), multiple cross-sectional data was collected. Several IPO studies have used cross-sectional designs (Aggarwal & Rivoli, 1990; Carter *et al.*, 1998; Loughran & Ritter, 2004; Agarwal *et al.*, 2008; Uddin, 2008 and Gao, 2010).

3.2 Target population and sample

The target population was all firms that issued an IPO in twenty four African countries over the period 1996 to 2011. The selected countries are members of ASEA. ASEA is an association of African stock markets which comprise the following as it stands in the year 2013; Botswana Stock Exchange, Bolsa de Valores de Cabo Verde(Cape

Verde), Bourse Regionale des Valeurs Mobilières, Bourse de Tunis, Casablanca Stock Exchange, Dar-Es Salaam Stock Exchange, Douala Stock Exchange, Egyptian Exchange, Ghana Stock Exchange, Johannesburg Stock Exchange, Khartoum Stock Exchange, Libyan Stock Market, Lusaka Stock Exchange, Malawi Stock Exchange, Mozambique Stock Exchange, Nairobi Securities Exchange, Namibian Stock Exchange, Nigerian Stock Exchange, Rwanda Stock Exchange, Sierra Leone Stock Exchange, Stock Exchange of Mauritius, Uganda Securities Exchange and Zimbabwe Stock Exchange.

A number of countries were dropped from the study due to issuance of less than ten IPOs during the study period. The remaining countries selected using stratified random sampling. The countries were broadly grouped into three categories based on their geographical locations namely northern region, central region and southern region. Based on this stratification one country was selected randomly from each strata. The countries selected were Egypt from the northern strata, Kenya from the central strata and South Africa from the southern strata. The number of firms that floated their shares for the first time (IPO) stands at 130during the period January 1996 to December 2011.This data was obtained from ASEA yearbooks (1996-2011) and respective Stock Exchange websites. Table 3.1 gives a breakdown of the number of IPOs per country. A survey of all firms that offered shares in an IPO in the period 1996 to 2011, in the three identified ASEA member stock markets was carried out and studied. Firms which withdrew their IPOs before listing were excluded because they lacked sufficient information on the trading price on the 1stday of trading.

Table 3.1 Sample breakdown

S No.	Country	Number of Firms	Number rejected	Number Accepted
1	**Egypt**	10	0	10
2	**Kenya**	10	2	8
3	**South Africa**	110	0	110
	TOTAL	**130**	**2**	**128**

Source: Survey data, 2015

3.4 Data types and sources

Secondary data was used in this study. The data was derived from secondary sources. Data on IPOs offered per year per country was derived from ASEA and respective stock markets. The detailed information regarding the issue characteristics like listing delay, oversubscription ratio, offer size, transaction volume, industry and market conditions was derived from the individual stock market bulletins and reviews as well as the stock markets' historical data. The firm specific characteristics like firm age and financial information that was used to compute firm size was derived from the individual formation documents, firm's prospectus and financial statements.

3.5 Measurement of variables

This study investigated the moderating role of market conditions on the determinants of underpricing of IPOs. These variables were selected from previous research work premised largely on developed markets. The variables were grouped into; endogenous, exogenous, moderating and control variables.

3.5.1 Exogenous variables

Transaction Volume (TranVol) is the trading volume on the first day of trading. Ofek & Richardson (2003) showed that high initial returns occur when institutions sell IPO shares to retail investors on first day. This means that there will be a higher trading

volume considering the fact that institutional investors are largely bulk buyers of equity. Boubaker (2011) found a negative and significant association between transaction volume and underpricing. Gao (2010) found that transaction volume is positive and significantly correlated to overpricing. This was measured as the logarithm of shares traded in first day of trading times the offer price in US dollars.

Offer size (Offer size) is measured using the logarithm of gross proceeds in US dollars, Cukur & Gumrah, (2012). The results of the study showed that offer size is positively related to the level of initial returns. Miller & Reilly (1987) and Clarkson & Merkley (1994) indicated that the size of offer is negatively correlated with the pricing level. Boudriga *et al.,* (2009) measured offer size using the total gross proceeds raised from the markets. This study followed the Cukur & Gumrah, (2012) approach of measurement by using the logarithm of gross proceeds in US dollars.

Investor Oversubscription (InvOvsbscript) is the ratio of shares oversubscribed by the applicants in an IPO during the offer period. This measure was used by Sohail & Raheman (2009) who measured oversubscription variable as the difference between the shares on offer and the shares applied for. Boudriga *et al.,* (2009) measured oversubscription ratio by the number of share demanded over the number of shares offered. This study followed Boubaker and mezhoud (2011) measurement of oversubscription ratio which used the logarithm of the number of shares applied for as a fraction of the number of shares offered.

Listing Delay (ListDlay) is the number of days separating the closing day of subscriptions and the listing day of the IPO. Shikha & Balwinder (2005) measured the listing delay by taking the number of days separating offer and the listing dates. This measure presented challenges where the number of days for different IPOs was having

a wide range e.g. in china the listing delay ranged from 84 days to 340 days. To address this challenge listing delay was measured using the Logarithm of the number of days between closing day of subscriptions and the listing day of the IPO. This measurement was used in the studies of Chowdhry & Sherman (1996); Uddin (2008); Ganon & Zhou (2009) and Boubaker (2011). This variable was also used in other studies (Loughran *et al.,* 1994 & Chan *et al.,* 2004).This study followed the method adopted by Boubaker (2011) which used the logarithm of the number of days separating the offer day and the listing day.

3.5.2 Endogenous variable

IPO pricing may result in underpricing. Underpricing is a frequently documented anomaly in the primary market. There are several methods used in previous research to measure the level of underpricing. They include the determination of intrinsic values Boubaker (2010), the use of initial return available to investors on first day of trading Wang (2010) and the market adjusted initial return. This study used the Market Adjusted Initial Return, (Agarwal 1993; Mok & Hui 1998; Carter *et al.,* 1998; Kooli & Suret 2002; Uddin 2008; Li 2009; Boudriga *et al.,* 2009 and Sohail & Raheman 2009), which is an improvement of the first day of trading returns available to subscribers. This was measured as follows:

Market Adjusted Initial Return = Initial Return – Market Equivalent Return

$MAIR = IR_u - MER$

Where:

Initial return $_{\text{Underpricing}}$ $(IR_u) = \frac{P_1 - P_0}{P_0}$

Where: $\mathbf{P_1}$ is the trading price at the close of first day of trading.

$\mathbf{P_0}$ is the offer price

Market Equivalent Return (MER) = $\frac{I_{m,1}-I_{m,0}}{I_{m,0}}$

Where: $\mathbf{I_{m,1}}$is the market Index at the close of the first day of trading

$\mathbf{I_{m,0}}$is the market index on the application closing day of the relevant stock.

3.5.3 Moderating variables

Hot or Cold market conditions (MktDummy): Market condition is captured through classification of the market into two distinct categories; hot market and cold market. Uddin (2008), classified the market using two alternative methods: the first method is based on the number of IPOs issued quarterly and the second is based on the average quarterly market return. The relevant stock market is ranked based of the average quarterly market returns from the stock market all share index or 20 share index (Li, 2009). A market was defined as "Hot" when the quarter is ranked in the top 33%, cold of ranked in the bottom 33% and a transition period in between. Since the study was interested in either hot or cold market conditions, a dummy variable was used to indicate whether the market is hot or cold, Bayless & Chaplinsky (1996).

3.5.4 Control variables

The following variables were controlled as they may have systematic influence on the level of underpricing. They were controlled to enable a clearer view of the influence of the exogenous variables as well as the moderating variables on the endogenous variable. *Firm Size (Fsize)* is measured using the logarithm of total assets at the end of the year preceding the IPO (Boudriga *et al.*, 2009). Tenai *et al.*, (2011) indicated that firm size has significant impact on IPO pricing. Ritter (1984) argued that larger firms are easier to value because of ease of forecasting cash flows. On the other hand, small firms may attract less attention from investors and investment analysts creating room for

information asymmetry in the event that they need to issue shares. Extant literature is in agreement on the role played by firm size.

Firm Age (Age) was controlled. This is defined and measured by the logarithm of the number of years between the year of incorporation and the year of IPO (Carter 1998; Daily 2005; Boudriga *et al.,* 2009; Tenai *et al.,* 2011; Cukur & Gumrah 2012 and Banerjee *et al.,* 2012). Carter (1998) indicated that older firms have longer operating histories, which makes it easier for investors to estimate the firm's future cash flows more accurately. This lowers the uncertainty associated with older firms. According to Daily (2005) and Cukur & Gumrah (2012), greater uncertainty associated with younger firms makes the investment banks and underwriters to apply greater offer price spread which lowers the offer price hence underpricing, compared to older firms with longer operating history. Tenai *et al.,* (2011) indicated that IPO firms missing track records will discount their offer price in order to compensate investors for the uncertainty.

Industry (Ind) was controlled. The study followed the approach used by Acconcia *et al.,* (2011). All firms that were of interest were grouped into service and Non-service sectors. The study used dummy coding to introduce industry into the model. The results of Acconcia *et al.,* (2011) showed that firms grouped into Non-service industry were negatively and significantly related to underpricing, while the other group was not statistically significant. Uddin (2008) study showed that using the market adjusted returns as the dependent variable industry is positive and statistically significant. *Country* was also controlled. Hardy (1993) indicated that to represent a variable with k categories, k-1 dummy variables are required. The study used two dummy variables to capture the data on three countries where the reference country was Egypt. The choice of Egypt as the reference category is informed by the recommendation of Garson

(2006) which showed that the best choice for a reference category should be the middle category in terms of sample size as it represent the best choice for comparison.

3.5.5 Summary of variables used

Table 3.2 Summary of variables

Name	Expected Sign	Definition
Initial return		The closing market price on the first day of trading minus the offer price, divided by the offer price
Market Equivalent Return		The closing market price on the first day of trading minus the market index on the offer day, divided by the market index on the offer day
MAIR		Initial return minus market equivalent return
Transaction Volume	±	Logarithm of number of shares traded on first trading day times the offer price.
Offer Size	-	Logarithm of shares offered times offer price
Investor Oversubscription	-	Logarithm of number of shares applied for as a fraction of the shares offered.
Listing Delay	+	Logarithm of number of days separating closing day of subscriptions and listing day of the IPO
Market Dummy	±	Dummy for Hot or Cold market conditions
Firm Age	-	Logarithm of the number of years between year of incorporation and the year of the IPO
Firm Size	-	Logarithm of total assets at the end of the year preceding the IPO.
Industry	±	Firms grouped into Service and Manufacturing
Country	±	Country relevant to stock market being Kenya – NSE, Egypt- EGX and South Africa-JSE

3.6 Data analysis

Data analysis was done using both descriptive and inferential statistics. Descriptive statistics was used to show the degree of underpricing and relate this observation across years, country and industry. This was analyzed through the use of mean and standard deviation. To test the relationship and usability of variables in regression analysis, correlation analysis was done using Pearson's Product Moments correlation. Variables depicting a high level of correlation may indicate multicollinearity.

Regression analysis was done in three broad stages. The first stage was done for control variables, then loading of exogenous variables in a sequential regression analysis to determine the direct effects and lastly the introduction of interaction terms one at a time to test moderated effects. In terms of the steps in conducting moderated regression, first the interaction term between the independent variable and the moderator variable was calculated. This is done by multiplying the two variables together which yields a product term that represents the interaction effect. Four interaction terms were tabulated for each of the independent variables; transaction volume, offer size, investor oversubscription and listing delay.

To avoid heteroscedasticity, the exogenous and moderator variables were transformed converting them to log values which reduced a ten-fold difference to a two-fold difference. By multiplying the two scores together, it is possible to determine whether their systematic variation is related to the change in the endogenous variable. An interaction (moderator) effect is indicated if the product term is statistically significant, with the endogenous and moderator variables also included in the equation. To verify the results obtained through standardized establishment of the interaction effect, each moderator was introduced as a separate step in a hierarchical regression. The addition

of the interaction term should be statistically significant, with a non-zero coefficient and an increment in variance explained (R^2) above and beyond the model without the product term. Tabachnick & Fidell (2001) recommend that if a standardized solution is desired for moderated regression, researchers should standardize all variables, including the dependent and independent variables, prior to forming the product term and interpret the resulting unstandardized coefficients as the alphas. This procedure will generate correct standardized (alpha) coefficients for the product term(s) in moderated regression models. In this case the variables were mean centered before determining the interaction term (Aiken & West, 1991).

3.7 Model specification

$MAIR_u = \alpha_0 + \alpha_1 Fage + \alpha_2 Fsize + \alpha_3 Indum + \alpha_4 CounDum1 + \alpha 5\ CounDum2 + \varepsilon$ ……Model 1

$MAIR_u = \alpha_0 + \alpha_1 TranVol + \alpha_2 OfferSize + \alpha_3 InvOvsbscript + \alpha_4 ListDlay + \alpha 5 MktDum + \alpha_6 Control + \varepsilon$ ……Model 2

$MAIR_u = \alpha_0 + \alpha_1 TranVol + \alpha_2 OfferSize + \alpha_3 InvOvsbscript + \alpha_4 ListDlay + \alpha 5\ MktDum + \alpha_6 TranVol * MktDum + \alpha_7 Control + \varepsilon$ …… Model 3

$MAIR_u = \alpha_0 + \alpha_1 TranVol + \alpha_2 OfferSize + \alpha_3 InvOvsbscript + \alpha_4 ListDlay + \alpha 5\ MktDum + \alpha_6 TranVol * MktDum + \alpha_7 OfferSize * MktDum + \alpha_8 Control + \varepsilon$ …….Model 4

$MAIR_u = \alpha_0 + \alpha_1 TranVol + \alpha_2 OfferSize + \alpha_3 InvOvsbscript + \alpha_4 ListDlay + \alpha 5\ MktDum + \alpha_6 TranVol * MktDum + \alpha_7 OfferSize * MktDum + \alpha_8 InvOvsbscript * MktDum + \alpha_9 Control + \varepsilon$ ……Model 5

$MAIR_u = \alpha_0 + \alpha_1 TranVol + \alpha_2 OfferSize + \alpha_3 InvOvsbscript + \alpha_4 ListDlay + \alpha 5\ MktDum + \alpha_6 TranVol * MktDum + \alpha_7 OfferSize * MktDum + \alpha_8 InvOvsbscript * MktDum + \alpha_9 ListDlay * MktDum + \alpha_{10} Control + \varepsilon$ ……Model 6

Where: $MAIR_u$ is the Market Adjusted Initial Return for underpricing

Fage – Firm Age

Fsize – Firm Size

Indum – Industry Dummy

CounDum1 and CounDum2 – Country Dummy

TranVol– Transaction Volume

OfferSize – Offer Size

InvOvsbscript – Investor Oversubscription

ListDlay – Listing Delay

MktDum – Market condition for Hot or Cold Market

Control – Contains the control variables Firm Age, firm size, Industry and country

α_1 to α_{10}– coefficients of the various exogenous variables

ε – Error term

3.8 Underlying assumptions of the regression model

A regression equation is a mathematical representation of what and how exogenous variables are related to the endogenous variables. All regression models have assumptions, and violation of these assumptions can result in parameter estimates that may be biased, inconsistent and inefficient. The following are the assumptions that underlie multiple regression model of analysis which include:

i. Normality of the dependent variable. Normality is the assumption that the scores on a continuous variable are normally distributed about the mean (i.e., the bell-shaped distribution) (Tharenou *et al.,* 2007). Regression is robust to moderate with violations of normality, provided there are no outliers.

ii. Linearity of relationship between the dependent variable and each independent variable. Linearity refers to the degree to which the change in the dependent variable is related to the change in the independent variables (Hair *et al.*, 2010).

For linear regression models, the degree of change should be consistent across all data points meaning a line of best fit should be best linear unbiased estimator (BLUE)

iii. Homoscedasticity (homogeneity of variance). This means the dependent variable scores have the same dispersion/variability around the regression line through them, meaning they have equal spread. In other words, the disturbances appearing in the population regression function are homoscedastic meaning that they all have the same variance regardless of the values taken by the exogenous variables.

iv. Independence of the error term. Each case or observation should be independent of one another. The regression model assumes that the errors from the prediction line are independent. This is a critical assumption for statistical tests to be accurate.

v. Multicollinearity occurs when two (or more) independent variables are highly correlated. Multicollinearity makes it difficult to determine the separate effects of individual variables. Highly correlated independent variables cause computational and interpretational problems (Saunders *et al.*, 2009).

3.9 Robustness Checks

The purpose of robustness checks is to address issues related to reliability and validity of the results that obtained from the study. The purposes of robustness checks are to enable generalization of results to make it possible for the results to be reproduced under similar methodology. The robustness checks was concerned with the cross-country currency differences which pose a challenge of the value of the share price, transaction volume and firm size. The solution was to convert all values to one common currency that allowed meaningful comparison between variables. The more stable common

currency used with a limited bid-ask spread is US Dollars. All values in the study were converted to US Dollars using July 1st 2011 exchange rates. The exchange rates were; Fx 1US$ = ZAR 6.731, Fx 1US$ = KES 88.7784 and Fx 1US$ = EGP 5.9589 for South African rand, Kenya shillings and Egyptian pound respectively.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.0 Introduction

This chapter presents the empirical findings of the study and their interpretation. This includes sample characteristics, descriptive statistics, test of assumptions of the regression analysis and the results of the regression models as well as their interpretations.

4.1 Sample characteristics

The sample comprised of firms that issued shares through an IPO in Johannesburg Stock Exchange, Nairobi Securities Exchange and Egyptian Exchange. Secondary data was collected for a period of fifteen years from 1996 to 2011. Two firms were removed from the analysis due incomplete data. These firms were from NSE. The final sample comprised of 110 firms from JSE, 10 from EGX and 8 from NSE making a total of 128 IPOs for the period under study.

4.2 Descriptive statistics

The econometric techniques require transforming the values of all real variables into their logarithmic values. Transformation of the variables should be regarded as a device for converting a heteroskedastic error model into a homoskedastic error model, not as something that changes the meaning of the coefficients Carter et al., (2011). All real variables except the dummy variables for market condition and country were transformed into logarithm form as transformation may reduce the problem of heteroscedasticity because it compresses the scale in which the variables are measured, thereby reducing a tenfold difference between two values to a twofold difference, Carter *et al.,* (2011). The variables shown in table 4.1 are: Market Adjusted Initial Return

(MAIR) which is the endogenous variable, the control variables are firm age, firm size, industry and country (two dummy variables). The exogenous variables are transaction volume, offer size, investor oversubscription, listing delay and market condition which was later used as the moderating variable. The means and standard deviations of the variables in this study are presented in table 4.1.

Table 4.1: Descriptive statistics

	Mean	Std. Deviation	N
MAIR	.203657	.3761923	128
Firm age	1.7332	1.31123	128
Firm size	15.6857	2.91241	128
Industry	.6016	.49150	128
Country dummy 1	.0625	.24301	128
Country dummy 2	.8594	.34900	128
Transaction volume	16.0575	2.34234	128
Offer size	16.9469	1.24061	128
Investor oversubscription	1.3884	1.34607	128
Listing delay	2.2796	.53621	128
Market condition	.3281	.47138	128

Source: Survey data, 2015

4.3 Statistical tests of assumptions

To assess whether the models fulfills the underlying assumptions of the OLS-procedure, several statistical tests were done. First, the goodness of fit test for normal distribution was done using Kolmogorov-Smirnov test with the Lilliefors correction factors for variables that have fifty cases or more. The desirable outcome is a significant value for test statistic more than 0.05 so that we fail to reject the null hypothesis and conclude that the variable is normally distributed and meets normality assumption

Field, (2005). The test statistic as indicated in table 4.2 was 0.082 with a p-value = 0.127, indicating that it is not significant and therefore data was normally distributed.

Table 4.2: Tests of normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
MAIR	.082	128	.127

a. Lilliefors Significance Correction
Source; Survey Data 2015

The study examined the assumption that the disturbances appearing in the population regression function are homoscedastic meaning that they all have the same variance regardless of the values taken by the exogenous variables. There are many reasons why heteroscedasticity may be seen in a regression model ranging from the observations following the error-learning models variance as learning takes place, improved or changes in data collecting techniques and presence of outliers. There are many techniques used to test for heteroscedasticity. These techniques includes park test which is empirically appealing, but has some problems. Goldfeld & Quandt (1972), argued that the error term entering into the regression model may not satisfy the OLS assumptions and may itself be heteroscedastic. Park test is therefore an exploratory method (Gujarati, 2004). The limitation of the Park test can be avoided if we consider the Breusch–Pagan–Godfrey (BPG) test which was developed as an improvement of Park test by Goldfeld–Quandt. The test depends not only on the value of the number of central observations to be omitted but also on identifying the correct exogenous variable with which to order the observations (Gujarati, 2004). BPG test was found to be sensitive to normality assumption.

The white test unlike the Goldfeld–Quandt test requires reordering the observations with respect to the predictor variable that supposedly caused heteroscedasticity in addition to the test being insensitive to normality assumption. This study used the general test of heteroscedasticity proposed by White which does not rely on the normality assumption.

This study followed white test by regressing the squared residuals by introducing all the regressors, their squared terms, and their cross products. White test can be a test of heteroscedasticity or specification error or both. If no cross-product terms are present in the White test procedure, then it is a test of pure heteroscedasticity. If cross-product terms are present, then it is a test of both heteroscedasticity and specification bias. This study introduced the cross products in order to test for both heteroscedasticity and specification bias. The results of the model showed a R^2 of 0.15 as shown in table 4.3. To determine tabulated χ^2we use $n \times R^2$ getting 128 (0.15) = 19.2. The 5% critical χ^2value for 14 degrees of freedom is 23.6862 which results in the conclusion that the null hypothesis is incorrect that the variances of the disturbances are significantly different, and therefore there is no heteroscedasticity and specification bias.

Table 4.3 Model Summary White Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.387[a]	.150	.045	.27016

Source; Survey Data, 2015

The study also examined the variables for multicollinearity. Multicollinearity exists where there is a strong correlation between two or more exogenous variables in a regression model (Field, 2005). If there is perfect collinearity between exogenous variables, the regression coefficients are indeterminate and their standard errors are infinite. If multicollinearity is less than perfect, the regression coefficients, although

determinate, possess large standard errors which means the coefficients cannot be estimated with great precision or accuracy (Gujarati 2004). There are a number of ways for detecting multicollinearity which includes cases where there is high R^2 but few significant 't' ratios. Although this method is sensible, its disadvantage is that "it is too strong in the sense that multicollinearity is considered as harmful only when all of the influences of the explanatory variables on Y cannot be disentangled (Kmenta, 1986). A popular method adopted by many studies is the use of high pair-wise correlation among regressors. The problem with this criterion is that, although high zero-order correlations may suggest collinearity, it is a sufficient but not a necessary condition for the existence of multicollinearity because it can exist even though the zero-order or simple correlations are comparatively low (Gujarati, 2004). The examination of partial correlation was developed to answer to the weaknesses associated with pair-wise correlation.

Although a study of the partial correlations may be useful, there is no guarantee that they will provide an infallible guide to multicollinearity, for it may happen that both R^2 and all the partial correlations are sufficiently high. Robert Wichers (1975) has shown that the Farrar-Glauber partial correlation test is ineffective in that a given partial correlation may be compatible with different multicollinearity patterns. This study followed the procedure set out in (Gujarati 2004) that indicated the use of Tolerance (TOL) and variance inflation factor (VIF). VIF is used as an indicator of multicollinearity. The larger the value of VIF, the more "troublesome" or collinear the variable is. As a rule of thumb, if the VIF of a variable exceeds 10, which will happen if R exceeds 0.90, that variable is said be highly collinear Kleinbaum *et al*., (1988). VIF and TOL have an intimate connection in the sense that Tolerance is equal to the inverse of VIF. The closer is TOL to zero, the greater the degree of collinearity of that variable

with the other regressors. On the other hand, the closer TOL is to 1, the greater the evidence that the variable is not collinear with the other regressors. The results of the study showed that all variables, including control variables had VIF values ranging from 1.138 to 4.904 suggesting that there was no problem of multicollinearity as shown in table 4.4.

Table 4.4: Collinearity statistics

Variables	Collinearity Statistics	
	Tolerance	**VIF**
(Constant)		
Firm Age	.730	1.370
Firm Size	.676	1.480
Industry	.879	1.138
Country Dummy 1	.204	4.904
Country Dummy 2	.265	3.776
Transaction Volume	.234	4.276
Offer Size	.270	3.703
Investor Oversubscription	.603	1.658
Listing Delay	.392	2.553
Market Condition	.429	2.329

Source; Survey data, 2015

The independence of the error term was detected using the celebrated Durbin-Watson D statistic which is the ratio of the sum of squared differences in successive residuals to the Regression Sum of Squares (Durbin J. & Watson G.S., 1950). A great advantage of the d statistic is that it is based on the estimated residuals, which are routinely computed in regression analysis. Gujarati (2004), indicated that if D is found to be 2 in an application, one may assume that there is no first-order autocorrelation, either positive or negative. The results of the study found the following; 1.921; 2.266; 2.296; 2.225; 2.215 and 2.194 for models 1 to 6 respectively as indicated in table 4.5. These results was found to be within the acceptable threshold of 1.5 – 2.5 (Hair *et al.,* 2006).

4.4 Correlation analysis

Bivariate correlations is the measure of strength or degree of linear association between variables. The test of interest as a precursor for regression analysis is the bivariate correlation between the exogenous variables and the endogenous variable. Firm age had a negative and significant correlation to MAIR ($p<0.01$), implying that older firms experience a low level of underpricing of their IPOs as opposed to younger firms which have a higher level of underpricing. This can be attributed to the inability of potential investors to estimate the value of a young firm. Leland & Pyle (1977) and Ritter (1986) both argued that it is difficult to establish the value of young firms hence valuation of their shares is affected by high uncertainty and consequently higher underpricing. Firm size had a negative and non-significant correlation to MAIR. Although the results are not significant, the results suggest that small firms are prone to higher underpricing compared to large firms. Small firms suffer more from asymmetric information hence investors demand more underpricing (Gao, 2009).Industry was found to have a positive and non-significant correlation with MAIR. This result seems to suggest that industry has no relationship with the level of underpricing in an IPO. Country was found to have a positive and significant correlation with MAIR ($p < 0.1$) for the first dummy variable representing South Africa, while the second dummy variable representing Kenya showed a negative and non-significant correlation with MAIR. These results shows that firms in South Africa have a low level of underpricing compared to firms found in Kenya and Egypt.

Listing delay had a positive and significant correlation with MAIR ($p<0.01$). This indicates that as the duration between date of offer and date of listing increases so does IPO underpricing. A possible explanation is that the investors may want compensation for their investment illiquidity during this period. The longer it takes the higher the price

on first day of trading. These findings are consistent with previous studies indicating that investors should ask for extra premiums for their investments as the lag between date of offer and date of subscription increases which increases the opportunity cost of capital as well as investment risk (Ganon & Zhou, 2009).

There is a positive and significant correlation between investor oversubscription and MAIR ($p<0.01$). This implies that when more investors are interested in buying the shares on offer in an IPO resulting in oversubscription, there may be a higher level of underpricing. The possible explanation is that a higher number of applications over and above the available shares on offer will create a scenario of excess demand. The investors who were not allotted the shares will be having money already allocated for the acquisition of the shares. This result in higher demand for the shares on first trading day, thereby pushing the price higher which in this case is interpreted as higher MAIR. These findings are consistent with results obtained by (Chowdry & Sherman 1996; Hanley 1993; Cornelli & Goldreich 2003 and Aggarwal *et al.*, 2008).

The study findings indicate that there is a significant positive correlation between transaction volume and MAIR ($p<0.05$). This implies that as more shares are traded in the first day of trading so is the level of underpricing. The plausible explanation for this scenario is that the increased trading is demand driven, meaning that more shareholders are drawn to the market to sell their shares due to the increased prices. If the increased trading volume is supply driven, then the price would go down instead of up. These findings are consistent with the findings of Boubaker (2011) and Cukur & Gumrah (2012) who found a positive and significant association between transaction volume and IPO underpricing. Market condition was found to have a positive and significant correlation with MAIR ($p < 0.01$). This result indicates that when the market is hot,

higher level of underpricing may be seen. This finding agrees with the findings of Derrien (2005) who found as positive correlation between recent levels of initial return and hot market conditions.

Firm age was found to be negatively and significantly correlated with firm size ($P<0.05$). This implies that older firms have a lower capital base compared to younger firms. The plausible explanation is that the older firms' founders are rigid to embrace changes in their firm's ownership profile. The owners want to maintain their *status quo* and therefore avoid dilution of their control. The issue of shares on IPO may be a due to the realization that they need more resources to remain relevant in their industry. Investor oversubscription was found to have a negative and significant correlation with firm age ($p<0.1$). This means that younger firms that offer IPOs experience more oversubscription compared to older firms. This can be due to the time factor, that the reason old firms issue an IPO may be seen as a survival technique rather than a strategic reason whereas new or younger firms issuing IPOs may be received well by investors. Another explanation can be looked at from the perspective of the firms' product life cycle.

Younger or new firm's products may be in the growth stages in the product life cycle while older firm's products may be in maturity or declining stage. Investors may not be willing to use their finances to rejuvenate a declining product. There was a negative and significant correlation between firm age and investor oversubscription ($p < 0.1$) as well as transaction volume $p < 0.05$). This implies that older firms have a lower or non-existent investor oversubscription which in turn leads to lower transaction volume on first day of trading. In relation to firm size, the study findings indicated that there was a significant and positive correlation between firm size and transaction volume ($p < 0.01$) as well as offer size ($p < 0.01$). On firm size there was a negative and significant

correlation between firm size and listing delay. This means that a large firm would experience lower lag between date of offer and date of subscription as opposed to younger firms.

The study findings indicated that there is a positive and significant correlation between firm size and offer size ($p<0.05$) as well as transaction volume ($p <0.05$). The possible explanation is that large firms offer a higher number of shares in an IPO given its scale as opposed to smaller firms. Given a bigger IPO offer, it follows that there will be a higher number of transactions if the market received the shares well. Finally investor oversubscription ($p < 0.05$) and offer size ($p < 0.01$) were found to have a positive and significant correlation with transaction volume.

Logically, if there is oversubscription of shares it means that the interest of investors on the company is very high to the extent that some were left out in the allotment of shares. Naturally those left out would want a second chance at the earliest opportunity to own part of the company which will be availed on the first day of trading, resulting in higher transaction volume. On offer size, a direct and positive correlation means the bigger the offer the higher the chance of a higher transaction volume.

Table 4.5: Pearson Correlation Coefficients Results

	MAIR	Firm Age	Firm Size	Industry	Country Dum 1	Country Dum 2	Listing Delay	Investor Oversub.	Offer Size	Transaction Volume
MAIR										
Firm Age	-.228***									
Firm Size	-.048	-.213**								
Industry	.014	-.256***	-.052							
Country Dum1	.173*	.297***	-.354***	.012						
Country Dum 2	-.080	-.299***	-.026	.084	-.638***					
Listing Delay	.308***	.055	-.161*	.092	.549***	-.217**				
Investor Oversub.	.531***	-.145*	.000	-.024	-.061	-.056	.238***			
Offer Size	.016	-.012	.445***	-.023	-.385***	-.148*	-.219**	.109		
Trans. Volume	.179**	-.272***	.361***	.080	-.654***	.419***	-.164*	.235***	.662***	
Market Condition	.462***	-.289***	.036	-.009	-.180**	.283***	.407***	.533***	-.033	.264***

**P< 0.1, **P < 0.05 and ***P < 0.01 (2 tailed)*

Source; Survey data 2015

4.5 Regression Results

Regression analysis was done to test the dependence of MAIR on control variables, exogenous variables and interaction terms. Hierarchical regression method was used which involved entering variables in blocks of variables for control variables and exogenous variables including the moderator as well as each of the interaction terms and observing their results. These blocks' results were presented as models 1 and 2 for the control variables and direct effects. Interaction terms for transaction volume, offer size, investor oversubscription and listing delay are shown in model 3, 4, 5 & 6 respectively in table 4.6.

4.5.1 Regression results for direct effects

Model 1 presents the results for control variables firm age, firm size, industry and country. These variables were entered in the model first. The results showed that firm age had a negative and significant effect on IPO underpricing (β= -0.095; $p<0.001$). This implies that older firms showed a lower level of underpricing compared to younger firms. This finding is consistent with prior research done by Daily *et al.,* (2005) which suggested that greater uncertainty associated with younger firms makes the investment banks and underwriters to apply greater offer price spread which lowers the offer price hence underpricing, compared to older firms with longer operating history. Although the question of uncertainty is tied to a control variable, the result of the regression brings out the link between this study and ex-ante uncertainty. Greater underpricing is seen where investors are not sure of the true value of the firm which makes them demand for grater compensation through underpricing. The results obtained support this notion.

Firm size was found to be non-significant and negatively related to IPO underpricing (β = -0.004; $p>0.1$), this confirms the findings of correlation analysis which showed

that there was no significant correlation between firm size and MAIR (r=-0.048; p>0.1), as well as Industry which had a negative and non-significant relationship (β = -0.057; p>0.1).Country was represented by two dummy variables and in this study the reference country was Egypt. The first dummy variable was representing firms found in South Africa where the results showed that there was a positive and significant relationship with MAIR (β = 0.390; p<0.05). The second dummy variable represented the country Kenya showed a negative and non-significant relationship with MAIR (β = - 0.014; p> 0.10).The overall model was found to be significant and explained 12.1 percent change in MAIR.

Model 2 presents the results of the direct effects of the exogenous variables and the control variables. The analysis done was hierarchical also called sequential regression, the second block of variables entered were the exogenous variables. When the exogenous variables were entered in model 2, among the control variables Firm age was found to have a negative and statistically significant effect on MAIR (β = -0.049; p<0.05). These results confirm the findings of model 1 that older firms have a track record to use for risk assessment unlike younger firms, hence greater price spread for younger firms compared to older firms. Country dummy 1 (South Africa) was found to be positive and significantly related to MAIR (β = 0.949; p < 0.01). The other control variables: Firm Size (β = -0.004; p>0.1), Industry (β = -0.035; p>0.1) and Country dummy for Kenya (β = -0.067; p>0.1), and were found to have a negative and non-significant effect on IPO underpricing.

Hypothesis 1 postulated that transaction volume had no significant effect on the level of IPO underpricing.

The results indicated that there exist a positive and significant effect on IPO underpricing ($\beta = 0.074$; $p < 0.01$). This result rejected the hypothesis H_{01}. The results suggest that higher transaction volume leads to higher underpricing.

Hypothesis 2 predicted that Offer Size had no significant effect on the level of IPO underpricing.

The results found a negative and non-significant effect on IPO underpricing ($\beta = -0.035$; $p>0.10$). The results failed to reject H_{02}. This finding seems to suggest that offer size had no significant relationship with IPO underpricing. The results confirms the earlier findings of bivariate correlation which showed that the correlation between MAIR and offer size was not significant ($r = 0.016$, $p>0.1$)

Hypothesis 3 indicated that Investor oversubscription had no significant effect on the level of underpricing of IPO.

The results showed a positive and significant effect of investor oversubscription on IPO underpricing ($\beta = 0.088$; $p<0.01$). H_{03} was therefore rejected. The results suggested that a higher level of investor oversubscription may result in a higher level of IPO underpricing. On the flipside a lower investor oversubscription leads to lower underpricing.

Hypothesis 4 stated that listing delay had no significant effect on the level of IPO underpricing.

The results of the regression analysis found a negative and significant effect of listing delay on IPO underpricing ($\beta = -0.134$; $p< 0.1$). This result rejected the hypothesis H_{04}, suggesting that longer listing delay increases the level of IPO underpricing.

Hypothesis 5 stated that market condition has no significant effect on IPO underpricing. The results found a positive and significant effect of market condition on IPO underpricing ($\beta = 0.246$; $p<0.05$). Market condition is a dummy variable which the researcher coded 1 as a hot market condition and 0 as cold market condition. The findings suggest that as the level of 'hotness' in the market increases, so does the level of IPO underpricing. The overall model with control variables and the exogenous variables explained 49 percent of the changes in IPO underpricing.

4.5.2 Moderated Regression Results

Baron & Kenny (1986) defined a moderator as a variable that affects the direction and/or strength of the relationship between an exogenous variable and an endogenous variable. Moderation implies that causal relationship between two variables changes as a function of the moderator variable. This indicates that the statistical test of moderation must measure the differential effect of the exogenous variable on the endogenous variable as a function of the moderator. A moderator effect could increase the effect of the exogenous on the endogenous variable called enhancing moderator, decrease the effect of the exogenous on the endogenous variable called buffering moderator or reverse the effect of the exogenous variable on the endogenous variable called antagonistic moderation (Aiken & West, 1991). Research in business has moved beyond testing simple bivariate or multivariate cause and effect relationship since there are many more situational, contextual or individual difference factors that can strengthen or change the direction of the relationship (Hayes & Matthes, 2009).

Moderation is said to exist if the following three conditions are fulfilled. First, the amount of variance accounted for with interaction should be significantly more than the variance accounted for without the interaction. Secondly, the coefficient for the

interaction term should be different from zero. This is the simple slope for the interaction which is the basis of the examination of the simple slopes in probing the nature of the interaction. Lastly, the overall models with and without the interaction should be significant (Hayes, 2013).

When an interaction is established, it should be probed in order to better understand the conditions under which the relationship between the moderator and the endogenous variable exists. This brings forward the various methods for probing the results for a moderated regression. Researchers have used the subgroup analysis, where data is split into various subsets defined by the moderator and the analysis repeated on these subgroups (Hayes & Matthes, 2009). This method was found to be faulty as it does not properly represent how the moderator's effect varies as a function of the moderator (Romero & Anderson, 1995 and Newsom *et al.*, 2003).

The second method used is Pick-a-point approach, which involves selecting representative values of the moderator and estimating the effect on the exogenous variable (Aiken & West 1991; Cohen, West & Aiken, 2003; Jaccard & Turris, 2003 and Bauer & Curran, 2005). The only difficulty in this approach would be to pick the arbitrary values of the exogenous variable. To mitigate this, data picked would either be in percentiles or plus/minus one standard deviation from the mean. The third and rarely used method is Johnson-Neyman technique, which addresses the problems of picking points in the pick-a-point approach by mathematically deriving the point(s) of the moderator where the exogenous variable transitions from significant to non-significant. However the Johnson-Neyman technique cannot be used in this study because the moderator used is a dichotomous variable and therefore this analysis was based on pick-a-point method.

Hypothesis 6a stated that a hot market condition does not moderate the relationship between transaction volume and IPO underpricing.

To test the hypothesis, first direct effects were determined and the results accounted for a significant amount of variance in MAIR (R^2 = 0.49, F (10, 117) = 11.244, p = 0.000).The next step was to add the interaction term into model two for direct effects. Since there is potentially significant moderation effect, there was need to run the regression on the centered terms to examine the conditional effects and to avoid potential problem of high multicollinearity with the interaction term (Aiken & West, 1991). The results with the interaction accounted for significantly more variance (R^2 change = 0.0369, Δ F (11,116) = 11.726, P = 0.000), indicating that there was significant moderation between transaction volume and market condition. The results of the moderated regression showed that interaction term transaction volume exerted positive and significant effect on IPO underpricing (β = 0.130; p= 0.003)

The examination of the interaction plots showed that there was cross-over enhancing interaction effect as higher market conditions enhanced the effect of transaction volume on MAIR as shown in figure 4.1.The conditional effects showed an increased level of significance, and at the same time a transition from negative effects (β = -0.3306; $p<0.05$) at low levels to positive effects at high levels (β=0.6694; $p<0.01$). These results led to rejection of the hypothesis H_{06a} suggesting that there is a positive and significant moderation between transaction volume and IPO underpricing.

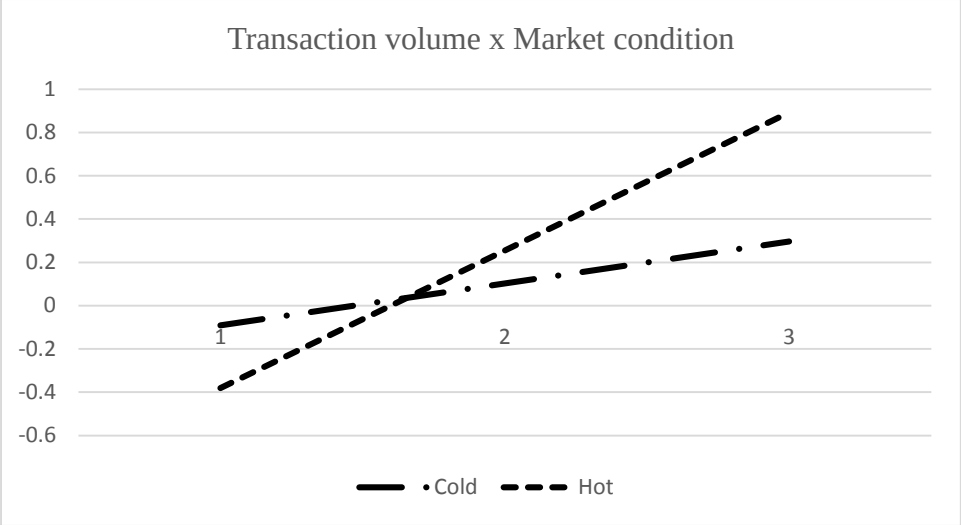

Figure 4.1 Simple plots for two way interaction transaction volume and market condition
Source; Survey data 2015

Hypothesis 6_{0b} indicated that a hot market condition does not moderate the relationship between offer size and IPO underpricing.

To test the hypothesis, first the results of model three were noted which accounted for a significant amount of variance in MAIR (R^2 = 0.527, F (11, 116) = 11.726, p = 0.000). The introduction of the interaction term for offer size resulted in significantly more variance (R^2 change = 0.033, Δ F (12,115) = 12.168, P = 0.000), indicating that there was significant moderation between offer size and market condition as well as the beta (β) value being different from zero (β = -0.267; p=0.004).

The examination of the interaction plots showed that there was enhancing effect as higher market conditions enhanced the effect of offer size on MAIR as shown in figure 4.2. The conditional effects showed an increased level of negative significance effects (β = -0.1055; p<0.05) at low levels to positive effects at high levels (β= -0.0279; p<0.01). These results led to rejection of the hypothesis H_{06b} suggesting that there is a negative and significant interaction between offer size and IPO underpricing.

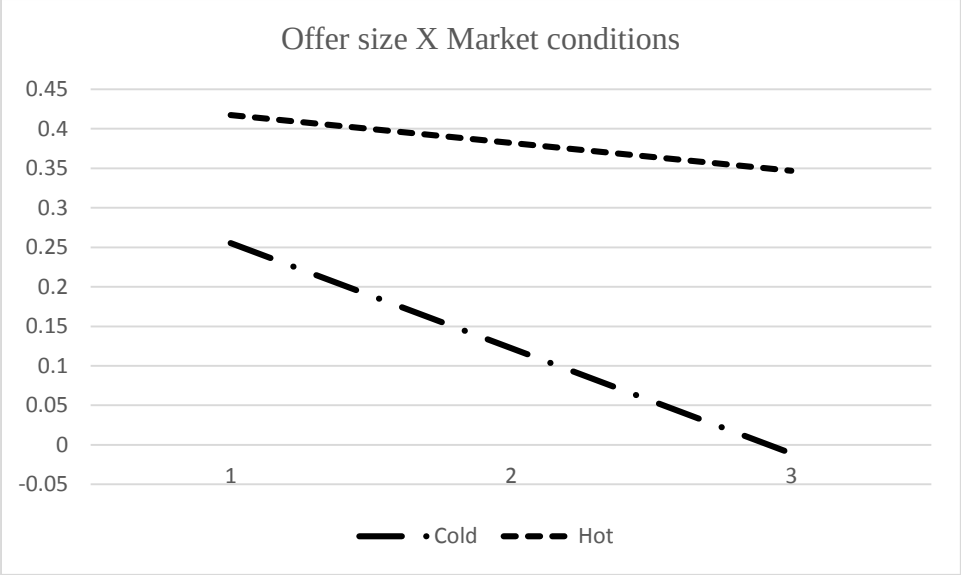

Figure 4.2 Simple plots for two way interaction offer size and market condition Source; Survey data 2015

Hypothesis 6c postulated that a hot market condition does not moderate the relationship between investor oversubscription and IPO underpricing.

To test the hypothesis, first the results of model four were noted which accounted for a significant amount of variance in MAIR (R^2 = 0.559, F (12, 115) = 12.168, p = 0.000). The introduction of the interaction term for investor oversubscription resulted in significantly more variance (R^2 change = 0.011, Δ F (13,114) = 11.643, P = 0.000), indicating that there was significant moderation between investor oversubscription and market condition as well as the beta (β) value being different from zero (β = 0.112; p<0.1).

The examination of the interaction plots showed that there was buffering effects at low level and enhancing effect at higher level of the moderator indicating an overall cross-over enhancing effect as higher market conditions enhanced the effect of investor oversubscription on MAIR as shown in figure 4.3.The conditional effects showed an increased level of positive significance effects (β = 0.0297; p<0.1) at low levels to (β=

0.2511; p<0.01) at high levels. This results led to rejection of the hypothesis H_{06c} suggesting that there is a positive and significant interaction between offer size and IPO underpricing.

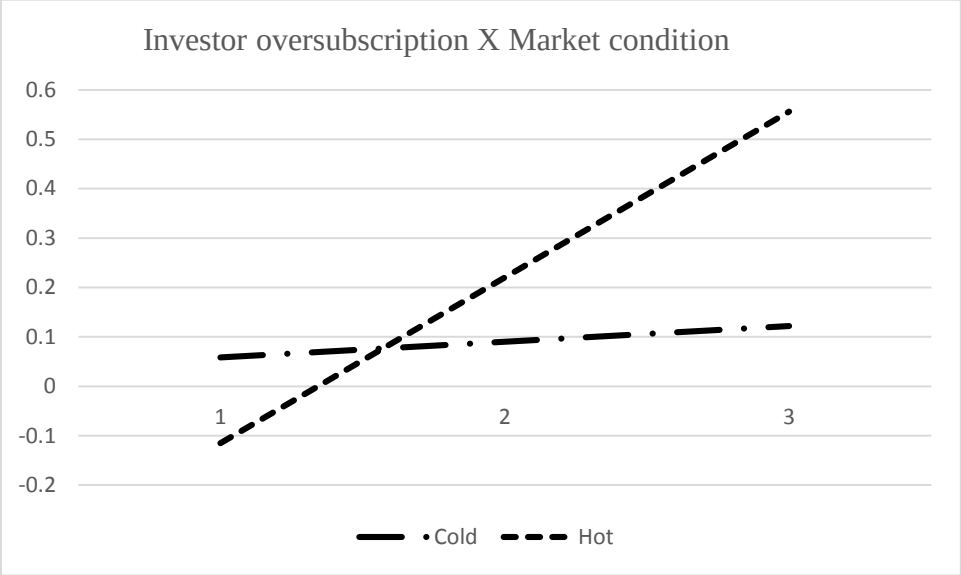

Figure 4.3 Simple plots for two way interaction investor oversubscription and market condition

Source; Survey data 2015

Hypothesis 6d stated that a hot market condition does not moderate the relationship between listing delay and IPO underpricing.

To test the hypothesis, first the results of model five were noted which accounted for a significant amount of variance in MAIR (R^2 = 0.570, F (13, 114) = 11.643, p = 0.000). The introduction of interaction term for listing delay accounted for significantly slightly more variance (R^2 change = 0.004, Δ F (14,113) = 10.903, P = 0.000). The beta (β) value being different from zero (β = - 0.208; p>0.1) however the beta value was not significant hence there was no significant moderation between listing and market condition. Although the variance accounted for was significant, the change could be the effect of additional variables as shown by the adjusted R^2 which was far much lower at 0.001. This results failed to reject H_{60d}, suggesting that market conditions did not

moderate the effect of listing delay on IPO underpricing. These results made it unnecessary to test conditional effects as well as draw the interaction plots.

Table 4.6: Regression Results

Variables	**Model 1 Controls**	**Model 2 Direct Effects**	**Model 3 Interaction Transaction Volume**	**Model 4 Interaction Offer Size**	**Model 5 Interaction Investor Oversub.**	**Model 6 Interaction Listing Delay**
Parameter	**Estimate**	**Estimate**	**Estimate**	**Estimate**	**Estimate**	**Estimate**
Intercept	0.460 (0.292)	-0.120 (0.563)	0.539 (0.588)	-0.057 (0.605)	0.014 (0.601)	-0.008 (0.601)
Controls						
Firm Age	-0.095 (0.027)***	-0.049 (0.022)**	-0.042 (0.022)**	-0.044 (0.021)*	-0.046 (0.021)**	-0.047 (0.021)**
Firm Size	-0.004 (0.013)	-0.004 (0.010)	-0.006 (0.010)	-0.012 (0.010)	-0.012 (0.010)	-0.014 (0.010)
Industry	-0.057 (0.068)	-0.035 (0.054)	-0.037 (0.052)	-0.038 (0.051)	-0.043 (0.050)	-0.052 (0.051)
Country Dum 1	0.390 (0.196)**	0.949 (0.226)***	0.779 (0.226)***	0.848 (0.220)***	0.841 (0.219)***	0.771 (0.228)***
Country Dum 2	-0.014 (0.130)	-0.067 (0.138)	-0.165 (0.138)	-0.077 (0.137)	-0.105 (0.137)	-0.113 (0.137)
Main Effects						
Transaction Vol.		0.074 (0.022)***	0.070 (0.021)***	0.053 (0.021)**	0.055 (0.021)**	0.054 (0.021)**
Offer Size		-0.035 (0.039)	-0.063 (0.038)*	-0.009 (0.042)	-0.013 (0.041)	-0.011 (0.041)
Investor Oversub.		0.088 (0.024)***	0.066 (0.024)**	0.055 (0.024)**	0.039 (0.025)	0.038 (0.025)
Listing Delay		-0.134 (0.074)*	-0.138 (0.072)*	-0.144 (0.069)**	-0.147 (0.069)**	-0.112 (0.076)
Market Condition		0.260 (0.080)**	-1.88 (0.722)***	0.174 (0.991)	0.278 (0.985)	0.729 (1.073)
Two way interactions						
Market condition × Transaction Vol.			0.130 (0.043)***	0.276 (0.065)***	0.187 (0.083)**	0.206 (0.085)**
Market condition × Offer Size				-0.267 (0.091)***	-0.198 (0.099)**	-0.213 (0.10)**
Market condition × Investor Inversub.					0.112 (0.066)*	0.113 (0.066)**
Market condition × Listing Delay						-0.208 (0.196)
F Statistic	3.356***	11.244***	11.726***	12.168***	11.643***	10.903***
R	0.348	0.700	0.726	0.748	0.755	0.758
R^2	0.121	0.490	0.527	0.559	0.570	0.575
Adjusted R^2	0.085	0.446	0.482	0.513	0.521	0.522
R^2 Change	0.121	0.369	0.036	0.033	0.011	0.004
Durbin Watson	1.921	2.266	2.296	2.225	2.215	2.194
N	128	128	128	128	128	128

Values of unstandardized regression coefficients, with standard errors in parenthesis
**p<0.1; **p<0.05; ***P<0.01*

Source, Survey Data 2015

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter ends the study with summary of findings, concluding comments drawn from the findings and recommendations on the implications of the research on policy & practice and suggestions for further research.

5.2 Summary of Findings

The purpose of the study was to examine moderating role of market conditions on the relationship between transaction volume, offer size, investor oversubscription, listing delay and IPO underpricing. The hypotheses were examined by regressing IPO underpricing again transaction volume, offer size, investor oversubscription, listing delay and IPO underpricing and their interaction terms. The study was conducted using all firms that offered IPOs for the period 1996 to 2011 in NSE, EGX and JSE. To understand the IPO process two theories underpinned the study namely; market timing theory and theories associated with information asymmetry namely: the winners curse, ex-ante uncertainty and signaling theory. The results of the study advanced knowledge on the importance of market conditions on the determinants of IPO underpricing which justified the firm's market timing tendencies given the market conditions.

5.2.1 Effect of transaction volume on IPO underpricing

The results indicated that there exist a positive and significant effect on IPO underpricing ($\beta = 0.083$; $p<0.01$). The results suggest that higher transaction volume leads to higher underpricing. This can be attributed to institutional investors off-loading their shares on the first day of trading. The reasons why institutional investors may off-load the shares is associated with high returns in the market. This notion was

supported by findings of Ofek & Richardson (2003) whose findings showed that high initial returns occur when institutions sell IPO shares to retail investors on first day. Chowdry & Sherman (1996) indicated that the allocation of more shares to the institutional investors or large investors enhances the winners curse scenario because this group of investors incur information acquisition costs. They are informed and will be willing to order a large amount than the uninformed investor. These results in crowding out of the uninformed investor who will be allotted a lower number of shares compared to an informed investor of similar wealth. The uninformed investor will be willing to buy more shares to meet their requirements post listing creating the heightened demand and the informed investors will also be willing to sell as long as they are able to make profits, given their cost of information generation and finance. A competing and equally plausible explanation for the effect of transaction volume is the development of interest by investors in the ownership of the firm. This can be due to support by fundamental analysis, technical analysis or the changes in market reception of changes in the firm. Other studies that concurred with the findings of the study were Boubaker (2011) and Cukur & Gumrah, (2012).

5.2.2 Effect of Offer size on IPO underpricing

The results found a negative and non-significant effect on IPO underpricing ($\beta = -0.035$; $p>0.1$) which suggest that as offer size increases, the level of underpricing is expected to reduce. Although this is not significant, it confirms results obtained from correlation analysis which showed a non-significant relationship. Firms and underwriters should first asses the market to determine the investor demand or the market's absorption capacity before deciding the number of shares to offer. This will help avoid the problem of excess supply which as per the findings will result in price adjustment downwards.

5.2.3 Effect of investor oversubscription on IPO underpricing

The results of the study showed a positive and significant effect of investor oversubscription on IPO underpricing ($\beta = 0.76$; $p<0.05$). These results suggested that a higher level of investor oversubscription may result in a higher level of IPO underpricing. This finding was consistent with previous studies showing that investor oversubscription positively influences the level of underpricing (Hanley, 1993; Chowdhry & Sherman, 1996; Cornelli & Goldreich, 2003; Boudriga *et al.,* 2009 & Gao, 2010).

An IPO may be issued following a very successful issue that can create expectations of high returns in the subsequent issue. This creates irrational expectations which will make all prospective investors to run for the offer without any meaningful appraisal in the investment risk and returns. This notion was seen in NSE after the successful IPO in the year 2006 for Kengen and the subsequent IPO for Scan group that saw an oversubscription ratio of 6.2 resulting in higher underpricing. This was supported by Tenai *et al.,* (2011) who stated that Investor Oversubscription is associated with investor sentiment or "fads" which are not justified by facts at hand. Aggarwal *et al.,* (2008) included the oversubscription ratio to test whether a positive relation exists between investor demand and IPO returns. The results of the study found that oversubscription ratio is a strong predictor of initial returns by a marginal unit of 0.18 % and is significant at 1%. This will result in higher demand on the first day of trading, creating excess demand which will push the price upwards. The upward pressure will be felt post issue, creating high initial returns.

5.2.4 Effects of Listing Delay on IPO underpricing

The results of the study indicated that listing delay had a negative and significant relationship with IPO underpricing ($\beta = -0.052$; $p=0.072$). This findings contradicted

prior studies (Chowdhry & Sherman, 1996; Loughran *et al.*, 1994; Chan *et al.*, 2004; Tian 2005; Uddin, 2008; Boudriga *et al.*, 2009; Ganon & Zhou 2009 and Boubaker, 2011). This can be attributed to the number of days found to be constant in EGX at 7 day listing delay across all IPOs offered hence no influence on Underpricing as it seemed to be a regulatory requirement.

5.2.5 Moderating Effect of Market conditions on IPO underpricing

The study of interaction effects should be done after the determination of the influence of the moderator variable as a direct effect. This ought to be the precursor to the establishment of interaction terms in the model. In this study, the moderator is market condition. The results of the study showed a positive and significant effect of market condition on IPO underpricing ($\beta = 0.260$; $p<0.05$). The identification of the 'Hot' market conditions has been supported by prior research (Ibbotson and Jaffe, 1975; Ritter; 1984; Ritter, 1998; Sundarasen, 2012). Market condition in this study was a dummy variable with a coding of one for hot market and zero for cold markets. This implies that the results will greatly impact on the 'Hot' market condition. When the market is 'Hot' it is more receptive and this implies that the investors are optimistic about the results of their actions, in this case their expectations are high returns for choosing to invest in IPOs. This positivity can be taken advantage of by firms to sell their shares. These findings were supported by prior studies (Aggarwal & Rivoli, 1990; Lowry & Schwert, 2001 and Derrien & Womack, 2005). The investor, issuers and underwriters should be weary of market conditions as it may alter the matrix of IPO issue process.

On the moderation aspect, the study found that there was significant interaction for transaction volume ($\beta = 0.130$; $p<0.01$) given its level of significance and the beta (β) value being non-zero. Further analysis indicated that there is change in the coefficient

or effect of market conditions when the market is cold or hot. When the market is cold, the interaction term showed a significant negative moderation of market conditions on the relationship between transaction volume and IPO underpricing. At hot market conditions, a significant and positive interaction is seen. This means that although interaction is witnessed at both levels, the impact of the moderator differs at the boundary zones of moderation.

On tabulating the interaction term for offer size and market condition before mean centering, the results shown in table 4.5 Model 3 indicated that there is interaction (β = -0.410; $p<0.01$). The implication of this finding based on the results of the 'process' is that listing delay may have impact on IPO underpricing irrespective of market conditions. The issuers should be weary of this factor before deciding on the number of shares on offer. The regulators can eliminate the impact of listing delay by regulating the number of days the issue can take before listing in the stock market by providing the necessary infrastructure.

The study findings indicated that there was significant interaction for investor oversubscription (β = 0.246; $p<0.01$) given its level of significance as well as the presence of non-zero beta value. Further analysis of the results indicated that when market condition is cold, the interaction was not significant (β = -0.3306; $p=0.4256$) and in hot market condition the interaction was significant (β = 0.6694; $p<0.01$). The relationship was stronger at high levels of the moderator. The possible explanation is that, unless the market is sufficiently 'Hot', the contribution of investor oversubscription in determination of IPO underpricing may not be very high although significant. The issuers and underwriters may be able to ride on the investor oversubscription wave if the market is sufficiently 'Hot'. The study found that there

was no interaction for listing delay (β = -0.208; p=.291). These results were expected for listing delay, given that the direct effects were not significant.

In sum, the overall findings although mixed, account for significant 57.5% variation in the level of IPO underpricing. This implies that the influence of all variables can account for the stated variability. On the individual exogenous variables, it was found that Investor oversubscription, transaction volume and market conditions have a positive and significant effect on IPO underpricing. Similarly, Offer size was found to have a negative and significant effect on IPO underpricing. The study also found a significant interaction between transaction volume and market conditions, offer size and market conditions, as well as between investor oversubscription and market conditions on IPO underpricing. This study therefore indicates the importance of market conditions in determination of initial returns in an IPO issue.

5.3 Conclusions of the Study

This study successfully extended knowledge by studying and testing whether market conditions could moderate the various relationships, which was true for transaction volume, offer size and investor oversubscription. This followed Daily *et al.,* (2003) meta-analysis that identified common variables and among them was market conditions, and wondered whether it could tamper with the magnitude of observed relationship between the various determinants of IPO underpricing.

Basing on the findings of this study, the following conclusions can be drawn; first, the impact of market conditions on IPO underpricing cannot be overemphasized given its positive and significant effects on IPO underpricing. This finding qualified market conditions to be treated as a moderator which resulted in testing interactions. The study found that there was a positive and significant interaction for investor oversubscription

and transaction volume. Issuers and underwriters should therefore be appraised on the conditions of the market before making decisions on when and what volume of shares to offer on an IPO. This is important because high underpricing leaves a lot of money on the table which supports the signaling theory, if the issuer is planning to issue a second batch of shares soon to recover the money left on the table in the IPO. This conclusion is supported by prior studies done in support of signaling theory (Welch, 1989; Allen & Faulhaber, 1989; Englen & Essen, 2007 and Banerjee *et al.*, 2012). For the investors the appreciation of the market conditions enable investors identify issues that will be associated with greater underpricing to guarantee high initial returns for growth investors and the opposite will be true for income investors due to preference of income investors to buy and hold shares and benefit from the declared dividends.

Market conditions can also result in the issuer firm being overvalued which will prompt the issuers to accelerate the issue process to take advantage of the window of opportunity. These findings agree with the market timing theory that states that firms will postpone issue of share if they perceive that the firm has been undervalued and will therefore accelerate the issue process if they estimate that the market has overvalued the firm. Overvaluation is a result of investor sentiments which are associated with 'Hot' market conditions. This assertion was supported by (Aggarwal & Rivolli, 1990; Lucas & McDonald, 1990; Ritter, 1991 and Lounghran & Ritter, 1995).

Secondly, the findings of the study indicated that Investor oversubscription had a positive and significant effect on IPO underpricing. This result is important for the issuers to establish the demand of the shares through road shows so as to issue the correct number of shares to avoid IPO underpricing or Overpricing. If the number of shares issued is low compared to the demand, oversubscription will result and

underpricing will most likely be observed. For the investors, shares that are likely to be oversubscribed are the best shares to invest in for growth investors as they are likely to experience tremendous growth in the first day of trading.

Thirdly, offer size was found to have a negative and significant effect on IPO underpricing. This study concludes that issue size should be revised up to the offer day to establish the optimum number of shares to offer, given the sensitivity of offer size to IPO underpricing. The results seem to suggest that offering less shares than what the market requires creates a scenario of oversubscription and may lead to severe excess demand. This scenario will not be good for the firm as the money left on the table will be very high and this will be a grave situation if the firm is not planning it offer a follow on offer to recover some of the lost cash as explained by the signaling theory (Welch, 1989).

Fourthly, transaction volume was found to have a positive and significant effect on IPO underpricing. This study concludes that the investors and issuers can simulate the possible transaction levels which can be derived from the offer size and investor oversubscription. Where there is a low offer size and high demand, investor interest will not be met causing those left out to wait for the first day of trading to try and buy these shares resulting in a high transaction volume. High transaction volume that is not supply driven will most likely be as a result of excess demand. This will push the price upwards resulting in IPO underpricing.

Lastly, it was interesting to note that a control variable earlier perceived as noise maker in the model, grounded Ex-ante uncertainty theory. This is a rare occurrence which may be a subject for further inquiry. Of importance is the findings that younger firms have little history which makes it difficult to appraise their true value which enhance their

perception of being more risky. Increased risk requires greater compensation which directly leads to greater underpricing in this case.

The overall results indicated that the variables under study explained 55.7 percent of the variability in IPO underpricing, which in the opinion of the study is sufficient to allow inference of the study results in IPOs issued in other areas particularly the developing world. These findings appear to provide new insights into the inner workings of the IPO underpricing. Of particular focus was the introduction of market conditions as a moderator, which to the best of the researchers' knowledge has not been done. This is a tremendous finding given the findings of significant interaction for investor oversubscription and transaction volume. It is the hope of this study that these findings will trigger new interest in the study of the inner workings of the IPO processes.

5.4 Recommendations of the study

From the findings spring several recommendations which can be broadly grouped into policy recommendations, recommendations to issuers and underwriters, recommendations to investors and finally recommendations for further research.

5.4.1 Policy recommendations

First, the primary equity market is in its infancy in most African countries. This explained why few countries could qualify for the study given that majority of the ASEA member countries have issued less than five IPOs that are truly IPOs in all aspects. Most of primary issues were private placements or privatization that were state controlled issues. Given this backdrop, this market needs further interrogation to improve the issue process. Variables that need to be eliminated is the impact of listing delay which was found to be insignificant, by automation and increased efficiency in

collecting and collating remittances to reduce listing delay to the bare minimum and allow regulatory pronouncement of mandatory period between date of offer and date of subscription.

Secondly, capital market regulators should encourage issuing firms to allot shares strategically to small investors to reduce the winners curse problem faced by the uniformed investors. The effect of this decision will be to favor the small investors which in turn allows issuers to choose a higher offer price as well as the favorable pricing process that will reduce the overall floatation cost. This will reduce the 'money left on the table' during an offer. The issuing firm will benefit directly in this process.

Lastly, market conditions was the single most influential factor in the determination of IPO underpricing. This should be put into focus by the regulators to avoid taking advantage by the 'bad firms' to sell their shares at high prices to the unknowing investors when the market is 'Hot'. The 'Hot' market conditions can also be taken advantage by the regulators to encourage firms to offer IPOs in this stage and avail the much needed capital and at the same time redistribute wealth in the process to investors. This will advance the country's security market which is crucial sector in resource mobilization.

5.4.2 Recommendations to issuers and underwriters

The study findings suggest that 'Hot' markets are a period that witnesses increased investor sentiment, which creates 'fads' in the market. This makes investors to be optimistic about the expectations from the shares issued. The issuers should always, where possible time their issues to the 'Hot' market periods. This will increase the chances of successful issues. The issuers should also ensure that they appraise the market properly through the road shows to establish the appropriate prices to offer the

shares, as well as the optimum number of share to offer. This is important because failure to appropriately appraise the market can result in high or low offer size that has implications already discussed in text. The offer size and market conditions may influence the other significant variables in the study, namely investor oversubscription and transaction volume.

5.4.3 Recommendations to the investors

The results of the study indicated that market conditions, investor oversubscription and transaction volume had positive and significant effect on IPO underpricing. Further, the study found that during a 'Hot' market condition and if there was investor oversubscription and high transaction volume, IPOs would be underpriced. For an investor, underpricing is good for initial purchase to sell on the first day of trading. This is particularly so for growth oriented investors whose aim is capital gains. The investor should look out for indicators of the market condition and based on this, make a decision whether to buy the shares offered in an IPO.

The investors should be weary of offers characterized by high volume of offer, which according to the findings will lower the level of underpricing. If the volume of offer is sufficiently high, this may result in IPO overpricing as a consequence of excess supply. This may result in loses for a growth investor as price will fall on the first day of trading. The same expectations will most likely be witnessed in a cold market, where there is investor undersubscription and low or non-existent number of deals in the first day of trading.

5.4.4 Recommendations for further research

This study brings forward recommendations for further research in two perspectives; first is focusing on methodology related issues. The study proposes further interrogation

of the impact of control variables that are not significant in a hierarchical study to establish the reasons for inclusion or removal of the control variables before the introduction of the next block of variables. This is of interest given that the overall significance of the model may depend on all variables inserted, whether significant or not.

The study also found interactions that were significant. When further probing was done, interestingly at low levels of the moderator variables the results differed with the results at a high level of the moderator either in the level of significance or the direction of influence. Further interrogation is recommended to establish the reasons for this type of findings.

Secondly on the subject area of study, further research is recommended to establish whether mediation exists and better still whether moderated mediation exists in this realm of study. This will bring research in this field to the latest level of interrogation.

Based on the importance of allotment process of shares, this study recommends inquiry into how shares are allotted in an IPO. This may be skewed towards establishing whether allotment favors small investors or not, to yield more empirical support to the recommendations of this study.

This study found unexpected relevance of a control variable firm age in drawing conclusions of the study. A replication of this study is recommended in the other developing countries and establishment of firm age as an exogenous variable, not a control variable of study.

A different inquiry may also be replicated following a separation of sample into cold and ‘Hot’ market conditions separately. Finally, the central variable in this study was

market condition which was categorized into ‘Hot’ or Cold market. The transition from one state may be associated to some trigger(s) or some chain of events. Given the empirical establishment of this variable, it is no doubt a worthwhile endeavor to probe and better understand the cyclicality of market conditions, both in terms of the causes of changes, signals that may pre-empt the transition and the boundary between the different market conditions.

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Appendix I:

The analysis of data in this study was done using IBM SPSS version 19 for establishment of controls, direct effects and initial investigation as to the presence or otherwise of interaction effects. The probing of the type of interaction was done using Andrew Hayes Process Macro an add-in to SPSS. Appendix I presents raw results from SPSS, and Appendix II presents results from Hayes Process. The following output is the raw SPSS output.

Model 1 Output for Control Variables

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Country Dummy 2, Firm Size, Industry, Firm Age1, Country Dummy 1	.	Enter

a. All requested variables entered.

b. Dependent Variable: MAIR

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.348[a]	.121	.085	.3598738	.121	3.356	5	122	.007	1.921

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.173	5	.435	3.356	.007[a]
	Residual	15.800	122	.130		
	Total	17.973	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.460	.292		1.576	.118
	Firm Age1	-.095	.027	-.333	-3.507	.001
	Firm Size	-.004	.013	-.034	-.345	.731
	Industry	-.057	.068	-.075	-.843	.401
	Country Dummy 1	.390	.196	.252	1.995	.048
	Country Dummy 2	-.014	.130	-.013	-.106	.916

a. Dependent Variable: MAIR

Model 2 - Direct effects

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Country Dummy 2, Firm Size, Industry, Firm Age1, Country Dummy 1	.	Enter
2	Investor Oversubscription, Market Dummy , Offer Size, Listing Delay, Transaction Volume	.	Enter

a. All requested variables entered.

b. Dependent Variable: MAIR

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.348[a]	.121	.085	.3598738	.121	3.356	5	122	.007	
2	.700[b]	.490	.446	.2798840	.369	16.940	5	117	.000	2.266

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.173	5	.435	3.356	.007[a]
	Residual	15.800	122	.130		
	Total	17.973	127			
2	Regression	8.808	10	.881	11.244	.000[b]
	Residual	9.165	117	.078		
	Total	17.973	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.460	.292		1.576	.118
	Firm Age1	-.095	.027	-.333	-3.507	.001
	Firm Size	-.004	.013	-.034	-.345	.731
	Industry	-.057	.068	-.075	-.843	.401
	Country Dummy 1	.390	.196	.252	1.995	.048
	Country Dummy 2	-.014	.130	-.013	-.106	.916
2	(Constant)	-.120	.563		-.213	.831
	Firm Age1	-.049	.022	-.172	-2.231	.028
	Firm Size	-.004	.010	-.028	-.354	.724
	Industry	-.035	.054	-.045	-.640	.523
	Country Dummy 1	.949	.226	.613	4.193	.000
	Country Dummy 2	-.067	.138	-.062	-.485	.629
	Transaction Volume	.074	.022	.459	3.359	.001
	Offer Size	-.035	.039	-.116	-.916	.362

	Investor Oversubscription	.088	.024	.315	3.710	.000
	Listing Delay	-.134	.074	-.192	-1.816	.072
	Market Dummy	.260	.080	.326	3.237	.002

a. Dependent Variable: MAIR

Model 3 Two way interaction (Transaction volume x Market condition)

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Country Dummy 2, Firm Size, Industry, Firm Age1, Country Dummy 1	.	Enter
2	Investor Oversubscription, Market Dummy , Offer Size, Listing Delay, Transaction Volume	.	Enter
3	Interaction Transaction Volume	.	Enter

a. All requested variables entered.

b. Dependent Variable: MAIR

Model Summary[d]

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.348[a]	.121	.085	.3598738	.121	3.356	5	122	.007	
2	.700[b]	.490	.446	.2798840	.369	16.940	5	117	.000	
3	.726[c]	.527	.482	.2708569	.036	8.929	1	116	.003	2.296

ANOVA[d]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.173	5	.435	3.356	.007[a]
	Residual	15.800	122	.130		
	Total	17.973	127			
2	Regression	8.808	10	.881	11.244	.000[b]
	Residual	9.165	117	.078		
	Total	17.973	127			
3	Regression	9.463	11	.860	11.726	.000[c]
	Residual	8.510	116	.073		
	Total	17.973	127			

Model 4 – Two way Interaction Offer Size and market condition

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Country Dummy 2, Firm Size, Industry, Firm Age1, Country Dummy 1	.	Enter
2	Investor Oversubscription, Market Dummy , Offer Size, Listing Delay, Transaction Volume	.	Enter
3	Interaction Transaction Volume	.	Enter
4	Interaction Offer Size	.	Enter

a. All requested variables entered.

b. Dependent Variable: MAIR

Model Summary[e]

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.348[a]	.121	.085	.3598738	.121	3.356	5	122	.007	
2	.700[b]	.490	.446	.2798840	.369	16.940	5	117	.000	
3	.726[c]	.527	.482	.2708569	.036	8.929	1	116	.003	
4	.748[d]	.559	.513	.2624088	.033	8.589	1	115	.004	2.225

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.460	.292		1.576	.118
	Firm Age1	-.095	.027	-.333	-3.507	.001
	Firm Size	-.004	.013	-.034	-.345	.731
	Industry	-.057	.068	-.075	-.843	.401
	Country Dummy 1	.390	.196	.252	1.995	.048
	Country Dummy 2	-.014	.130	-.013	-.106	.916
2	(Constant)	-.120	.563		-.213	.831
	Firm Age1	-.049	.022	-.172	-2.231	.028
	Firm Size	-.004	.010	-.028	-.354	.724
	Industry	-.035	.054	-.045	-.640	.523
	Country Dummy 1	.949	.226	.613	4.193	.000
	Country Dummy 2	-.067	.138	-.062	-.485	.629
	Transaction Volume	.074	.022	.459	3.359	.001
	Offer Size	-.035	.039	-.116	-.916	.362
	Investor Oversubscription	.088	.024	.315	3.710	.000
	Listing Delay	-.134	.074	-.192	-1.816	.072
	Market Dummy	.260	.080	.326	3.237	.002
3	(Constant)	.539	.588		.917	.361
	Firm Age1	-.042	.022	-.147	-1.956	.053
	Firm Size	-.006	.010	-.044	-.562	.575
	Industry	-.037	.052	-.049	-.715	.476
	Country Dummy 1	.779	.226	.503	3.444	.001
	Country Dummy 2	-.165	.138	-.153	-1.195	.234
	Transaction Volume	.070	.021	.439	3.316	.001
	Offer Size	-.063	.038	-.208	-1.639	.104
	Investor Oversubscription	.066	.024	.236	2.723	.007
	Listing Delay	-.138	.072	-.197	-1.931	.056
	Market Dummy	-1.885	.722	-2.362	-2.610	.010
	Interaction Transaction Volume	.130	.043	2.758	2.988	.003

a. Dependent Variable: MAIR

ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.173	5	.435	3.356	.007[a]
	Residual	15.800	122	.130		
	Total	17.973	127			
2	Regression	8.808	10	.881	11.244	.000[b]
	Residual	9.165	117	.078		
	Total	17.973	127			
3	Regression	9.463	11	.860	11.726	.000[c]
	Residual	8.510	116	.073		
	Total	17.973	127			
4	Regression	10.054	12	.838	12.168	.000[d]
	Residual	7.919	115	.069		
	Total	17.973	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.460	.292		1.576	.118
	Firm Age1	-.095	.027	-.333	-3.507	.001
	Firm Size	-.004	.013	-.034	-.345	.731
	Industry	-.057	.068	-.075	-.843	.401
	Country Dummy 1	.390	.196	.252	1.995	.048
	Country Dummy 2	-.014	.130	-.013	-.106	.916
2	(Constant)	-.120	.563		-.213	.831
	Firm Age1	-.049	.022	-.172	-2.231	.028
	Firm Size	-.004	.010	-.028	-.354	.724
	Industry	-.035	.054	-.045	-.640	.523
	Country Dummy 1	.949	.226	.613	4.193	.000
	Country Dummy 2	-.067	.138	-.062	-.485	.629
	Transaction Volume	.074	.022	.459	3.359	.001
	Offer Size	-.035	.039	-.116	-.916	.362
	Investor Oversubscription	.088	.024	.315	3.710	.000
	Listing Delay	-.134	.074	-.192	-1.816	.072
	Market Dummy	.260	.080	.326	3.237	.002

3	(Constant)	.539	.588		.917	.361
	Firm Age1	-.042	.022	-.147	-1.956	.053
	Firm Size	-.006	.010	-.044	-.562	.575
	Industry	-.037	.052	-.049	-.715	.476
	Country Dummy 1	.779	.226	.503	3.444	.001
	Country Dummy 2	-.165	.138	-.153	-1.195	.234
	Transaction Volume	.070	.021	.439	3.316	.001
	Offer Size	-.063	.038	-.208	-1.639	.104
	Investor Oversubscription	.066	.024	.236	2.723	.007
	Listing Delay	-.138	.072	-.197	-1.931	.056
	Market Dummy	-1.885	.722	-2.362	-2.610	.010
	Interaction Transaction Volume	.130	.043	2.758	2.988	.003
4	(Constant)	-.057	.605		-.095	.925
	Firm Age1	-.044	.021	-.154	-2.115	.037
	Firm Size	-.012	.010	-.091	-1.181	.240
	Industry	-.038	.051	-.050	-.758	.450
	Country Dummy 1	.848	.220	.548	3.848	.000
	Country Dummy 2	-.077	.137	-.072	-.565	.573
	Transaction Volume	.053	.021	.330	2.471	.015
	Offer Size	-.009	.042	-.029	-.215	.830
	Investor Oversubscription	.055	.024	.198	2.334	.021
	Listing Delay	-.144	.069	-.206	-2.080	.040
	Market Dummy	.174	.991	.218	.175	.861
	Interaction Transaction Volume	.276	.065	5.885	4.227	.000
	Interaction Offer Size	-.267	.091	-5.664	-2.931	.004

a. Dependent Variable: MAIR

Model 5 –Two way Interaction- Investor Oversubscription and market condition

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Country Dummy 2, Firm Size, Industry, Firm Age1, Country Dummy 1	.	Enter
2	Investor Oversubscription, Market Dummy , Offer Size, Listing Delay, Transaction Volume	.	Enter
3	Interaction Transaction Volume	.	Enter
4	Interaction Offer Size	.	Enter
5	Interaction Investor Oversubscription	.	Enter

a. All requested variables entered.

b. Dependent Variable: MAIR

Model Summary[f]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.348[a]	.121	.085	.3598738	.121	3.356	5	122	.007	
2	.700[b]	.490	.446	.2798840	.369	16.940	5	117	.000	
3	.726[c]	.527	.482	.2708569	.036	8.929	1	116	.003	
4	.748[d]	.559	.513	.2624088	.033	8.589	1	115	.004	
5	.755[e]	.570	.521	.2602540	.011	2.912	1	114	.091	2.215

ANOVA[f]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.173	5	.435	3.356	.007[a]
	Residual	15.800	122	.130		
	Total	17.973	127			
2	Regression	8.808	10	.881	11.244	.000[b]
	Residual	9.165	117	.078		
	Total	17.973	127			
3	Regression	9.463	11	.860	11.726	.000[c]
	Residual	8.510	116	.073		
	Total	17.973	127			
4	Regression	10.054	12	.838	12.168	.000[d]
	Residual	7.919	115	.069		
	Total	17.973	127			
5	Regression	10.252	13	.789	11.643	.000[e]
	Residual	7.721	114	.068		
	Total	17.973	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.460	.292		1.576	.118
	Firm Age1	-.095	.027	-.333	-3.507	.001
	Firm Size	-.004	.013	-.034	-.345	.731
	Industry	-.057	.068	-.075	-.843	.401
	Country Dummy 1	.390	.196	.252	1.995	.048
	Country Dummy 2	-.014	.130	-.013	-.106	.916
2	(Constant)	-.120	.563		-.213	.831
	Firm Age1	-.049	.022	-.172	-2.231	.028
	Firm Size	-.004	.010	-.028	-.354	.724
	Industry	-.035	.054	-.045	-.640	.523
	Country Dummy 1	.949	.226	.613	4.193	.000
	Country Dummy 2	-.067	.138	-.062	-.485	.629
	Transaction Volume	.074	.022	.459	3.359	.001
	Offer Size	-.035	.039	-.116	-.916	.362
	Investor Oversubscription	.088	.024	.315	3.710	.000
	Listing Delay	-.134	.074	-.192	-1.816	.072
	Market Dummy	.260	.080	.326	3.237	.002
3	(Constant)	.539	.588		.917	.361
	Firm Age1	-.042	.022	-.147	-1.956	.053
	Firm Size	-.006	.010	-.044	-.562	.575
	Industry	-.037	.052	-.049	-.715	.476
	Country Dummy 1	.779	.226	.503	3.444	.001
	Country Dummy 2	-.165	.138	-.153	-1.195	.234
	Transaction Volume	.070	.021	.439	3.316	.001
	Offer Size	-.063	.038	-.208	-1.639	.104
	Investor Oversubscription	.066	.024	.236	2.723	.007
	Listing Delay	-.138	.072	-.197	-1.931	.056
	Market Dummy	-1.885	.722	-2.362	-2.610	.010
	Interaction Transaction Volume	.130	.043	2.758	2.988	.003
4	(Constant)	-.057	.605		-.095	.925
	Firm Age1	-.044	.021	-.154	-2.115	.037
	Firm Size	-.012	.010	-.091	-1.181	.240
	Industry	-.038	.051	-.050	-.758	.450
	Country Dummy 1	.848	.220	.548	3.848	.000
	Country Dummy 2	-.077	.137	-.072	-.565	.573
	Transaction Volume	.053	.021	.330	2.471	.015
	Offer Size	-.009	.042	-.029	-.215	.830
	Investor Oversubscription	.055	.024	.198	2.334	.021
	Listing Delay	-.144	.069	-.206	-2.080	.040
	Market Dummy	.174	.991	.218	.175	.861
	Interaction Transaction Volume	.276	.065	5.885	4.227	.000
	Interaction Offer Size	-.267	.091	-5.664	-2.931	.004

5	(Constant)	.014	.601		.023	.982
	Firm Age1	-.046	.021	-.162	-2.233	.027
	Firm Size	-.012	.010	-.090	-1.170	.244
	Industry	-.043	.050	-.056	-.858	.393
	Country Dummy 1	.841	.219	.543	3.845	.000
	Country Dummy 2	-.105	.137	-.097	-.766	.446
	Transaction Volume	.055	.021	.344	2.594	.011
	Offer Size	-.013	.041	-.042	-.305	.761
	Investor Oversubscription	.039	.025	.140	1.547	.125
	Listing Delay	-.147	.069	-.209	-2.127	.036
	Market Dummy	.278	.985	.348	.282	.778
	Interaction Transaction Volume	.187	.083	3.973	2.235	.027
	Interaction Offer Size	-.198	.099	-4.193	-1.995	.048
	Interaction Investor Oversubscription	.112	.066	.375	1.707	.091

a. Dependent Variable: MAIR

Model 6 – Two way Interaction- Listing Delay and market condition

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Country Dummy 2, Firm Size, Industry, Firm Age1, Country Dummy 1	.	Enter
2	Investor Oversubscription, Market Dummy , Offer Size, Listing Delay, Transaction Volume	.	Enter
3	Interaction Transaction Volume	.	Enter
4	Interaction Offer Size	.	Enter
5	Interaction Investor Oversubscription	.	Enter
6	Interaction List Delay	.	Enter

a. All requested variables entered.
b. Dependent Variable: MAIR

Model Summary[g]

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.348[a]	.121	.085	.3598738	.121	3.356	5	122	.007	
2	.700[b]	.490	.446	.2798840	.369	16.940	5	117	.000	
3	.726[c]	.527	.482	.2708569	.036	8.929	1	116	.003	
4	.748[d]	.559	.513	.2624088	.033	8.589	1	115	.004	
5	.755[e]	.570	.521	.2602540	.011	2.912	1	114	.091	
6	.758[f]	.575	.522	.2601115	.004	1.125	1	113	.291	2.194

ANOVA[g]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.173	5	.435	3.356	.007[a]
	Residual	15.800	122	.130		
	Total	17.973	127			
2	Regression	8.808	10	.881	11.244	.000[b]
	Residual	9.165	117	.078		
	Total	17.973	127			
3	Regression	9.463	11	.860	11.726	.000[c]
	Residual	8.510	116	.073		
	Total	17.973	127			
4	Regression	10.054	12	.838	12.168	.000[d]
	Residual	7.919	115	.069		
	Total	17.973	127			
5	Regression	10.252	13	.789	11.643	.000[e]
	Residual	7.721	114	.068		
	Total	17.973	127			
6	Regression	10.328	14	.738	10.903	.000[f]
	Residual	7.645	113	.068		
	Total	17.973	127			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.460	.292		1.576	.118
	Firm Age1	-.095	.027	-.333	-3.507	.001
	Firm Size	-.004	.013	-.034	-.345	.731
	Industry	-.057	.068	-.075	-.843	.401
	Country Dummy 1	.390	.196	.252	1.995	.048
	Country Dummy 2	-.014	.130	-.013	-.106	.916
2	(Constant)	-.120	.563		-.213	.831
	Firm Age1	-.049	.022	-.172	-2.231	.028
	Firm Size	-.004	.010	-.028	-.354	.724
	Industry	-.035	.054	-.045	-.640	.523
	Country Dummy 1	.949	.226	.613	4.193	.000
	Country Dummy 2	-.067	.138	-.062	-.485	.629
	Transaction Volume	.074	.022	.459	3.359	.001
	Offer Size	-.035	.039	-.116	-.916	.362
	Investor Oversubscription	.088	.024	.315	3.710	.000
	Listing Delay	-.134	.074	-.192	-1.816	.072
	Market Dummy	.260	.080	.326	3.237	.002

3	(Constant)	.539	.588		.917	.361
	Firm Age1	-.042	.022	-.147	-1.956	.053
	Firm Size	-.006	.010	-.044	-.562	.575
	Industry	-.037	.052	-.049	-.715	.476
	Country Dummy 1	.779	.226	.503	3.444	.001
	Country Dummy 2	-.165	.138	-.153	-1.195	.234
	Transaction Volume	.070	.021	.439	3.316	.001
	Offer Size	-.063	.038	-.208	-1.639	.104
	Investor Oversubscription	.066	.024	.236	2.723	.007
	Listing Delay	-.138	.072	-.197	-1.931	.056
	Market Dummy	-1.885	.722	-2.362	-2.610	.010
	Interaction Transaction Volume	.130	.043	2.758	2.988	.003
4	(Constant)	-.057	.605		-.095	.925
	Firm Age1	-.044	.021	-.154	-2.115	.037
	Firm Size	-.012	.010	-.091	-1.181	.240
	Industry	-.038	.051	-.050	-.758	.450
	Country Dummy 1	.848	.220	.548	3.848	.000
	Country Dummy 2	-.077	.137	-.072	-.565	.573
	Transaction Volume	.053	.021	.330	2.471	.015
	Offer Size	-.009	.042	-.029	-.215	.830
	Investor Oversubscription	.055	.024	.198	2.334	.021
	Listing Delay	-.144	.069	-.206	-2.080	.040
	Market Dummy	.174	.991	.218	.175	.861
	Interaction Transaction Volume	.276	.065	5.885	4.227	.000
	Interaction Offer Size	-.267	.091	-5.664	-2.931	.004
5	(Constant)	.014	.601		.023	.982
	Firm Age1	-.046	.021	-.162	-2.233	.027
	Firm Size	-.012	.010	-.090	-1.170	.244
	Industry	-.043	.050	-.056	-.858	.393
	Country Dummy 1	.841	.219	.543	3.845	.000
	Country Dummy 2	-.105	.137	-.097	-.766	.446
	Transaction Volume	.055	.021	.344	2.594	.011
	Offer Size	-.013	.041	-.042	-.305	.761
	Investor Oversubscription	.039	.025	.140	1.547	.125
	Listing Delay	-.147	.069	-.209	-2.127	.036
	Market Dummy	.278	.985	.348	.282	.778
	Interaction Transaction Volume	.187	.083	3.973	2.235	.027
	Interaction Offer Size	-.198	.099	-4.193	-1.995	.048
	Interaction Investor Oversubscription	.112	.066	.375	1.707	.091

6	(Constant)	-.008	.601		-.013	.990
	Firm Age1	-.047	.021	-.165	-2.271	.025
	Firm Size	-.014	.010	-.108	-1.377	.171
	Industry	-.052	.051	-.068	-1.025	.308
	Country Dummy 1	.771	.228	.498	3.375	.001
	Country Dummy 2	-.113	.137	-.105	-.826	.411
	Transaction Volume	.054	.021	.335	2.520	.013
	Offer Size	-.011	.041	-.036	-.263	.793
	Investor Oversubscription	.038	.025	.138	1.520	.131
	Listing Delay	-.112	.076	-.160	-1.475	.143
	Market Dummy	.729	1.073	.913	.680	.498
	Interaction Transaction Volume	.206	.085	4.388	2.412	.017
	Interaction Offer Size	-.213	.100	-4.523	-2.130	.035
	Interaction Investor Oversubscription	.113	.066	.380	1.726	.087
	Interaction List Delay	-.208	.196	-.679	-1.061	.291

a. Dependent Variable: MAIR

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.460	.292		1.576	.118		
	Firm Age1	-.095	.027	-.333	-3.507	.001	.800	1.250
	Firm Size	-.004	.013	-.034	-.345	.731	.738	1.355
	Industry	-.057	.068	-.075	-.843	.401	.916	1.091
	Country Dummy 1	.390	.196	.252	1.995	.048	.451	2.217
	Country Dummy 2	-.014	.130	-.013	-.106	.916	.497	2.014
2	(Constant)	-.120	.563		-.213	.831		
	Firm Age1	-.049	.022	-.172	-2.231	.028	.730	1.370
	Firm Size	-.004	.010	-.028	-.354	.724	.676	1.480
	Industry	-.035	.054	-.045	-.640	.523	.879	1.138
	Country Dummy 1	.949	.226	.613	4.193	.000	.204	4.904
	Country Dummy 2	-.067	.138	-.062	-.485	.629	.265	3.776
	Transaction Volume	.074	.022	.459	3.359	.001	.234	4.276
	Offer Size	-.035	.039	-.116	-.916	.362	.270	3.703
	Investor Oversubscription	.088	.024	.315	3.710	.000	.603	1.658
	Listing Delay	-.134	.074	-.192	-1.816	.072	.392	2.553
	Market Dummy	.260	.080	.326	3.237	.002	.429	2.329
3	(Constant)	.539	.588		.917	.361		
	Firm Age1	-.042	.022	-.147	-1.956	.053	.721	1.388
	Firm Size	-.006	.010	-.044	-.562	.575	.673	1.486
	Industry	-.037	.052	-.049	-.715	.476	.879	1.138
	Country Dummy 1	.779	.226	.503	3.444	.001	.191	5.233
	Country Dummy 2	-.165	.138	-.153	-1.195	.234	.250	4.001
	Transaction Volume	.070	.021	.439	3.316	.001	.233	4.287
	Offer Size	-.063	.038	-.208	-1.639	.104	.254	3.932
	Investor Oversubscription	.066	.024	.236	2.723	.007	.546	1.833
	Listing Delay	-.138	.072	-.197	-1.931	.056	.391	2.554
	Market Dummy	-1.885	.722	-2.362	-2.610	.010	.005	200.598
	Interaction Transaction Volume	.130	.043	2.758	2.988	.003	.005	208.681
4	(Constant)	-.057	.605		-.095	.925		
	Firm Age1	-.044	.021	-.154	-2.115	.037	.720	1.389

	Firm Size	-.012	.010	-.091	-1.181	.240	.643	1.555
	Industry	-.038	.051	-.050	-.758	.450	.879	1.138
	Country Dummy 1	.848	.220	.548	3.848	.000	.189	5.293
	Country Dummy 2	-.077	.137	-.072	-.565	.573	.238	4.200
	Transaction Volume	.053	.021	.330	2.471	.015	.215	4.648
	Offer Size	-.009	.042	-.029	-.215	.830	.204	4.896
	Investor Oversubscription	.055	.024	.198	2.334	.021	.533	1.876
	Listing Delay	-.144	.069	-.206	-2.080	.040	.391	2.557
	Market Dummy	.174	.991	.218	.175	.861	.002	402.839
	Interaction Transaction Volume	.276	.065	5.885	4.227	.000	.002	505.823
	Interaction Offer Size	-.267	.091	-5.664	-2.931	.004	.001	974.738

5	(Constant)	.014	.601		.023	.982		
	Firm Age1	-.046	.021	-.162	-2.233	.027	.717	1.395
	Firm Size	-.012	.010	-.090	-1.170	.244	.643	1.555
	Industry	-.043	.050	-.056	-.858	.393	.876	1.142
	Country Dummy 1	.841	.219	.543	3.845	.000	.189	5.295
	Country Dummy 2	-.105	.137	-.097	-.766	.446	.235	4.259
	Transaction Volume	.055	.021	.344	2.594	.011	.214	4.666
	Offer Size	-.013	.041	-.042	-.305	.761	.204	4.909
	Investor Oversubscription	.039	.025	.140	1.547	.125	.459	2.179
	Listing Delay	-.147	.069	-.209	-2.127	.036	.391	2.557
	Market Dummy	.278	.985	.348	.282	.778	.002	404.390
	Interaction Transaction Volume	.187	.083	3.973	2.235	.027	.001	838.690
	Interaction Offer Size	-.198	.099	-4.193	-1.995	.048	.001	1171.839
	Interaction Investor Oversubscription	.112	.066	.375	1.707	.091	.078	12.839
6	(Constant)	-.008	.601		-.013	.990		
	Firm Age1	-.047	.021	-.165	-2.271	.025	.716	1.396
	Firm Size	-.014	.010	-.108	-1.377	.171	.611	1.636
	Industry	-.052	.051	-.068	-1.025	.308	.851	1.175
	Country Dummy 1	.771	.228	.498	3.375	.001	.173	5.781
	Country Dummy 2	-.113	.137	-.105	-.826	.411	.234	4.273
	Transaction Volume	.054	.021	.335	2.520	.013	.213	4.686
	Offer Size	-.011	.041	-.036	-.263	.793	.203	4.917
	Investor Oversubscription	.038	.025	.138	1.520	.131	.459	2.181
	Listing Delay	-.112	.076	-.160	-1.475	.143	.320	3.123
	Market Dummy	.729	1.073	.913	.680	.498	.002	479.809
	Interaction Transaction Volume	.206	.085	4.388	2.412	.017	.001	879.254
	Interaction Offer Size	-.213	.100	-4.523	-2.130	.035	.001	1197.582
	Interaction Investor Oversubscription	.113	.066	.380	1.726	.087	.078	12.843
	Interaction List Delay	-.208	.196	-.679	-1.061	.291	.009	108.849

a. Dependent Variable: MAIR

Appendix II

The results in this appendix relate to probing interactions for the two way interaction between market conditions and the various exogenous variables whose coefficients were non zero and significant. These interactions were for transaction volume, offer size and investor oversubscription. Listing delay was not significant and on this basis was not probed.

```
Results from A.F Hayes process for probing interactions


***************** PROCESS Procedure for SPSS Release 2.13 ***********

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013).
www.guilford.com/p/hayes3

**************************************************************************

Model = 3
    Y = MAIR
    X = Transaction volume
    M = Market Condition

Statistical Controls:
CONTROL= Country  Industry Ageln    Firmsize ListDly  InvOver
Offersiz

**************************************************************************
Outcome: MAIR

Model         coeff      se        t          p      LLCI       ULCI
constant    3.6319    1.0484    3.4641    .0008    1.5548    5.7090
Mktdum       .1531     .0923    1.6578    .1001    -.0299     .3360
Transvol     .1443     .0439    3.2905    .0013     .0574     .2312
int_1        .1882     .0688    2.7338    .0073     .0518     .3245
Country     -.4049     .1358   -2.9808    .0035    -.6740    -.1358
Industry    -.0268     .0646    -.4147    .6791    -.1549     .1013
Ageln       -.0376     .0191   -1.9682    .0515    -.0755     .0002
Firmsize    -.0058     .0094    -.6113    .5422    -.0245     .0129
ListDly     -.0970     .0751    1.2912    .1993    -.2459     .0519
InvOver      .0522     .0311    1.6784    .0960    -.0094     .1138
Offersiz    -.1197     .0412   -2.9088    .0044    -.2013    -.0382

Interactions:
 Interaction_1    Transaction volume    X     Market Condition
**************************************************************************
Conditional effect of X on Y at values of the moderator(s):
Mktdum     Effect  se          t          p       LLCI       ULCI
-.3306    .0821  .0402     2.0406      .0436      .0024      .1618
 .6694    .2703  .0756     3.5762      .0005      .1205      .4200
**************************************************************************
```

```
Data for visualizing conditional effect of X on Y
Paste text below into a SPSS syntax window and execute to produce
plot.

DATA LIST FREE/Transaction volume Market condition MAIR. BEGIN DATA.
    -2.3578     -.3306     -.0911
      .0000     -.3306      .1025
     2.3578     -.3306      .2960
    -2.3578      .6694     -.3817
      .0000      .6694      .2555
     2.3578      .6694      .8927
END DATA.
```

Model = 4

```
    Y = MAIR
    X = Offer size
    M = Market condition

Statistical Controls:
CONTROL= Transvol Country Industry Ageln    Firmsize ListDly  InvOver

Sample size        128

**************************************************************************
Outcome: MAIR
```

Model	coeff	se	t	p	LLCI	ULCI
constant	.1920	.4994	.3846	.7013	-.7973	1.1814
Mktdum	.2597	.1006	2.5805	.0111	.0603	.4590
Offersiz	-.0798	.0487	-1.6396	.1039	-.1763	.0166
int_2	**.0776**	**.0797**	**.9727**	**.3328**	**-.0804**	**.2356**
Transvol	.0865	.0463	1.8671	.0645	-.0053	.1784
Country	-.3961	.1496	-2.6482	.0092	-.6923	-.0998
Industry	-.0278	.0695	-.4003	.6897	-.1655	.1099
Ageln	-.0455	.0211	-2.1520	.0335	-.0873	-.0036
Firmsize	-.0080	.0098	-.8196	.4142	-.0275	.0114
ListDly	-.0648	.0759	-.8539	.3950	-.2152	.0855
InvOver	.0740	.0334	2.2185	.0285	.0079	.1401

```
Interactions:
Interaction_2    Offer size    X     Market Condition

**************************************************************************

Conditional effect of X on Y at values of the moderator(s):
```

Mktdum	Effect	se	t	p	LLCI	ULCI
-.3306	-.1055	.0407	-2.5910	.0108	-.1861	-.0248
.6694	-.0679	.0518	-1.3105	.0605	-.2059	.1501

```
**************************************************************************
```

```
Data for visualizing conditional effect of X on Y
Paste text below into a SPSS syntax window and execute to produce
plot.

DATA LIST FREE/Offer size Market condition MAIR.
BEGIN DATA.

    -1.2602     -.3306      .2552
      .0000     -.3306      .1223
     1.2602     -.3306     -.0106
    -1.2602      .6694      .4171
      .0000      .6694      .3819
     1.2602      .6694      .3468

END DATA.
GRAPH/SCATTERPLOT=Offer size WITH MAIR BY Market condition.

* Estimates are based on setting covariates to their sample means.

****************** ANALYSIS NOTES AND WARNINGS ******************
Model = 5
    Y = MAIR
    X = Investor Oversubscription
    M = Market Condition

Statistical Controls:
CONTROL= Offersiz Transvol Country  Industry Ageln   Firmsize ListDly

**************************************************************************
Outcome: MAIR

Model         coeff       se         t        p       LLCI       ULCI
constant     1.9077     .4885     3.9054    .0002     .9400     2.8755
Mktdum        .1303     .0823     1.5839    .1160    -.0327      .2933
InvOver       .0989     .0309     3.2054    .0018     .0378      .1601
int_3         .2274     .0730     3.1151    .0023     .0828      .3720
Offersiz     -.0826     .0392    -2.1074    .0373    -.1603     -.0049
Transvol      .0769     .0419     1.8343    .0692    -.0062      .1600
Country      -.4066     .1320    -3.0793    .0026    -.6681     -.1450
Industry     -.0379     .0643     -.5898    .5565    -.1652      .0894
Ageln        -.0481     .0201    -2.3941    .0183    -.0879     -.0083
Firmsize     -.0114     .0091    -1.2618    .2096    -.0294      .0065
ListDly      -.0824     .0695    -1.1852    .2384    -.2202      .0553

Interactions:

Interaction_3    Investor Oversubscription     X     Market Condition
**************************************************************************
Conditional effect of X on Y at values of the moderator(s):
Mkt Cond    Effect      se          t          p       LLCI       ULCI
-.3306      .0237     .0297       .7996     .4256     -.0351     .0826
 .6694      .2511     .0683      3.6776     .0004      .1158     .3864

**************************************************************************
```

```
Data for visualizing conditional effect of X on Y
Paste text below into a SPSS syntax window and execute to produce
plot.

DATA LIST FREE/Investor Oversubscription Market Condition MAIR.
BEGIN DATA.

    -1.3362     -.3306      .0582
      .0000     -.3306      .0899
     1.3362     -.3306      .1216
    -1.3362      .6694     -.1153
      .0000      .6694      .2202
     1.3362      .6694      .5558

END DATA.
GRAPH/SCATTERPLOT=Investor Oversubscription WITH MAIR BY Market
Condition.

* Estimates are based on setting covariates to their sample means.

************************************************************************


Model = 6
    Y = MAIR
    X = Listing Delay
    M = Market Condition

Statistical Controls:
CONTROL= InvOver  Offersiz Transvol Country  Industry Ageln
Firmsize

Sample size       128
************************************************************************
*****
Model       coeff        se        t          p       LLCI       ULCI
constant     1.5708     .4390     3.5780    .0005     .7010     2.4405
Mktdum        .2509     .1029     2.4373    .0164     .0469      .4548
ListDly      -.0561     .0927     -.6054    .5461    -.2398      .1275
int_4        -.0240     .2402     -.0999    .9206    -.4999      .4519
InvOver       .0768     .0335     2.2895    .0239     .0103      .1432
Offersiz     -.0863     .0430    -2.0047    .0474    -.1715     -.0010
Transvol      .0829     .0482     1.7190    .0884    -.0126      .1785
Country      -.3820     .1531    -2.4956    .0140    -.6853     -.0787
Industry     -.0281     .0708     -.3969    .6922    -.1684      .1122
Ageln        -.0487     .0220    -2.2092    .0292    -.0924     -.0050
Firmsize     -.0108     .0099    -1.0903    .2779     -.0303     .0088

Interactions:

Interaction_4    Listing Delay     X     Market Condition

************************************************************************
Values for quantitative moderators are the mean and plus/minus one SD
from mean.
Values for dichotomous moderators are the two values of the
moderator.
```

```
*************************************************************************
Data for visualizing conditional effect of X on Y
Paste text below into a SPSS syntax window and execute to produce
plot.

* Estimates are based on setting covariates to their sample means.

******************** ANALYSIS NOTES AND WARNINGS ********************

Level of confidence for all confidence intervals in output:95.00
NOTE 1: All interaction terms were mean centered prior to analysis:
NOTE 2: All standard errors for continuous outcome models are based
on the HC3 estimator
NOTE 3: The Johnson-Neyman method cannot be used with a dichotomous
moderator
                        ------ END MATRIX -----

*************************************************************************
```