STOCK PRICES REACTION TO EQUITY ISSUES ANNOUNCEMENT BY DEPOSIT MONEY BANKS (DMBs) IN NIGERIA

By

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BEING A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE (M.Sc) IN BUSINESS ADMINISTRATION.

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Declaration

I declare that this thesis titled "Stock Prices Reaction around Equity Issues Announcement by Deposit Money Banks in Nigeria" has been written by me under the supervision of Professor S. A. Abdullahi and Dr. M. N. Maiturare. The information derived from the literature has been duly acknowledged in the text and a list of references provided. To the best of my knowledge, no part of this thesis was previously presented for another degree or diploma at any university.

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Certification

This thesis titled "Stock Prices Reaction around Equity Issues Announcement by Deposit Money Banks in Nigeria" meets the regulations governing the award of the degree of Master of Science (M.Sc) in Business Administration of Ahmadu Bello University Zaria, and is therefore approved for its contribution to knowledge and literary presentation.

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ABSTRACT

The role of corporate information releases in promoting market efficiency cannot be overstressed. Thus, the extent to which stock prices of a firm respond to the announcement of corporate events such as equity issues announcements has far reaching implication on the assessment such a firm receives from existing shareholders, prospective investors and other market analysts. Despite these importance and the fact that studies on stock prices reaction to equity issues announcements have become increasingly relevant in explaining semi-strong form market efficiency; little or no research attention has been devoted to the study of such reactions in Nigeria. Consequently, the objective of this study is to empirically examine the reaction of stock prices to the announcement of equity issues by DMBs in Nigeria. The study is correlational in nature and employed the standard event study methodology where the abnormal return is computed as the residuals of the market model. Using a total of fourteen announcements by thirteen DMBs from 1st January 2006 to 31st December 2010; the study found a positive and significant cummulative abnormal return prior to the announcement date and a negative and significant cummulative abnormal return on the announcement date. The study therefore concluded that the presence of abnormal return suggests the semi-strong form inefficiency of the Nigerian banking sector with respect to the announcement; while evidence of abnormal return before the announcement is consistent with insider trading. Consequently, it was recommended that there was the need for capital market regulators, the SEC and the NSE, to put in place rules that will compel insiders to report the details of their transactions not later than forty eight hours after they have been executed and entrench an efficient information dissemination mechanism in the form of a dedicated daily capital market journal in both print and electronic form that will ensure the instant and rapid circulation of corporate events as they are announced by firms. Lastly, it was also recommended that the regulatory authorities should ensure that the process of equity issues is undertaken under a transparent, efficient and reliable framework devoid of manipulations.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The role of the financial system in mobilizing funds from the deficit to the surplus units of any economy cannot be overstressed. The financial system ensures that resources are directed from the surplus spending units to the most productive sectors of the economy. At the centre of this important intermediation function is the stock market, which ensure channelling of resources into long term productive investments. The stock market of any economy therefore sees to the mobilization of funds on long term basis to stimulate economic growth. Thus, it is therefore not surprising that a number of studies on developed and emerging markets have empirically documented the role of the stock market in fostering economic growth (Atje & Jovanic, 1993; Yartey, 2007; Aruwa, 2009).

A central question to the operation and performance of stock markets the world over is the extent to which such markets instantaneously and unbiasedly impound new information into stock prices. Thus, a market is considered efficient if it quickly and automatically adjusts to reflect new information. This process of stock prices adjustment to new information is referred to as market efficiency in finance. Fama (1970) identified three forms of efficiency associated with stock markets. According to him, a stock market is said to be weak-form efficient if information in past stock prices is fully reflected in current prices, semi-strong form efficient if all publicly available information is captured in stock prices; and strong-form efficient if all information including the one held by insiders is fully reflected in stock prices.

Empirical studies on equity issues announcements by Myers and Majluf (1984), Loughran and Ritter (1997) and De Medeiros and Matsumoto (2006) have shown it is common

knowledge that investors' judgement of an equity issue announcement is reflected in the behaviour of stock prices around the announcement period. Thus, investors and other market participants' judgement determines whether or not the issue is a good or bad signal; which in turn influences their buying and selling decisions. Furthermore, studies by Morse (1980), Lee and Karpoff (1991), Bhattacharya, Daouk, Jorgenson and Kehr (2000) and Dogu, Karacaer and Karan (2010) have shown that corporate insiders have incentives to trade in their best interest prior to equity issues announcements, and such activities are also reflected in stock prices behaviour prior to the issue.

Furthermore, previous empirical studies have shown that stock prices generally react to equity issues announcements by firms in one of three ways. Stock prices can react negatively, implying that the market perceived the announcement as a bad signal that the firm's stock is overvalued, the negative impact of transaction costs associated with equity issues, or a signal of poor future cash flow prospect (Scholes, 1972; Miller & Rock, 1985; Myers & Majluf, 1984). In the same vein, stock prices could show "a zero or no effect" reaction, consistent with the argument of efficient markets (Modigliani & Miller, 1958; Fama, 1970). Thirdly, firm's stock prices can also react positively to equity issues announcement, consistent with the argument that the market perceives the announcement as a positive signal that the proceeds of the offer would be invested in projects that will yield positive net present value (Barclay & Litzenberger, 1988; Denis, 1994).

Studies on stock prices reaction to equity issues announcements are generally conducted using the event study methodology because of its ability to accurately capture the impact of an event announcement (Ball & Brown, 1968). This methodology involves the thorough analysis of the difference between the return earned as a result of the announcement and the return that would have been earned had the announcement not been made (Brown & Warner,

1985; Mackinlay, 1997). The analysis is usually for a defined time period around the date of announcement (event window). A typical event window consists of a period covering a number of trading days before the day the equity issue was announced, the announcement date itself; and some trading days after the announcement date. The essence of event studies is therefore to identify and analyze the presence and significance of abnormal return before, during and after the announcement date of corporate events such as equity issues. The presence of abnormal return at whatever level is an evidence of semi-strong form inefficiency (Peterson, 1989)

According to Hadi (2006), the period prior to the announcement date within the event window is often analyzed to gain insight into the activities of corporate insiders prior to the announcement of equity issues. Similarly, the announcement date is analyzed to test for the presence of abnormal return as a result of the announcement; while the trading days shortly after the announcement date are analyzed to test the speed of adjustment. Although the choice of an event window is mostly arbitrary and does not follow any rule, emerging markets studies utilize larger event windows than their mature market counterparts. Given the empirical evidence that mature markets are more efficient, event windows designed to test for the reaction of stock prices to the announcement of corporate events such as equity issues announcements typically consist of eleven days: five trading days before the announcement date, the announcement date and another five trading days after it. In extreme cases, event windows are designed to test the reaction of stock prices the announcement of corporate events within hours or even minutes for mature markets (Mackinlay, 1997).

For emerging market studies however, larger event windows consisting typically thirty to forty trading days are utilized. Researchers on emerging markets often justify their choice of event windows larger than those employed by mature market studies with the argument that

emerging markets tend to be more sluggish in adjusting to new information. Hence, it makes a lot of sense to choose event windows that will accommodate this sluggish speed of adjustment. Although there is no one golden rule to the choice of an event window even among emerging markets, most emerging market studies on the reaction of stock prices to the announcement of equity issues announcement such as Castillo (2004), De Medeiros and Matsumoto (2005) and Cahit (2006) utilized an event window of thirty one or thirty two trading consisting of fifteen trading days before the announcement, the announcement day or two-day announcement date, and fifteen trading days after the date of announcement. According to these studies, event windows of the foregoing length can adequately capture the effect of an equity issue announcement for an emerging market.

Like in many other emerging markets, investors and financial analysts are seriously concerned with the efficiency of the Nigerian stock market. This is because the efficiency of a stock market plays a dominant role in determining investors' confidence. Market inefficiency can create room for such undesirable activities as trading on privileged information by corporate insiders and other investors who get whiff of the information through firm managers and other insiders.

Since the banking sector consolidation of 2005, the Nigerian banking sector has dominated trading activities on the floor of the Nigerian Stock Exchange (NSE). The exercise witnessed the issue of substantial number of new equity by banks in order to beef up their capital base to the minimum level set by the Central Bank of Nigeria (CBN). About 80% of the banks that survived the exercise had to go back to the stock market in 2006 to raise more funds through equity issues in order to finance worthwhile projects such as opening more branches, introducing better products and investing in subsidiaries (Securities and Exchange Commission [SEC], 2007).

Even though DMBs have been issuing new equity over the last five years and raising capital through the issue of equity has gained popularity in the sector, the resultant reaction of stock prices to the announcement of such issues has not received any research attention in Nigeria. In the same vein, the possibility of insider trading before the announcement was also not empirically investigated. Thus, as important as shareholders and investors' judgement is regarding equity issues however; it is worrisome that these banks did not pay much attention to the resultant signal that this important corporate event will send to market participants. It is therefore against this backdrop that the study was conducted to establish the reaction of stock prices prior to, during and after equity issues announcements by DMBs in Nigeria using the event study methodology.

1.2 Statement of the Problem

Studies on stock prices reaction to corporate announcements such as equity issues are commonplace in mature financial markets worldwide. However, there is little evidence of such studies in emerging markets; especially those from Sub-Sahara Africa (SSA). In Nigeria, the contribution of the banking sector to the performance of the stock market cannot be overlooked. Between 2006 and 2010, a number of DMBs in Nigeria have announced their intention to issue more equity as an aftermath of the 2005 banking sector consolidation exercise. Despite this myriad of announcements and the importance of understanding their implication on stock prices, little or no research attention has been devoted to the reaction of stock prices to the announcement of equity issues by these banks within and outside Nigeria using the event study methodology.

Furthermore, there is also near absence of studies on insider trading in Nigeria. Thus, despite the fact that corporate insiders in Nigeria have the tendency to take advantage of their knowledge of inside information to trade in their best interest during the announcement of

corporate events like equity issues, little or no research attention has been devoted to the possibility of insider trading before equity issues announcement in Nigeria. This is especially imperative considering the negative effects of insider trading on investor confidence.

In the same vein, even the few studies so far conducted on stock prices reaction to the announcements of other corporate events like those of Adelegan (2009a) who analyzed stock prices reaction to dividend announcements, Adelegan (2009b) who studied stock prices reaction to management change announcements; and Afego (2010) who investigated stock prices reaction to earnings announcements suffered from a number of methodological setbacks such as their inability to correct for the effect of thin trading and the failure to take into cognizance the effect of Autoregressive Conditional Heteroskedasticity (ARCH) on daily stock and market return series. Unless corrected for, such methodological inadequacies can render results statistically inconsistent and hence unreliable. The inability to correct for the effect of thin trading results in overstating market returns and ultimately creates a systematic bias towards rejecting the hypothesis of market efficiency (Miller, Muthuswamy & Whaley, 1994). Furthermore, failure to model for the presence of ARCH effects renders the coefficient estimates inefficient and hence creates a downward bias in abnormal return (Bollerslev, 1986; Akgiray, 1989; Chiang & Doong, 2001).

Consequently, the absence of a study on the reaction of stock prices to the announcement of equity issues in Nigeria is a glaring gap that this study hoped to fill. Furthermore, the study was also designed to cement the methodological inadequacies that the few studies on stock prices reaction prior to, during and after equity issues announcement conducted in other emerging markets, especially Africa (such as Bhana, 1999 and Mordant & Muller, 2003), suffered from.

1.2 Research Questions

In the light of the foregoing, this study hopes to provide answers to the following research questions:

(i) To what extent do the stock prices of DMBs in Nigeria exhibit cummulative abnormal returns fifteen trading days before the announcement date?

(ii) To what extent do stock prices of DMBs in Nigeria exhibit cummulative abnormal returns on the announcement date?

(iii) To what extent do stock prices of DMBs in Nigeria exhibit cummulative abnormal returns fifteen trading days after the announcement date?

(iv) To what extent do stock prices of DMBs in Nigeria exhibit cummulative abnormal return over the thirty two trading days' event window?

1.4 Objectives of the Study

The objectives of this study are to:

(i) Determine the extent to which stock prices of DMBs in Nigeria exhibit cummulative abnormal returns fifteen trading days before the announcement date.

(ii) Find out the extent to which stock prices of DMBs in Nigeria exhibit cummulative abnormal returns on the announcement date.

(iii) Establish the extent to which stock prices of DMBs in Nigeria exhibit cummulative abnormal returns fifteen trading days after the announcement date.

(iv) Examine the extent to which stock prices of DMBs in Nigeria exhibit cummulative abnormal return over the thirty two trading days' event window

1.5 Research Hypotheses

The following hypotheses have been formulated for testing:

$H_0$1: Stock prices of DMBs in Nigeria do not exhibit significant cummulative abnormal return fifteen trading days before the announcement date of equity issues.

$H_0$2: Stock prices of DMBs in Nigeria do not exhibit significant cummulative abnormal return on the announcement date of equity issues.

$H_0$3: Stock prices of DMBs in Nigeria do not exhibit significant cummulative abnormal return fifteen trading days after the announcement date of equity issues.

$H_0$4: Stock prices of DMBs in Nigeria do not exhibit significant cummulative abnormal return over the thirty two trading days' event window of equity issues announcement.

1.6 Significance of the Study

The study of stock prices reaction to equity issues announcements in Nigeria is indeed a virgin area in the Nigerian finance and investment arena. Aside the fact that this study would be a pioneer effort in establishing the semi-strong form efficiency of the Nigerian stock market with respect to the announcement of equity issues, the study of stock prices reaction to equity issues announcement by DMBs would provide the bedrock for further research since to the best of the researcher's knowledge no empirical research has been conducted in this area within Nigeria. The utility of the study also lies in the fact that since there are few empirical studies on stock prices reaction to equity issues announcements in the whole of SSA, the findings of the study will significantly contribute to existing knowledge by adding to the scanty existing empirical works on the subject matter in SSA. Furthermore, it is expected that, being a relatively new and untapped area of research in the Nigerian finance and investment sphere; the study would stimulate substantial research interest on stock prices reaction around the announcement of equity issues. Aside the foregoing significance, it is also hoped that the study will be of invaluable utility in the following ways:

The findings from this study would have far reaching implications for policy makers in the Nigerian stock market. A study of this nature would be of utmost importance to policy makers in the Nigerian stock market, especially the Securities and Exchange Commission (SEC) by providing empirical justification for the semi-strong form efficiency (or otherwise) of the Nigerian stock market, taking into account peculiarities that are common to emerging markets. Given the pose by the apex regulator to sanitize the market and further boost investor confidence, the findings of the study will immensely aid in understanding the nature and extent of insider trading; a menace that has been bedeviling the Nigerian stock market for a very long time.

The study of the stock prices reaction to equity issues announcement by DMBs in Nigeria, and the implication for semi-strong form efficiency is also of vital utility to the long run growth and continuous survival of listed firms in Nigeria. It is believed that the findings of this study would be useful to managers of DMBs in Nigeria when mapping out their capital structure decisions, as equity issues have effect on the market value of the firm. By pointing out the extent of market reaction to equity issues, the study would provide some guide to managers of DMBs on when and how to initiate equity issues in order to enhance the market value of the firm.

Lastly, it is also expected that the study would be able to provide information to existing shareholders and prospective investors by clearly revealing the likely benefits and consequences of corporate announcements such as equity issues on the overall value of stockholders. It is a well-known fact that the Nigerian banking sector is the most attractive sector to prospective shareholders, especially foreign investors. This is evidenced in the volume of activities recorded by the sector on the floor of the NSE in the last five years (Mohammed, 2010). Having realized the extent of efficiency and market reaction,

prospective investors would better be informed on the riskiness and volatility of the stocks of DMBs; and existing shareholders would be better equipped to confront management on decisions that may erode their value.

1.7 Scope of the Study

This study restricts itself to listed firms under the banking sector of the Nigerian stock market. The banking sector was chosen because of the fact that it is the most dominant and active sector on the floor of the NSE in terms of volume of trading activities over the period of the study. Furthermore, official statistics by the NSE (2006, 2007, 2008, 2009 & 2010) have revealed that the sector controls an average of not less than 72.08% of the total units of shares listed on the NSE. Hence, given the above background; it is believed that the banking sector accounts for a significant proportion of equity issues announcements by firms on the NSE.

Furthermore, the study restricts itself to common or ordinary stock issued by these DMBs. This is because preferred stocks are not popular in Nigeria (Mohammed, 2009). Against this backdrop, the study did not concern itself with announcements of preferred stock or bonds issues.

Lastly, the study is also restricted to the analysis of stock prices reaction to equity issues announcements by DMBs in Nigeria for the five – year period from 2006 to 2010. It is believed that the choice of this period has far reaching implications on the study because the period coincides with the post – consolidation era of the Nigerian banking sector when many DMBs announced their intention to issue equity for the sole aim of expanding operations and financing new projects (SEC, 2010). Thus, it is expected that the announcements by DMBs during this period would be perceived by the stock market as “good news.”

1.8 Limitations of the Study

It is very difficult, if not practically impossible, to conduct a research of this nature without encountering one or two setbacks. Like most genuine researches, this study is not devoid of problems such as the inconsistencies between data made available by the SEC and those gotten from the NSE. Where this was observed the study addressed the problem by verifying from other independent and alternative sources such as the databases of the Central Securities Clearing System and the publications of the CBN.

Furthermore, the fact that neither of the Nigerian capital market regulatory bodies maintains a dedicated database for verifying the official announcement dates of important corporate events such as equity issues announcement made it very tedious for the study to independently source for the records of these official announcements dates. However, the researcher was able to retrieve these dates from a number of archived dailies (both in hard and soft forms) and the databases and verified such dates with those from the databases of important financial sites such as the African Financial Markets and some efficient asset management companies in Nigeria such as Cashcraft Asset Management Limited and Capital Assets Management Limited.

Lastly, the practice in the past where the stock prices of firms issuing equity are placed on technical suspension in the Nigerian stock market with effect from the date the NSE officially approves the application made it very difficult to obtain the required data for some DMBs that announced their decision to issue equity to be part of the study's final sample. Since the stock prices of these affected banks were essentially constant over a very long period of time, they failed to meet the 120 trading days' time series data of stock prices to estimate the parameters in the estimation window. Thus, the only mitigant was to drop such banks from the final sample of the study. However, the affected banks constituted a negligible proportion of the population.

1.9 Definition of Key Terms

For the purpose of this study, the following terms are defined as follows:

Abnormal Return: The excess return that a firm's stock earns over and above what it would have earned had the corporate event was not announced. In this study, the abnormal return is simply the prediction errors (residuals) of the market model estimated using parameters estimated over the parameter estimation window.

Cummulative Abnormal Return: The aggregation of sample banks' average abnormal return over a given period of interest.

Event Window: A period around the announcement date of a corporate event the length of which is determined by the nature of the corporate event under study. This is the period within which the behaviour of stock prices vis-à-vis the announcement of a corporate event is rigorously analyzed.

Parameter Estimation Window: The period over which the corporate event was not announced and hence the firm earned normal return. Typically, the period is considered to be several days (usually 120) before the event window, even though the period after the event window may also be considered as the estimation window.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter deals with the review of previous studies on market reaction to equity issues announcement, the insider trading associated with such announcements and the theoretical framework that underpins the study. The chapter reviewed works on the concept of market efficiency, its forms and observed anomalies. Furthermore, studies on the concept of equity issues, the various forms of equity issues and the motives for issuing equity were also discussed under this chapter. Similarly, empirical studies on the behaviour of stock prices around equity issues, the reaction of both developed and emerging markets to the announcement of equity issues and the attendant insider dealing around the announcements were also critically reviewed under this chapter. The chapter also discusses the trend of equity issues by DMBs in Nigeria over the period of the study and reviewed studies on stock prices reaction to corporate events' announcements in Nigeria. Finally, the chapter presents a number of theoretical frameworks out of which it adopted those that best explain the behaviour of stock prices around equity issues announcement by DMBs in Nigeria.

2.2 Concept of Market Efficiency

The concept of market efficiency has been very central to the field of finance over the past three decades. Infact, the concept became the dominant paradigm among economists and financial analysts over the past decades. Although the term efficiency was used by Fama in his 1970 article, studies on how the stock market reacts to various kinds of information date as far back as 1900; beginning with the PhD dissertation of Louis Bachelier. In his work, he opined that "past, present and even discounted future events are reflected in market price, but often show no apparent relation to price changes." This, no doubt provided the foundation of

what later was to be known as the random walk model, which is the basis of efficient capital markets.

According to Fama (1970), a market is said to be efficient with regard to information if it fully and instantaneously reflect such information on stock prices so that no market participant can earn excess return by trading on that information. In otherwords, market efficiency is the proposition that current security prices fully reflect available information regarding the firm's value so that it becomes an impossibility to earn excess return. Thus, for a market to be described as efficient; it must be able to rapidly impound relevant information into the prices of financial assets (Dimson & Mussavian, 1998).

The concept of efficient markets rests heavily on the Random Walk theory propounded by Maurice Kendall. Also referred to as the Efficient Market Hypothesis (EMH), the fundamental notion of efficient markets is the proposition that stock prices should approximately follow a random walk. In a study involving twenty two UK stock and commodity price series, Kendall (1953) concluded that "in series of prices that are observed at fairly close intervals, the random changes from one term to the next are so large as to swamp any systemic effect which may be present. The data behaved almost like wandering series" (p. 23). Thus, the random walk theory requires that future changes in stock prices should be independent of past or current stock prices for all practical purposes.

The primary hypothesis of efficient markets is that stock prices accurately and quickly reflect all available information in such a way that no one can earn abnormal return, while the alternative hypothesis is that of the inability of the security market to accurately reflect new information on stock prices (Hadi, 2006). It is important to note that the time for the adjustment of new information is considered a critical factor because the more rapidly and

accurately a market adjusts; the more efficient it is said to be. Fama (1970) classified market efficiency into three levels on the basis of information as weak, semi-strong and strong form.

2.2.1 Weak form market efficiency

The weak form of EMH asserts that stock prices fully reflect information about the series of past share prices. This implies that investors who solely depend on past stock prices to detect mispricing cannot consistently outperform the same investors who buy and hold random portfolio at the same risk (Hadi, 2006). As the name suggests, the weak form of EMH is so called because past security prices are the most common and easily available pieces of information and as such; one should not be able to earn profit by trading on what "everyone else knows."

Several studies in developed financial markets have established that stock prices exhibit a random or wandering pattern in response to the arrival of relevant information in the securities market. For emerging markets however, there have generally been a mixed evidence on the weak form efficiency; with certain markets exhibiting randomness and others not. According to Aga (2008), tests for weak form efficiency are conducted by testing the dependence of return on time. The four dominant methods in this regard include the serial correlation tests, filter rule tests, cyclical tests and volatility tests.

Studies on the weak form efficiency in developed financial markets have been around for over five decades. Osborne (1959) and Roberts (1959) have found that stock price movement follow a random walk. Similarly, studies by Alexander (1961), Fama (1965) and Fama and Blume (1966) employed filter rule tests and found no abnormal return. Cyclical tests were used by French (1980), and Gibbons and Hess (1981) to test for the effect of the day of the week and month of the year. The evidence was found to be consistent with the random walk theory.

Emerging markets on the otherhand relatively received lower attention. The recent growth in the importance of emerging markets however has attracted the attention of financial economists. Gandhi, Saunders and Woodward (1980) studied the Kuwaiti stock market by using monthly data running from 1975 to 1978 and found that both simple linear regressions of stock returns on lagged returns and runs test for autocorrelation rejected the random walk theory for all share and industrial indices. Dickinson and Muragu (1994) found evidence that is consistent with the EMH in their study of the Nairobi stock exchange. Berry, Hassan and O'Bryan (1997) employed seventeen years market data to study the weak form efficiency of the Kuala Lumpur stock exchange. He concluded that the stocks traded on the exchange do not behave in a manner consistent with the random walk. Abeysekera (2001) employed a series of past stock prices to test the efficiency of the Colombo stock exchange. His findings revealed that the market is not weak form efficient. Frimpong and Oteng-Abayie (2007) employed daily returns over the five year period of 1999 to 2004 to test the Random Walk hypothesis on the Ghana stock exchange using random work and GARCH models. Their findings revealed that there is evidence of volatility clustering, which is an indication of inefficiency of the market.

Efforts to establish the weak form efficiency of the Nigerian stock exchange dates as far back as 1981. Samuel and Yacout (1981) studied the weekly share prices of twenty one companies listed on the NSE between 1977 and 1979. They found that the market exhibited evidence that is consistent with the random walk hypothesis. Hence, they concluded that the market is weak form efficient. In a related study, Ayadi (1984) tested the weak form efficiency of the NSE based on weekly share price data collected from 1977 to 1980 using the Wald-Wolfwitz and runs test. He also concluded that the random walk theory holds in the market. However, the study by Ekechi (1989), which examined past stock price series using Box and Pierce and Runs tests revealed that the hypothesis of randomness does not hold for the Nigerian stock

market. Omole (1997) employed a comprehensive sample of daily stock prices of twenty five listed companies in Nigeria before and during financial liberalization between 1984 and 1991 to also test the weak form efficiency of the NSE. Using serial correlation tests for lag 1, runs tests and frequency distribution tests; he arrived at the conclusion that the NSE is weak form efficient. Using correlational analysis over the monthly return data obtained from January 1981 to December 1992; Olowe (1999) provided further evidence to support the weak form efficiency of the Nigerian stock market.

In a more recent study, Okpara (2010) employed past price series from 1984 to 2006 to test the efficiency of the NSE using runs tests and correlogram/ partial autocorrelation function. He found that the market is weak form efficient and investors cannot earn abnormal return by trading on the information during the period of the study. From the foregoing, it is obvious that empirical evidence overwhelmingly points to the fact that the NSE is weak form efficient.

2.2.2 Semi-strong form efficiency

The semi-strong form EMH asserts that security prices reflect not only information on historical prices but all publicly available information. Public information includes data reported by a company in its financial statements (annual reports, income statement, filings with the SEC, and so on), earnings and dividend announcements, announced merger/acquisition plans, the financial situation of a company's competitors, and; expectations regarding macroeconomic variables (money supply, inflation, unemployment, interest rates, and so on) among others (Clarke, Jandik & Mandelka, 2001). According to Fama (1965), in an efficient market, competition will, on the average, cause the full effects of new information on intrinsic values to be reflected "instantaneously" in actual prices. Thus, a semi-strong efficient market is that in which stock prices adjust instantly and in an unbiased

manner to all public announcements in newspapers, journals, corporate forecasting and annual reports.

Tests of semi-strong form efficiency are conducted by measuring the information content of an announcement as a fraction of the variance of stock returns associated with the announcement (Aga, 2008). This process of examining the market reaction to announcement of public information is referred to as event studies in the field of finance and economics. The event study methodology was pioneered by Fama, Fisher, Jensen and Roll (1969). Using risk-adjusted return, they employed a sample of 940 over the period January 1927 to December 1959 to test the market reaction to the announcement of stock splits. They found that there is considerable high abnormal return prior to the announcement, but the extraordinary return disappears after the stock split; consistent with the semi-strong form EMH. Since then, event studies have become commonplace among economists, and financial academics and analysts.

In the developed markets, there are numerous studies that have established market reaction to various announcements such as mergers/acquisitions, dividend initiations and omissions, earnings announcements, and the intention to buyback shares; to mention but a few. Ball and Kothari (1991) investigated the impact of quarterly earnings announcements by US firms from 1980 to 1988 on stock prices. They found that abnormal returns persisted even after earnings announcements. Lonie, Gunasekarage, Power and Sinclair (1996) employed the event study and interaction tests to investigate the dividend announcement of six hundred and twenty UK firms from January to June 1991. They discovered that investors responded to the increase or decrease in dividends. Duso, Gugler and Yurtoglu (2006) used a sample of 167 mergers involving 544 EU firms either as merging firms or competitors during the period 1990-2002 to contrast the merger's profitability based on event studies with the one based on accounting data. They found a positive and significant correlation between them.

It is a conventional wisdom among market efficiency scholars that emerging markets are less efficient than their developed counterparts (Aga, 2008). Hence, there are relatively fewer studies on the semi-strong form efficiency of emerging markets. The reason for this is not farfetched; most emerging markets have barely proved to be weak-form efficient. Ali and Mustapha (2001) examined the reaction of the Karachi stock exchange to information released in two daily newspapers and the changes in trade volume and stock returns. They concluded that the market is not sensitive to such information. It is rather driven by private information. Uddin and Chowdhury (2005) investigated dividend announcement on the Dhaka stock exchange and found that there was no statistically significant abnormal return and that dividend has no information content in the market. Kong and Taghavi (2006) analysed earnings announcement for the Chinese stock market using M-EGARCH to models stock returns using the event study methodology. They found evidence inconsistent with the semi-strong form efficiency of the market. Akbar and Baig (2010) employed a sample of seventy nine firms listed on the Karachi stock exchange from June 2004 to June 2007 to analyse the market reaction to cash, stock and simultaneous cash and stock dividend announcements. Their study revealed that there is negligible abnormal return for cash dividend announcement, but positive and statistically significant abnormal returns for stock and simultaneous cash and stock dividend announcements.

In Nigeria, tests of the semi-strong form efficiency of the market have not been very popular. There are few studies that attempted to study the impact of select corporate announcements such as dividends, earnings and money supply on share prices. For instance, Emenuga (1989) used money supply to test the reaction of the market. He concluded that the change in money supply has no significant effect on stock prices. In the same vein, Olowe (1998) examined the effect of stock splits on monthly share prices in the NSE. He arrived at the conclusion that the Nigerian stock market is not semi-strong form efficient with respect to such information.

Oludoyi (1999) investigated the impact of earnings announcement on the share prices of the Nigerian stock market. He also concluded that the market is not semi-strong form efficient with respect to earnings announcement. The foregoing clearly depicts the picture of a market that can be considered semi-strong form inefficient.

2.2.3 Strong form market efficiency

The strong form EMH holds that current stock prices fully reflect all public and even private (insider) information. This is the most comprehensive form of market efficiency. This form of market efficiency implies that corporate insiders, such as managers of firms, cannot consistently profit by trading on information not yet made public. According to Clarke *et al.* (2001), the rationale for the strong form market efficiency is that the market anticipates in an unbiased manner, future developments, and therefore the stock price may have incorporated and evaluated the information in a manner much more objective and informative than corporate insiders would have.

Testing for strong form efficiency in financial markets, whether developed or emerging, is very difficult because of the difficulty associated with observing private information. Inspite of the strict penalties spelt out by capital market regulatory bodies the world over; the phenomenon of insider trading still persists. For instance, Jaffe (1974a) found considerable evidence that insider trades are profitable. Similarly, Penman (1982) also examined insider trading around earnings forecast announcement. He found that insiders buy shares before the announcement, and sell the shares after the announcement to make high abnormal return. A more comprehensive study by Rozeff and Zaman (1988) found that even after deducting an assumed two percent transaction cost, the net gain by insiders still stood at three percent per annum.

Generally speaking, tests for private information are carried out through one of two ways. The first approach entails testing the return that is earned by corporate insiders. If the return exceeds the maximum prescribed by law, then there is a clear cut case of strong form market inefficiency. Under the second approach, an indirect test is employed on the return and volume traded. Thus, if there is high abnormal return or volume reaction prior to the announcement of the event; that will be the evidence that there was information leakage through a source other than the one known to the market (Hadi, 2006). Using the above approaches, Morse (1980) found evidence of a greater trading than normal a day to public announcement. Similarly, Abdel-Khalik and Ajinkya (1982) discovered high abnormal return a week before analysts' earnings announcement. Given the complications in capturing and observing private information, tests of strong form efficiency have been generally very scanty among emerging markets.

2.2.4 Anomalies associated with market efficiency

Since the advent of the EMH, there have been occasional studies which produce results that are inconsistent with the proposition of efficient markets; but until the 1980s, such studies did not appear to be important. In a study involving a sample of 1400 firms, Basu (1977) observed that low price-to-earnings securities are outperforming their high price-to-earnings counterparts by more than seven percent per year. A similar study by Banz (1981) analysed the monthly return of shares listed on the New York Stock Exchange (NYSE) between 1931 and 1975. His study revealed that the fifty smallest stocks outperformed the fifty largest by an average of one percent point per month on a risk-adjusted basis. These findings gave rise to what later was to be known as the "small firm effect" in the study of market efficiency. These findings were later proven to be as a result of the researchers' choice of their benchmark for estimating returns. Ball and Brown (1968) have noted evidence of post-earnings drift in the direction indicated by an earnings surprise.

Furthermore, there has also been evidence on the negative longrun performance of new issues documented by Ritter (1991) and Loughran and Ritter (1995). Using a sample of 1526 initial public offerings over the period 1975 to 1984, Ritter finds that an initial investment in these shares at the end of the first day of trading would have generated substantial underperformance over the following three years, relative to a wide variety of benchmarks including a detailed matching procedure that controls for the market capitalisation and industry of each security. A central difficulty in interpreting studies such as these is the joint hypothesis problem. The magnitude of over- or under-performance depends critically on the choice of benchmark (Dimson & Marsh, 1986), and this makes it difficult to interpret the results.

The literature on stock market seasonalities, including month-of-the-year, week-of-the-month, day-of-the-week, and hour-of-the- day effects is another reported source of contradiction for the EMH. According to Dimson (1988), some of these patterns, notably the January seasonal nature of small stock returns, may be consistent with either market inefficiencies or seasonalities in asset pricing. Other patterns, notably those observed over very short periods, may be explained better by market microstructure.

Poterba and Summers (1988) have presented evidence of long term stock return reversals. They argued that there is the existence of negative serial correlation on stock market return over longer horizons. Some studies have attributed this behaviour to the tendency of stock markets to overreact. However, the finding of mean reversion is not uniform across studies and is quite a bit weaker in some periods than others. Indeed most of the evidence of mean reversion came during the period of the Great Depression, which is a period with patterns that may not be generalized.

Despite the observed anomalies with the EMH, overwhelming evidence is still in support of market efficiency. The EMH still provides a framework that is widely used by financial

economists. The so-called anomalies, as we have seen, are either as a result of a "bad model" problem, or a time variant behaviour of the market. Infact stock market anomalies are only too often chance events that do not persist into the future (Dimson & Mussavian, 1998).

2.3 Concept of Equity Issues

An equity issue is one of the most prominent means through which a firm raises capital to finance its growth. Studies have shown that there are a number of ways through which firms can choose to issue their equity. The choice of a particular form of equity issue is a coefficient of a number of factors, the elaboration of which does not fall within the purview of this study. Generally speaking however, equities are either issued in the form of Initial Public Offerings (IPOs), or Seasoned Equity Offerings (SEOs).

2.3.1 Forms of equity issues

First and foremost, IPOs are about the most popular form of equity issues all over the world. Under this method of offer, a firm's security is sold to the general public for the first time, with the hope of developing a liquid market for the firm's stock (Bayer, 2008). According to Ritter (1998), when a firm goes public; it enables the pre-issue shareholders to sell their holdings in the future and cash out if they so desire. Thus, if a firm has need for huge capital; the public market is its best bet as it provides cheaper source of funds.

Studies have indicated that shares sold by firms through IPOs are always (deliberately) offered at a price below their intrinsic worth, and this underpricing subsequently creates a huge profit opportunity for investors to exploit (Kiymaz, 2000; Durukan, 2002). The fact that these shares are underpriced most often results in the over-subscription of the offer, and when this happens; issuing firms leave cash on the table. Ritter (2002) argued that the money left on the table is recovered through better prices or less underpricing during SEOs. Thus,

underpriced IPOs afford the firm and its insiders the opportunity to sell future offerings at a higher price.

Another method by which equity may be issued is through SEOs. Gollamudi (2006) defined SEOs as "the sale of additional shares by a company whose shares are already publicly traded" (p. 5). Such issues may include floating additional shares to the public, private placements, rights issues and dividend reinvestment plans. Generally speaking, listed firms raise capital through SEOs to finance new investment projects or alter their existing capital structure by repaying debt. After IPOs, SEOs enable existing shareholders to sell their holdings to investors.

According to Bayer (2008), SEOs can further be classified into primary offerings, secondary offerings and mixed offerings. Primary offering entails the issue of new shares by a firm, while secondary offering is the sale of existing shares by shareholders or insiders. As the name implies, mixed offering refers to a combination of both primary and secondary offerings by a firm at a time. It is important to stress here that while the capital raised through a primary SEO is utilized by the firm to finance new projects; the story is entirely different with secondary SEOs. Under secondary SEOs, the proceeds from the sale of shares go back to existing shareholders and as such; the money cannot be used by the firm.

Furthermore, primary and secondary SEOs can be in the form of public offerings, rights issues or private placements. A rights issue is the issue of securities entitling existing shareholders to purchase new shares at a predetermined price (usually a discount to the market price) in proportion to the number of shares already held. Private placement on the other hand is the sale of securities to small group of sophisticated investors and institutions such as mutual funds, investment companies and insurance companies by managers or informed insiders (Gollamudi, 2006). In Nigeria, SEOs are mostly carried out in the form of

public offerings. This is especially true of SEOs recorded over the last one decade. However, private placements are also not uncommon, especially during the recent recapitalization exercise of the Nigerian banking and insurance sectors.

2.3.2 Motives for equity issues

About five decades of research on equity issues has provided rich literature as to why firms issue equity. The most frequently cited reason in the literature is the need to raise capital for financing new projects. According to Dittmar and Thakor (2007), managers are likely to use equity issues to finance new projects when they believe that investors' beliefs about project payoffs are likely to be aligned with theirs. Under such circumstances, the market recognises the information as a positive one. In Nigeria, most of the equity issues are aimed at financing new investments that will generate positive Net Present Value (NPV) to the issuing firm.

Furthermore, a firm may issue equity to take advantage of the market's overvaluation of its shares. According to Baker and Wugler (2002), firms time when to issue their equity and do so when they are convinced that it is overvalued by irrational investors who do not revise their valuations to reflect the information conveyed by the equity issuance. Thus, firms tend to issue equity when their share prices are high (Asquith & Mullins, 1986; Baker & Wugler, 2002).

Firms also issue equity to rationalize their existing capital structure. Bayer (2008) and Hazra and Valencia (2009) argued that a firm may sell equity and subsequently use the proceeds to off-set debt. However, studies have documented a negative market reaction as a result of substituting equity with debt. According to Castillo (2004), the market receives the signal as a sign of managers' belief that the firm cannot generate enough future cash flows to pay its debtors. The proportion of firms that issued equity for the sole aim of off-setting debt in Nigeria is very insignificant.

2.4 Equity Issues and Stock Price Behaviour

A number of studies, beginning with Myers and Majluf (1984) and Asquith and Mullins (1986), have sought to establish the behaviour of stock prices to announcements of equity issues by firms. After about three decades of empirical research covering matured and emerging markets, the evidence regarding this behaviour is still mixed.

Despite the fact that the nature of the impact of equity issues on stock prices remained unresolved, various theories have emerged to provide a better understanding of this behaviour. Based on these theories the announcement date price effect can be grouped into three categories: the negative price effect, no price effect, and the positive price effect.

2.4.1 Negative price effect

The negative price behaviour exhibited by stock prices of issuing firms on the announcement dates can be explained by a number of theories. First and foremost, the negative price effect is observed as a result of the fact that there is a downward sloping demand curve for firms' stock, giving rise to price fall (Scholes, 1972). The expected increase in the number of the firm's stock as a result of the issue announcement creates a downward pressure on prices.

Secondly, the observed negative price effect can also be said to be induced by information asymmetry between managers and shareholders. Informed shareholders who read the announcement as a negative signal of poor expected future cashflow and thus resort to selling their holdings. This sale by informed shareholders gives rise to a price drop for the firm's equity (Miller & Rock, 1985; Myers & Majluf, 1984).

Lastly, negative price effects could also be observed as a result of perception by existing shareholders of the high transaction costs associated with the issue of new equity. When a firm issues new equity, the transaction costs associated with the issue are borne by existing

shareholders. Thus, existing shareholders read equity issues announcement as a bad signal because of the associated costs of issuance (Miller & Rock, 1985).

2.4.2 No price effect

The no price or zero price effect on the event announcement date is consistent with the theory of efficient markets. The theory argues that stock prices immediately adjust to reflect the information conveyed by the equity issues announcement.

In otherwords, the zero price effect means that the announcement of equity issue by a firm has no effect on its market value. This implies that the announcement should not generate abnormal return. The zero effect argument was proposed by Modigliani and Miller (1958). There is no much empirical evidence in favour of the zero effect argument compared to either the negative or positive argument, because most studies do not report stock markets to be highly efficient.

2.4.3 Positive price effect

The positive price effect observed on the equity issue announcement date is consistent with the theory of favourable investment signalling. Among the most common reasons why firms issue new equity is to raise funds to finance future investments. Thus, the fact that existing shareholders and investors perceive the signal as favourable information leads to a surge in stock prices of the issuing firm (Barclay & Litzenberger, 1988).

It is important to note that investors' optimism is hinged on their expectation of future cashflows from the new investment. Hence, for equity issue announcement to generate positive price effects; there must be an agreement between the assessment of firm managers and shareholders on the ability of the project(s) to generate positive NPV (Denis, 1994).

Although, the aim of this study is to establish which of the three effects is consistent with our data, this study expects a positive announcement date effect; consistent with the proposition that the sample DMBs issued new equity within the period of this study primarily to finance projects that will generate positive NPV. It is also believed that the market correctly read the investment signal as money was left on the table for most, if not all the issues. In otherwords, most of the issues during the period under study were oversubscribed.

2.5 Market Reaction to Equity Issues Announcement

Generally speaking, studies on market reaction to corporate events' announcements such as equity issues are not common in emerging markets compared to their developed counterparts. Thus, a critical review of previous studies on stock market reaction to equity issues announcements in both mature and emerging markets is undertaken with a view to assessing their contributions to knowledge and identifying their inherent methodological inadequacies. To appreciate the existing research gap between the developed and emerging markets on the subject matter, the review is divided into two subheadings; studies from developed markets, and those from emerging markets.

2.5.1 Market reaction studies in developed/mature markets

Many studies have been conducted across developed markets to investigate market reaction to equity issues announcements. Even among the developed markets, there are more of such studies on the U.S. market. Table 2.1 provides a summary of the studies reviewed under this sub-heading.

Table 2.1 Market Reaction Studies in Developed/Mature Markets

Country	Author & Year of Publication	Sample Size	Period	Objective	Findings
USA	Asquith and Mullins (1986)	531 common stock offers by utility and Industrial firms	1963 to 1981	Evaluate market reaction to equity issues announcements	Significant negative abnormal return of 2.7% on announcement date.
USA	Barclay and Litzenberger (1988)	219 common stock and 85 straight debt issues	N/A	Test for intraday stock reaction to equity issues and straight debt	A fall of 1.5% in stock prices the first 15 minutes after announcement
USA	Korajczyk, Lucas and McDonald (1990)	1480 SEO announcements by industrial firms	1974 to 1983	To test the behaviour of stock prices around equity issues	Average CAR of 3% and 2.9% for NYSE/AMEX and OTC firms on announcement date
USA	Dierkens (1991)	197 firms listed on the NYSE/AMEX	1980 to 1983	Role of information asymmetry in equity issues	Negative abnormal return of 2.4% around the announcement date
USA	Jain (1992)	269 common stock announcements by industrial firms	1979 to 1983	Test information conveyed by equity issues about future earnings	Negative abnormal return of 2.89% for the 3-day announcement period
USA	Denis (1994)	435 primary common stock issues	1977 to 1990	Test the nature of information conveyed by equity issues announcement	Announcement day return positively related to profitability of new investment
USA	Hertzel, Lemmon, Linck and Rees (2002)	619 private placements	1980 to 1996	Examine longrun performance of privately placed equity issuing firms	Positive and significant abnormal return at announcement
France	Jeanneret (2003)	198 rights issues	1984 to 2000	To test the significance of abnormal return	Negative effect of 1.26% on announcement date
USA	Dittmar and Thakor (2007)	4,496 equity issues and 3,321 non-convertible debt	1993 to 2002	To measure why firms issue equity	Firms that issue equity experience higher raw and market-adjusted stock returns
Australia	Arsiraphongphisit (2008)	377 private placements, and 158 rights issues	1991 to 2003	Investigate information conveyed by equity	Positive effect for private placement and negative for rights issues

Source: Researcher's Compilations

The study by Asquith and Mullins (1986) is one of the earliest to document stock market reaction to equity issues announcement in the U.S. They employed a sample of 531 common stock offerings by utilities and industrial firms listed on the NYSE/ASE between January 1963 and December 1981 to evaluate the reaction of the market to equity issues announcement. Using the event study approach, they have found a statistically significant negative abnormal return of 2.7% on the announcement date in over 80% of the sample. Hence, they concluded that the announcement of common equity issues leads to a reduction in stock prices.

Being one of the early studies on the subject matter, the work did not only establish the nature of abnormal returns on the announcement date, but also went ahead to even analyse the longrun performance of the sample firms (which is not within the purview of this study). However, the study's shortcomings include its utilization of the combination both primary and secondary issues in one sample, its inability to model volatility in stock returns; and the use of the CAPM to estimate stock returns.

In another development, Barclay and Litzenberger (1988) employed a sample of 219 issues of common stock and 85 issues of straight debt by industrial firms listed on the NYSE/ASE to test for the intraday stock prices reaction to equity issues and straight debt announcements. Using the event study methodology, they discovered that there is a fall of 1.5% in stock prices within the first fifteen minutes after the announcement of equity issues, and the decline increases to between 2.7% and 3.0% in the three hours around the announcement. They therefore concluded that equity issues announcements convey negative signal to the market.

Although, the study made a significant contribution by analysing market reaction to equity issues announcement within minutes and hours after announcements, it is not devoid of a number of methodological shortcomings. Given the fact that the study utilized intraday data,

the need to measure and control for the presence of ARCH effects in the time series of returns becomes even more evident as studies have shown that the shorter the interval, the higher the volatility (Brooks, 2008). Similarly, the study also employed the CAPM to compute returns despite the inherent sensitivity of the model to firm size and P/E ratios.

Furthermore, Korajczyk, Lucas and McDonald (1990) utilized a total sample of 1,480 SEO announcements by industrial firms out of which 791 are listed on the NYSE/AMEX, and the remaining 691 are OTC firms to test for the behaviour of stock prices around the announcement of equity issues. They employed the event study approach to show that there was an average cummulative abnormal return of 43.8% for the 500 days preceding the issue announcement, but this drastically dropped to 3.0% for NYSE/AMEX firms and 2.9% for OTC firms on the two days on and preceding the equity issue. Thus, they concluded that equity issues announcements result in a large price drop for announcing firms.

Despite the fact that the study utilized a reasonably long period of time as the event window and employed various benchmarks to estimate returns, an apparent shortcoming is its inability to provide further explanation for the large and statistically significant price drop prior to the announcement. In addition, the study did not also control for volatility in returns.

In another study, Dierkens (1991) investigated the role of information asymmetry between managers, the firm and the market during equity issues. Using a sample of 197 firms listed on the NYSE/AMEX that issued equity between 1980 and 1983, the study established the presence of a negative abnormal return of 2.4% around the announcement period and increases in information asymmetry further increases the drop in stock prices. In addition, the study also revealed that the announcement of equity issues significantly attenuated the level of asymmetry. They therefore concluded that information asymmetry is a significant consideration when issuing equity.

A major strength of the study was its ability to comprehensively model information asymmetry by classifying information into good and bad. However, the findings of the study may not be completely free from the influence of volatility in returns, which renders estimated coefficients inefficient.

In the same vein, Jain (1992) utilized a sample of 269 announcements of common stock by industrial firms listed on the NYSE/AMEX between 1979 and 1983 to test for the information conveyed by equity issues announcement about the firms' future earnings prospects. Using the event study methodology, he found that firms in the sample experience a negative abnormal return of 2.89% during the three-day announcement period. Though not within the scope of this study, the findings also showed a positive correlation between equity issues and revision of earnings forecast by analysts. Consequently, he interpreted this as evidence that SEOs provide signals to the market about future earnings.

Unlike previous works that sought to establish the information conveyed by the announcements of equity issues, the study was in addition, able to establish the nature of the information conveyed by such announcements. However, the results would have been more reliable had the study avoided the use of economic-based models such as the CAPM as they have been proved to be sensitive to a number of firm-specific variables. Similarly, the study did not also address the inherent volatility problem in computed stock returns.

To further explain the nature of information conveyed by the announcement of equity issues, Denis (1994) employed a sample of 435 primary offerings of common stock issued between January 1977 and December 1990 by industrial firms listed on the NYSE/AMEX, the study revealed that the announcement of equity issues is positively related to the estimated profitability of new investments, and this relation is purely driven by a subset of smaller,

younger high growth firms. He therefore concluded that investment opportunities play a minor role in explaining stock prices reaction to equity issues announcements.

Although the study improved on previous works by evaluating the effect of firm size on the reaction to equity issues announcements, the study failed to empirically establish the factors that explain such findings. Similarly, the study also failed to adjust returns for the effect of return volatility.

Furthermore, Hertzel, Lemmon, Linck and Rees (2002) examined the performance of privately placed equity over a long period of time using a sample of 619 announcements of private placements between 1980 and 1996 by firms listed on the NYSE/AMEX and NASDAQ. They employed the event study methodology in their analysis, and their findings revealed that there was a positive and statistically significant abnormal return at announcement. Although not within the purview of this study, the findings also documented a negative longrun abnormal performance of 45.15 percent.

An apparent shortcoming of this study was its use of the Capital Asset Pricing Model (CAPM) as a benchmark for estimating abnormal returns and buy-and-hold abnormal returns, despite the model's observed inadequacies already pointed out by previous studies. Similarly, the study's utilization of a long time horizon for testing longrun performance increases the tendency of the presence of ARCH effects in computed returns.

Similarly, Jeanneret (2003) utilized a sample of 198 executions of rights issues in the French stock market between January 1984 and December 2000. The sample was classified into two according to the reason for the issue as contained in the issuing prospectus. Thus, the final sample consisted of 98 firms who issued equity for reasons related to capital structure and another 100 firms that issued equity to finance new investment projects. Using the event study methodology to estimate cross-sectional regressions on a number of price and balance

sheet variables, the study revealed a negative announcement effect of 1.26 percent on the three- day interval starting on the announcement date. Considered separately, the announcement of equity issues as a result of capital structure concerns does not generate a significant abnormal return, while the joint announcement of equity issues with a new investment project induces a negative and significant drop of 2.16 percent in CAR during the three-day interval. Consequently, she concluded that equity issues for the sole aim of financing new investment projects are undertaken by firms that are less levered and have more cash and cashflow prospects than issuers motivated purely by capital structure explanations in the French stock market.

The study was indeed thorough in that it took into account the effect of a number of some variables and concerns raised by previous studies on the need to control for firm size, book-to-market value, issue size and issue price. However, the study failed to establish the robustness of the results to the influence of volatility in computed returns.

In another study, Dittmar and Thakor (2007) used a sample of 4,496 equity issues and 3,321 non-convertible debt issues by industrial firms listed on the NYSE/AMEX from 1993 to 2002 with a view to developing an alternative explanation as to why firms issue equity. They developed a set of price variables to measure agreement between managers and the market as well as issue timing and time-varying adverse selection in equity issues. Their findings revealed that firms that issued equity have significantly higher raw and market-adjusted stock returns in the three, six, nine and twelve months preceding the issue. Similarly, equity issuers have higher market-to-book ratios and industry-adjusted market-to-book ratios. They concluded that their findings are consistent with the argument that managers time their equity issues to coincide with the period of agreement between managers and the market about the value of the firm.

The robustness of the findings of this study was further enhanced by the estimation of returns with a combination of return estimation models such as the market model and the market-adjusted model. However, the strengths of the findings are attenuated by the absence of control for volatility in the return series utilized by the study.

Furthermore, Arsiraphongphisit (2008) investigated the information conveyed by equity and debt issues announcements on the Australian stock Exchange (ASX). Using the event study methodology on a sample of 377 private placements, 158 rights issues, 60 straight debt issues and 43 convertible debt issues by firms publicly listed on the ASX from 1991 to 2003; the study documented a positive price effect for straight debt and private placements; and a negative effect for convertible debt and rights issues. He interpreted the findings as consistent with leverage and asymmetric information theories.

The study's major strengths included the removal of confounding events and correction for thin trading bias in the sample. However, the study failed to model for the presence of ARCH effects in computed returns.

Lastly, a study by Chiou, Lin and Syue (2009) analysed the announcement effect of equity issues from the perspective of the profitability prospects of the various stages of a firm's life cycle. They employed the conventional event study methodology on a sample of 1,495 publicly listed firms on the NYSE/AMEX from 1991 to 2004. Their study revealed that SEO announcements are generally accompanied by a negative market reaction. They further observed that in the short run, SEO firms at the stagnation stage obtain relatively less negative market reactions than those in the growth stage do, while the reverse is the case in the long run. They therefore concluded that a firm's current life-cycle stage plays a significant role in explaining market reaction to its equity issues announcement.

The study differed from previous works on the effect of the life-cycle stage on firm' equity issues announcement in that it adjusted for industry-effects in the sample and proposed a variable for the continuous measurement of firms' life-cycle tendencies. This notwithstanding however, the study suffers from setbacks such as the absence of adjustments for the effects of return volatility.

In a nutshell, the review of market reaction studies in mature markets shows that the market reacts negatively to SEO announcements, while positive reaction has also been documented for private placements and equity issues for the sole aim of financing future growth opportunities. However, there is also evidence of drop in abnormal return immediately after the announcement date.

2.5.2 Market reaction studies in emerging markets

There are relatively fewer studies on market reaction to equity issues in emerging markets, and the reasons for this had been earlier advanced. Even among emerging markets, studies on market reaction to equity issues announcements are rarer in African emerging markets. Table 2.2 presents a summary of studies on market reaction to the announcement of equity issues in emerging markets.

Table 2.2 Market Reaction Studies in Emerging Markets

Country	Author & Year of Publication	Sample Size	Period	Objective	Findings
South Africa	Bhana (1998)	100 equity issues announcements	1980 to 1995	Examine share price reaction to equity issues announcements	Negative price reaction of -3.51% on the announcement date
Chile	Castillo (2004)	408 equity and 154 bond issues on the Chilean stock market	1993 to 2002	Test the announcement effect of equity and bond issues	Significant negative abnormal return of 0.78% on announcement date
Brazil	De Medeiros and Matsumoto (2005)	80 equity issues announcements by firms listed on the Brazilian stock market	1992 to 2003	Test the reaction of the market prior to and after the announcement of equity issues	Negative abnormal return of 2.4% on the announcement date
Turkey	Cahit (2006)	98 publicly traded firms on the ISE	1994 to 1999	Analyse the response of the ISE to right issues	Negative abnormal return of 11.1% on announcement date
Sweden	Fritzell and Hansveden (2006)	1,753 equity issues by firms traded on the Stockholm Exchange	1986 to 2005	Test the reaction of the Swedish stock market to equity issues announcements and offering discounts	Negative and significant market-adjusted announcement day abnormal return of 2.2% for right issues and 1.7% for private placements
Turkey	Bayer (2008)	34 SEO announcements on the ISE	1996 to 2005	Test market reaction to SEOs	Negative and significant abnormal return of 1.6% on announcement date
China	Shahid, Xinping, Mahmood and Usman (2010)	565 right issues and 152 public offers on the Shanghai and Shenzen Exchanges	1998 to 2008	Test the reaction of the markets to right issues and public offering announcements	Negative and significant average abnormal return of 0.18% on the announcement date for right issues and 1.25% for public offers

Source: Researcher's Compilations

Bhana (1998) employed a random sample of 100 equity issues announcements by firms listed on the Johannesburg stock Exchange (JSE) between 1980 and 1995 to examine the share price reaction to announcement of equity issues. The study utilized the standard event study

approach. Consistent with the evidence on developed markets, he found a negative price reaction of -3.51 percent on the announcement date. The study also documented the persistence of stock price reduction of -2.54 for up to one month after the announcement. He considered this as evidence of the presence of information asymmetry between managers and shareholders in South Africa.

The limitation of this study lies in its inability to correct for thin trading bias in the sample. Similarly, considering the fact that the JSE is an emerging market, the need to control for the inherent volatility in the market becomes indispensable. Thus, the results of the study may not be completely free from the influence of these vital limitations.

In Chile, Castillo (2004) analysed the announcement effect of bond and equity issues on the Chilean stock market using a sample 408 equity issues and 154 bond issues by publicly traded firms from 1993 to 2002. Using the event study methodology, the study found that the announcement of bond issues yielded no significant abnormal returns; while equity issues announcement yielded significant negative abnormal return of 0.78 percent during the three-day announcement date interval. He also found that the magnitude of abnormal return is related to the size of the issue.

Although the study proved the robustness of its results by employing a number of benchmarks to compute abnormal returns and also correct for clustering, it failed to correct for the inherent bias in the returns as a result of thin trading. Similarly, the study also failed to take into cognizance the effect of volatility on estimated returns.

In a related study, De Medeiros and Matsumoto (2005) analysed the reaction of the Brazilian stock market to equity issues announcement. They employed a sample of 80 equity issues announcement by firms listed on the Brazilian stock market between 1992 and 2003 to test for reaction of the market prior to and after the announcement of equity issues. Using the

standard event study methodology and ARCH/GARCH models, the study also established a negative abnormal return of 2.4% on the announcement date. On the whole, the study established a negative cummulative abnormal return of 4.6% around the announcement date. They considered this finding as evidence that SEOs announcements in Brazil convey negative information to the market.

This study happens to be one of the not so many works in emerging markets that took into account the effect of volatility in returns and duly modelled for the presence of ARCH effects in their sample. However, the findings of the study would have been more valid had it corrected for the presence of thin trading bias in the computed returns.

Furthermore, Wu, Wang and Yao (2005) investigated the reaction of the Hong Kong stock market to the announcement of private and public equity placements. They employed the event study methodology on a total sample of 405 firms, consisting of 99 private placements and 306 public placements announcements between 1989 and 1997. The study documented a positive and significant positive average CAR of 2.0 percent for private placements and 1.9 percent for public placements. Furthermore, the study also revealed positive and significant CAR of 3.5 and 3.1 percent for private and public placements respectively during the three-day announcement date interval. They interpreted their findings to be consistent with the geberalized Myers-Majluf model which predicts that more asymmetric information about growth (relative to that about assets in place) is likely to determine the positive announcement effect of equity issues.

The unique contribution of this study is its revelation of a positive market reaction to equity issues, contrary to what has been documented in mature markets, especially the U. S. However, the absence of correction for thin trading bias, the use of the CAPM to estimate

returns and the presence of ARCH innovations in computed returns put the validity of the findings of the study in doubt.

In a related study, Cahit (2006) analysed the reaction of the Istanbul Stock Exchange (ISE) to right offerings using a sample of 98 firms publicly traded on the market between 1994 and 1999. He classified his sample into 65 sweetened and 33 unsweetened offerings. Using the event study approach, he found the presence of negative abnormal returns of 11.1 percent on the announcement date for unsweetened right offerings, and a positive price reaction of 2.0 percent for right offerings sweetened with bonus issues. He interpreted these findings as consistent with the sweetener effect of the simultaneous distribution of bonus issues.

It is not in doubt that the classification of the study sample into sweetened and unsweetened offers clearly shows the role of timing and institutional differences in explaining stock prices behaviour during equity issues. However, the presence of ARCH innovations in the computed returns may have led to the overstatement of abnormal returns. In the same spirit, the absence of correction for thin trading bias in the sample may also have influenced the results of the study.

In Sweden, Fritzell and Hansveden (2006) tested the Swedish stock market's response to the announcement of equity issues and offering discounts. They utilized the standard event study approach on a sample of 1753 equity issues by firms publicly traded on the Stockholm Stock Exchange between January 1986 and December 2005. Their findings revealed a negative and significant announcement day market-adjusted abnormal return of 2.2 percent for rights issues, 1.5 percent for private placements and a positive and significant 1.7 percent abnormal return for private placements after excluding employee stock options. Hence, they concluded that both investors and existing shareholders who participated in the private placements gained.

Contrary to the evidence in existing works, the study revealed a positive price effect for private placements after excluding employee stock options. Unfortunately, the study failed to advance any empirical explanation as to the role of employee stock options in determining market reaction to equity issues announcements. Furthermore, the study did not correct for the effect of infrequent trading and the presence of volatility in returns.

In another study, Bayer (2008) employed a sample of 34 SEOs consisting of 19 primary SEOs and 15 secondary SEOs by firms listed on the Istanbul Stock Exchange (ISE) between 1996 and 2005 to test for market reaction to the announcement of such issues. Using the event study approach, he found a negative and significant abnormal return of 1.6 percent for all SEOs on the announcement date. Similarly, a positive and significant effect of three percent was observed for primary private placements on the announcement day. He concluded that the findings are better explained by a combination of hypotheses which include asset signalling, wasted investment, cashflow signalling, windows of opportunity, floatation cost and leverage change.

Although the study utilized a comprehensive sample that includes all primary and secondary SEOs during the period of the study, it was not devoid of a number of methodological inadequacies which include the non-correction for thin trading and the absence of modelling for the effect of volatility in returns.

Lastly, Shahid, Xingping, Mahmood and Usman (2010) investigated the reaction of the Shanghai and Shenzhen stock markets in China to the announcement of SEOs using the event study methodology on a sample of 565 rights issues and 152 public offers from 1998 to 2008. Out of the total 565 rights issues, 302 were issued on the Shanghai Stock Exchange, while the remaining 263 were issued on the Shenzhen Stock Exchange. Similarly, the total sample of 152 public offers consists of 87 issues in Shanghai and 65 in Shenzhen. They found a

negative and statistically insignificant average abnormal return of 0.18 percent on the event date for rights issues, while a negative and significant average abnormal return of 1.25 percent was detected on the announcement date of public offers. Consequently, they concluded that the negative announcement date reaction for rights issues may be correction for earlier market overreaction to the announcement of the event, while the findings on public offers are consistent with existing studies on equity issues.

This study differed from previous works on market reaction to equity issues announcements in that it tested the robustness of its results to three different sets of announcement dates that have been the subject of disagreement among scholars; board of directors' meeting date, shareholders' meeting date and announcement date to the public. However, the results may have been affected by the non-correction for thin trading bias and the absence of control for Autoregressive Conditionally Heteroskedstic (ARCH) effects in stock returns.

In summary, the review of literature on emerging markets' reaction to equity issues announcements provides evidence that can generally be considered as mixed as some economies reacted negatively and others positively. Furthermore, the studies reviewed on market reaction to equity issues in both developed and emerging markets suffer from a number of methodological shortcomings which in turn reduces the explanatory power of their results. These shortcomings include the absence of modelling for volatility in return, failure to correct for thin trading bias in returns, absence of control for clustering of events and the use of economic models that have been proven to be sensitive to firm size and P/E ratios. Hence the study was therefore designed to address these inandequacies.

2.6 Equity Issues and Insider Trading

It is well documented in the empirical literature that the market reacts negatively to equity issues announcement because of the existence of information asymmetry between managers

and investors (Myers & Majluf, 1984; Asquith & Mullins, 1986). This implies that managers are in possession of information regarding the future prospects of the firm that investors do not know. Despite the existence of sanctions, managers are naturally tempted to take advantage of such information to maximize the value of their holdings (if the information is a good signal) or minimize the loss on their investments (Lee, 1997). Empirical evidence has shown that insiders can predict price movements in their securities for up to six months in the future (Rogof, 1964).

As it is the case with studies on market reaction to equity issues, most of the studies on insider trading relate to mature markets, with emerging markets constituting a very negligible proportion. Consequently, a critical review of previous studies on insider trading prior to equity issues and other corporate events' announcements is undertaken with a view to assessing their contributions to knowledge and identifying their inherent methodological inadequacies. To clearly show the gap between studies in developed and emerging markets, the review is also divided into two subheadings; studies from developed markets, and those from emerging markets.

2.6.1 Insider trading studies in developed/mature markets

According to Lee and Karpoff (1991) managers trade on private information because the expected gain from insider trading exceeds the expected cost of any prospective legal and/or market penalty. They therefore concluded that the prospects of any legal action do not completely eliminate the possibility of insider trading around corporate events' announcements like equity issues.

There is essentially a rich body of empirical literature on insider trading around equity issues announcements. However, the chunk of such studies comes from mature markets, especially the US where rules prohibiting insider trading have been in existence since 1934 (Jaffe,

1974b). Studies on insider trading are not very common among emerging markets because of the non-existence of documented records on the timing and volume of insider trading and the lack of strong will to enforce insider trading rules (Dogu, Karacaer, & Karan, 2010). The summary of studies on insider trading reviewed under this sub-heading is provided in table 2.3

Table 2.3 Insider Trading Studies in Developed/Mature Markets

Country	Author & Year of Publication	Sample Size	Period	Objective	Findings
USA	Jaffe (1974a)	200 large firms covering trades in 1000 months	1962 to 1968	Test for evidence of insider transactions	Insiders earned approximately 3% in the eight months after the transaction
USA	Morse (1980)	50 securities traded on the ASEX and OTC firms	1973 to 1976	Test the relationship between price changes and trading volume	Successful insider trading occurs before the announcement of corporate events
USA	Seyhun (1986)	60,000 reported insider trades by a total of 769 publicly traded firms in the US	1975 to 1981	To test the abnormal profit available to insiders as a result of trading on private information	Insiders purchase stocks prior to an abnormal rise in stock price and sell prior to an abnormal decline
USA	Barclay and Litzenberger (1988)	219issues of common stock and 85 issues of straight debt	N/A	Test intraday stock price reaction to equity and straight debt issues announcements	Small but significant drop in stock prices one hour before the announcement of equity issues
USA	Rozeff and Zaman (1988)	698 firms trading on the NYSE after adjusting for size and P/E ratios	1973 to 1982	Test the extent of profit earned by corporate insiders as a result of trading on private information	Insider trading was at most 5% per annum in the absence of transaction costs and 3% with it
USA	Lee and Karpoff (1991)	179 insider trade events from 83 firms publicly traded on the NYSE/AMEX	1977 to 1990	To examine insider trading before the announcement of common stock and convertible debt	Unusual number of insiders sell their stock prior to common stock and debt issues
USA	Kahle (1995)	Publicly traded companies on the NYSE	N/A	To investigate the existence of abnormal insider trading	Significant increase in insider sales prior to equity issues
USA	Lee (1997)	4,496 equity issues and 3,321 non-convertible debt	1976 to 1990	Test the relationship between trading by insiders and longrun performance of equity issuing firms	Primary issuers underperformed their benchmark irrespective of prior trading pattern
USA	Lee (2002)	1,281 SEO announcements by on the NYSE and NASDAQ	N/A	Analyse trading by insiders prior to SEOs in the US	No relationship between insider trading and longrun performance

Source: Researcher's Compilations

In the US, Jaffe (1974a) employed a random sample of 200 large firms covering trades in approximately 1000 firm-months from 1962 to 1968 to test for evidence of insider transactions. Using the traditional event study methodology, he found that insiders earned approximately three percent profits in the eight months after the transaction after deducting two percent transaction costs. He therefore concluded that insiders possess special information.

Although the study improved on the shortcomings of previous researches on the subject matter by taking a larger sample and incorporating the effect of transaction costs on insider gains, it failed to succinctly capture the effect of leakages of insider information to friends and relatives who are not required by law to report their transactions to the SEC. Similarly, the choice of a complicated benchmark model for estimating insider abnormal returns (such as the control portfolio approach) further complicates the "bad model" problem put forward by Fama (1998).

Furthermore, Morse (1980) investigated the relationship between price changes and trading volume using a total sample of fifty securities made up of twenty securities traded on the NYSE, five on the American Stock Exchange (ASEX) and twenty five traded over the counter (OTC). Using the event study methodology over a four-year period from 1973 to 1976; the study found that successful trading on private information occurs on a short period of time in securities markets before the announcement of corporate events by firms. He concluded that investors with private information will continue to trade on the information until it is fully reflected in stock prices.

The foregoing shows that Morse (1980) went a step ahead of previous studies to include OTC firms in the sample. However, he failed to address the inherent volatility effects in the share prices of the sample firms. It has been established by a number of studies that the volatility in

share price returns renders the coefficient estimates inefficient and create a downward bias (Brooks, 2008).

In a related study, Seyhun (1986) analysed a sample of 60,000 reported insider trades by a total of 769 publicly traded firms in the US from 1975 to 1981 with a view to investigating the abnormal profits available to insiders as a result of trading on private information. He utilized the traditional event study methodology to determine the abnormal returns available to corporate insiders. Consistent with the findings of previous works, the study revealed that insiders purchase a firm's stock prior to an abnormal rise in stock prices, and sell their stock prior to an abnormal decline in stock prices. He therefore concluded that different insiders possess differences in the quality of information.

One of the major contributions of this study was its ability to circumvent the use of benchmark models that would create downward biases in abnormal return. The use of the market model as a benchmark for estimating returns minimizes the firm effect associated with other models, especially the CAPM (Banz, 1981). However, the market model does not have the capacity of dealing with the issue of ARCH effects associated with stock return series.

Furthermore, Barclay and Litzenberger (1988) utilized a sample of 219 issues of common stock and 85 issues of straight debt by industrial firms listed on the NYSE/ASE to test for the intraday stock prices reaction to equity issues and straight debt announcements. Using the standard event study methodology, they found a small but statistically significant drop in average stock prices one hour prior to the announcement of equity issues. They interpreted this as evidence that insider trading preceding the first public announcement of equity issues does affect stock prices.

The study was one of the early works on the effect of insider trading on stock prices prior to equity issues announcements. However, the study suffers from a number of setbacks such as the use of the CAPM which has been proven to be sensitive to size and P/E ratios, and failure to capture volatility in stock returns.

Similarly, Rozeff and Zaman (1988) analysed the extent of profits earned by corporate insiders as a result of trading on private information using a sample of 698 firms trading on the NYSE, after adjusting for size and earnings-to-price (P/E) ratios. The sample firms accounted for a total of 722 insider trading events during the ten-year period of the study, from January 1973 to December 1982. Using the control portfolio approach to compute abnormal returns, the study found that insider profit was at most five percent per annum in the absence of transactions costs, and declined to three percent per annum after the imposition of an assumed two percent transaction cost. Thus, they concluded that though insiders possess private information, trading on it does not give them so much abnormal profit.

The study was indeed an improvement over similar works on insider trading because the authors controlled for the much debated effects of size and P/E ratios on the residuals of the market, which are considered as the abnormal return. This notwithstanding however, the study did not address the volatility associated with returns. Also, the study failed to take into account the effect of other similar variables identified by Finnerty (1976) such as earnings and dividends that affect the computation of abnormal returns.

In a study on equity issues, Lee and Karpoff (1991) examined insider trading before the announcement of common stock, convertible debt and straight debt issues by US firms. They employed the event study methodology on a sample of 179 insider trade events from 83 firms publicly traded on the NYSE/AMEX with a view to analysing the existence of abnormal net

selling by insiders prior to announcement. Their study revealed that an unusual number of insiders sell their stock prior to stock and convertible debt issues. However, pre-announcement selling for common stock is concentrated only in a few firms. Hence, they concluded that the prospect of legal penalties does not deter insiders from trading prior to a stock issue.

The study's major shortcoming is its failure to recognize that outsiders who are close to insiders also take advantage of information asymmetry to make abnormal returns prior to equity issues. In effect, the study failed to address the issue of outsiders who receive the information before the market.

Furthermore, Kahle (1995) employed a sample of public firms traded on the NYSE to investigate the existence of abnormal insider sales prior to equity and convertible debt issues. Using the conventional event study methodology, the study found that there is significant increase in insider sales prior to equity issues even after controlling for the huge prior return of issuing firms. He concluded that the number of corporate buyers prior to an equity issue is smaller than the number of sellers.

A major weakness of this study was its inability to control for portfolio rebalancing after large stock price increases for firms in the sample. Similarly, these findings may not be devoid of the influence of ARCH effects.

Lee (1997) studied the relationship between trading by insiders of firms that issued equity and longrun performance of issuing firms. He utilized a sample of 2,164 Seasoned Equity Offerings (SEOs) consisting of both primary and secondary offerings on the NYSE and AMEX between 1976 and 1990. Using a benchmark portfolio of matching firms to compute annual returns, the study revealed that primary issuers significantly underperformed their benchmarks, regardless of insiders' prior trading pattern.

The major shortcoming of this study lies in its inability to utilize benchmark models that minimize the possibility of sensitivity to firm size and a downward bias in estimated annual returns as established by a number of previous works already cited. This is in addition to the failure to control for volatility in computed returns.

The study by Gombola, Lee and Liu (1999) also analysed a sample of US firms listed on the NYSE/AMEX with a view to establishing the extent of abnormal net selling prior to equity issues. They classified their sample into growth and mature firms during the period of the study. The findings of their study revealed that the abnormal net selling prior to equity issues is greater for growth firms than for mature firms. The study also documented that greater insider selling prior to the issue announcement is said to be as a result of greater price run-ups prior to the announcement and not associated with a more negative market reaction to the announcement. Consequently, they concluded that investors may be overly optimistic about the future of growth firms.

The weakness of this study lies in its choice of a theoretical basis. Although the study assumed that the level of an insider's profit is determined by the degree of asymmetry between insiders and outsiders and superiority of the information; it failed to take into cognizance the superior skills of some insiders. Insiders who have superior skills are able to interprete information better than their counterparts who are not skillful; and this can influence the level of net sales by insiders. The study also failed to control for volatility in asset price returns.

Lastly, Lee (2002) employed a total of 1,281 SEO announcements by 569 firms listed on the NYSE/AMEX and another 712 firms listed on NASDAQ to analyse trading by insiders prior to SEOs in the US. In addition to using the standard event methodology, the study controlled for the effects of exogenous variables on insider sales prior to an offering. The findings of the

study revealed that there is no close relationship between insider trading and longrun performance of firms issuing SEOs. He therefore concluded that the poor relationship could be as a result of the free cashflow problems that arise after equity issues.

While the greatest contribution of this study was controlling for the effects of exogenous needs of insiders such as house down payments, it failed to recognize the role played by outsiders who got a whiff of the information in influencing the resulting abnormal return.

In a nutshell, the studies reviewed on insider trading in emerging markets revealed that despite the sanctions associated with insider trading, corporate insiders do trade on private information to their advantage. However, the abnormal returns as a result of this form of trading do not persist as insiders inadvertently signal such information to the market.

2.6.2 Insider trading studies in emerging markets

Generally speaking, studies on the behaviour of market returns prior to corporate events' announcements (like equity issues) as a result of the dealings of corporate insiders are not common. The reasons for this unfortunate occurrence are not farfetched. The difficulty associated with accessing relevant data and the lack of a strong will by policy makers to enforce market rules in emerging markets are the major reasons for the neglect of studies on market efficiency in emerging markets (Dogu, *et al.*, 2010). Table 2.4 reports the summary of emerging market studies on insider trading and equity issues.

Table 2.4 Insider Trading Studies in Emerging Markets

Country	Author & Year of Publication	Sample Size	Period	Objective	Findings
Mexico	Bhattacharya, Daouk, Jorgenson and Kehr (2000)	49 publicly traded firms that make up 75 corporate announcements	1994 to 1997	Investigate insider trading around corporate events announcements	No abnormal return prior to event announcement in the event window
South Africa	Mordant and Muller (2003)	2,549 transactions executed and	2000 to 2002	Analyse the profitability of	Directors outperformed the

		declared by directors		directors' dealings on the JSE	market in their share dealings
Brazil	De Medeiros and Matsumoto (2006)	80 equity issues announcements by firms listed on the Brazilian stock market	1992 to 2003	Test the reaction of the market prior to and after the announcement of equity issues	Significant negative abnormal return three weeks prior to the announcement date
Turkey	Dogu, Karacaer and Karan (2010)	4,564 reported insider transactions by active companies listed on the ISE	2005 to 2007	Evaluate insider trading in a volatile emerging market	Most insiders are aware of the event before its official announcement
China	Shahid, *et al.* (2010)	565 right issues and 152 public offers on the Shanghai and Shenzen Exchanges	1998 to 2008	Test the reaction of the markets to right issues and public offering announcements	Positive and significant average abnormal return of 0.2% right issues prior to the announcement

Source: Researcher's Compilations

Bhattacharya, *et al.* (2000) investigated insider trading vis-à-vis corporate event announcements on the *Bolsa Mexicana de Valores* (the Mexican stock exchange). They used daily closing bid and ask transactions price series, daily trading volume and daily closing prices for the Mexican stock index on a sample of 49 firms publicly traded on the *Bolsa Mexicana de Valores*. These sample firms made a total of 75 corporate events announcements covering dividend, earnings, mergers/acquisitions, equity issues, and board change announcements from July 1994 to June 1997; the period of the study. They found that there were no abnormal returns prior to the announcement of these events in the event window. They concluded that their findings provide evidence that suggests that unrestricted insider trading causes prices to fully reflect the information before it is made public.

The inclusion of volatility effects, which have been proven to be more prevalent in emerging markets has indeed given a lot of credence to this work. However, the study failed to take into account the effect of thin or infrequent trading that has dominated the activities of

emerging markets. A study by Miller, *et al.,* (1994) have documented that emerging markets generally suffer from thin trading, and if uncontrolled for; there is the tendency for coefficients to be downward-biased in returns computation. In the same vein, the paper failed to test price run-ups or run-downs to show pre-announcement drift. This is necessary to further validate the results.

There are very few studies involving insider trading in African emerging markets. Mordant and Muller (2003) studied the profitability of directors' dealings on the Johannesburg stock exchange (JSE) with a view to analysing how informative these transactions are to outside investors. Using a sample of 2,549 transactions executed and declared by directors between 2nd October 2000 and 31st March 2002, the study established that directors outperform the market in their share dealings, and the outperformance is more pronounced in sale rather than buy transactions. They also found that the major proportion of abnormal returns was as a result of extra-market factors rather than directors' transactions.

The study made a significant methodological improvement by controlling for the effect of the price of gold on the returns of the market, a phenomenon unique to the JSE. However, the study did not mitigate the effect of volatility on firm and market returns despite the existing evidence that failing to model for volatility of stock returns (especially in emerging markets) can create significant bias in the estimation of returns. Furthermore, the findings of the study may also be affected by the absence of control for the effect of non-synchronous trading in the return series employed by the study.

In a related study, De Medeiros and Matsumoto (2006) utilized a sample of 80 equity issues announcement by firms listed on the Brazilian stock market between 1992 and 2003 to test for reaction of the market prior to and after the announcement of equity issues. Using the standard event study methodology and ARCH/GARCH models, the study have found the

presence of significant negative abnormal returns three weeks to the announcement, indicating that insiders sold their holdings prior to the announcement. Hence, they concluded that the occurrence of abnormal returns three weeks before the announcement may be interpreted as the evidence of insider trading, since negative abnormal returns are ideally anticipated on the announcement date only.

Although the study reduced the bias in estimated returns by adequately capturing the effect of volatility through the use of ARCH/GARCH models, its inability to correct for the effect of thin trading casts a lot of doubt on the reliability of the findings. This is in addition to the study's failure to provide further evidence on the extent of insider trading on the Brazilian stock market.

A study by Dogu, *et al.* (2010) sought to evaluate the level of insider transactions in a volatile emerging market like Turkey. They employed a total of 4,564 reported insider transactions by active companies listed on the ISE from 2nd February 2005 to 30th June 2007. This number of observations was related to 213 out of the 326 firms listed on the ISE. Using the standard event study methodology, the study documented that most of the insiders are aware of the event before the event date, and their transactions either purposely or unintentionally leak information to the market. Consequently, they concluded that all insiders take advantage of market information.

From the foregoing, it will not be out of place to say that the existence of a database for reporting insider transactions in Turkey lent a lot of credence to the findings of the study. However, methodological issues such as the use of the CAPM in computing returns, non-correction for thin trading bias; and non-modelling of stock returns volatility collectively attenuate the reliability of the study's findings.

Lastly, Shahid *et al.* (2010) investigated the reaction of the Shanghai and Shenzhen stock markets in China around the announcement of SEOs using the event study methodology on a sample of 565 rights issues and 152 public offers from 1998 to 2008. Out of the total 565 rights issues, 302 were issued on the Shanghai Stock Exchange, while the remaining 263 were issued on the Shenzhen Stock Exchange. Similarly, the total sample of 152 public offers consists of 87 issues in Shanghai and 65 in Shenzhen. The study documented a positive and statistically significant average abnormal return of 0.2 percent for rights issues prior to the announcement. Similarly, average abnormal return for public offers prior to the announcement was also positive and statistically significant. Thus, they concluded that the positive pre-announcement return for rights issues shows that the news of rights issues has been leaked out prior to the board meeting. For SEOs, the positive pre-announcement return is consistent with earlier studies that upward movement in share prices occurs before the announcement of equity issues.

While the study differed from previous works on market reaction to equity issues announcements in a number of ways, especially its use of to three different sets of announcement dates and various models for computing abnormal return, the study is characterised with a number of setbacks. Precisely, the results of the study may have been affected by the non-correction for thin trading bias and the absence of control for ARCH effects in stock returns.

In summary, insider studies in emerging markets do not present strong evidence in favour of the persistence of insider trading in their markets compared to their developed market counterparts. Thus, the result is at best mixed; with some markets even recording no abnormal return. Furthermore, a critical look at the methodologies, findings and conclusions of the insider trading studies reviewed in both developed and emerging markets reveal a number of deficiencies which include the need to model for the volatility of stock returns,

control for the effect of thin trading; and the failure to utilize return models that will de-emphasize the problem of sensitivity to firm size and P/E ratios. For emerging market studies, the need to correct for thin trading becomes particularly crucial because of the dormancy of a number of firms listed on their stock exchanges.

2.7 Theories of Stock Prices Reaction to Equity Issues Announcements

Empirical studies on the reaction of stock markets to the announcement of equity issues over the last five to six decades have led to the emergence of a number of hypotheses and theories that seek to explain the behaviour of stock prices around the announcement date. The most popularly known theories/hypotheses that seek to explain the underlying philosophy behind the behaviour of stock prices around the announcement of equity issues include the price pressure hypothesis, the leverage hypothesis, the agency cost theory, the information theories, the company life cycle theory and the soft information hypothesis.

The price pressure hypothesis was developed by Scholes (1972) and it is based on the basic premise that there are no perfect substitutes for the securities of a firm. Hence firms face a downward sloping demand curve for their stocks. In the absence of perfect substitutes, an increase in the supply of a firm's stock in the form of new equity issues will exert a price pressure on the firm's equity, causing the price to fall at the announcement of equity issues. Thus, the magnitude of fall in stock prices of the issuing firm is correlated with the size of the issue. Another dimension of the price pressure explanation put forward by Scholes (1972) is the decline in the stock price of the issuing firm as a result of the discount that must be offered to compensate investors for the transaction costs they bear in adjusting their portfolios to absorb the new issue (Barclay & Litzenberger, 1988; Bayer, 2008).

The price pressure hypothesis does not adequately explain the announcement of equity issues in the Nigerian banking sector because contrary to the postulations of the hypothesis, most of

the equity issues were offered at high prices and despite that; most issuing banks during the period of the study had their shares oversubscribed. Bearing this in mind, it becomes obvious that the price pressure hypothesis does not suitably explain the announcement of equity issues by DMBs in Nigeria.

Furthermore, the leverage hypothesis developed by Modigliani and Miller (1958, 1963) is based on the fundamental assumption that the unexpected announcement of new equity issues leads to an unanticipated reduction in the firm's financial leverage. Because of the tax advantages associated with debt financing, the stock price of the issuing firm decreases as a result of the decrease in financial leverage. They also argued that the absolute magnitude of the decline in stock prices will be directly related to the size of the issue. Equity issues for the purpose of retiring existing debt tend to have even greater negative price reaction than issues made for the sole aim of financing new investments because the former has greater impact on leverage (Barcly & Litzenberger, 1988).

The leverage hypothesis, like the foregoing hypothesis, does not also sufficiently explain the reaction of the stock prices of DMBs in Nigeria if the fact that a lot of money was left on the table after the execution of the issues is anything to go by. The rush by investors for the shares of these banks did not in any way suggest the relevance of the hypothesis in explaining equity issues by DMBs in Nigeria. Thus, the hypothesis cannot underpin the study.

The agency cost theory, otherwise referred to as the wasteful investment theory was developed by Jensen (1986). The theory is based on the assumption that there are agency costs associated with the separation of ownership from control of the firm and this separation breeds the tendency for management to overinvest by accepting projects with negative NPV. Given that information regarding the magnitude of the firm's investment plan is not known, but information regarding the intrinsic value of the firm's existing assets as well as its current

internal cashflow is well known; unexpected announcement of equity issues of any kind signals a higher level of investment. If the NPV of such investment is negative, the stock price of the issuing firm declines in response to the perceived fear of wasting the proceeds from the equity issue on value-destroying rather than value-enhancing projects. The level of planned investment and the absolute magnitude of the percentage decline in the stock price of the issuing firm are correlated with the size of the issue.

The agency theory also fails to adequately explain the philosophy of equity issues announcement by DMBs in Nigeria because most of the banks that raised money through equity issues during the period of the study cited the financing of expansion in the form of deploying IT in all branches and other related projects as their reasons for issuing equity. Given that the projects are easy to see and assess, it is highly unlikely that the market will judge any of such projects as wasteful investment.

The term information theory is used to refer to a group of information-related theories that have their root in the work of Myers and Majluf (1984). All information theories are anchored on the basic assumption that managers and other corporate insiders know more about the value of the firm than do shareholders and potential new investors, and this information asymmetry creates an adverse selection problem referred to as "the lemons problem" by Akerlof (1970). Myers and Majluf (1984) developed a framework based on this that later became very popular in the equity issues literature. The theory basically consists of three mutually exclusive explanations to the behaviour of stock prices around the announcement of equity issues: the existing asset value signaling theory, the cashflow signaling theory and the good investment signaling theory.

The existing assets valuation theory was first developed by Myers and Majluf (1984) and it is premised on the fact that managers possess more information about the intrinsic value of the

firm than other investors. Since managers are believed to act in the best interest of shareholders, they resort to equity issues as a mode of external financing only when they are sure that the firm's existing assets are overvalued (market value exceeds its intrinsic value). Rational investors who are well aware of this rule interprete the news of equity issues announcement as an expression of management's opinion that the firm is overvalued and hence the firm's stock price falls.

Similarly, the cashflow signaling theory was developed by Miller and Rock (1985) and it is based on the assumption of asymmetric information about the magnitude of the firm's current internal cashflow but symmetric information about both the level of planned investment and the value of the firm's assets conditional on current cashflow. Thus, an unanticipated announcement of equity issues signals the weak internal cashflow prospects of the issuing firm, which implies that it has to rely on external financing in the form of equity to finance its planned investments. This signal naturally translates into a fall in the stock prices of the issuing firm. Thus, the announcement of equity issues to finance new investments can result in the decline in stock prices.

The existing asset value signaling hypothesis does not offer the kind of scenario that best explains the announcement of equity issues as all the issuing banks emerged from a recapitalization process in 2005 that compelled them to beef up their capital base to the tune of N25 billion. This exercise inadvertently ushered in a number of acquisitions and business combinations that further enhanced the underlying asset base of these banks. In the same vein, the cashflow signaling theory does not also hold water as the consolidation exercise created mega banks that have the potentiality of venturing into big businesses that can yield adequate cashflow.

In a nutshell, the foregoing theories have been popular in explaining the behaviour of stock prices in reaction to the announcement of equity issues. Even though the study does not see any of the theories explaining the reaction of stock prices to the announcement of equity issues in Nigeria, understanding them provides the bedrock for appreciating the findings of stock reaction studies over the decades.

2.8 Equity Issues in the Nigerian Banking sector

A number of DMBs in Nigeria issued new equity within the period of the study and most of these issues were through public offers. Table 2.5 presents the trend of equity issues by DMBs in Nigeria between 2006 and 2010.

Table 2.5 Equity Issues in the Nigerian Banking Sector

	Public Offers (000s of Units)	Rights Issue (000s of Units)	Mergers (000s of Units)	Private Placement (000s of Units)	Loan Conversion (000s of Units)	Total (000s of Units)
2006	83,074,855	-	-	-	-	83,074,855
2007	68,298,659	4,959,222	6,250,000	2,281,082	-	81,788,963
2008	34,615,076	11,046,200	-	4,546,498	278,257	50,486,031

2009	-	-	-	-	-	-
2010	-	-	-	-	-	-
Total	185,988,590	16,005,422	6,250,000	6,827,580	278,257	215,349,849

Source: (i) The Nigerian Stock Exchange Annual Report and Accounts 2006 (pp. 46-47)
(ii) The Nigerian Stock Exchange Annual Report and Accounts 2007 (pp. 48-49)
(iii) The Nigerian Stock Exchange Annual Report and Accounts 2008 (pp. 50-51)
(iv) The Nigerian Stock Exchange Annual Report and Accounts 2009 (p. 57)
(v) The Nigerian Stock Exchange Annual Report and Accounts 2010 (p. 53)

Table 2.5 shows that the year 2006 also experienced the issuance of new equity by some listed DMBs. During the year, a total of 83.07 billion units of shares were floated in addition to the total number of shares already outstanding. It is important to note here that all units of shares issued during the year were through the public offers method. The rush to the stock market by DMBs during the year was informed by their need to raise more capital to fund their operations and investment projects, as most banks were left with little after beefing up their paid up capital to the minimum prescribed by the CBN in 2005.

Furthermore, the table also reveals that in the year 2007, approximately 68.30 billion units were issued through the public offers method, 4.96 billion units through rights issue, 6.25 billion units through mergers, and 2.28 billion units through the private placement arrangement. This sums up the total number of new issues during the year to approximately 81.79 billion units. The volume represents an additional 98.46% increase over that of the previous year, bringing the total volume of new issues over the last two years to approximately 164.86 billion units. As was the case in the previous year, banks continued to patronize the primary issues market in order to raise more capital for financing operations. Their motive for equity issues was contained in their respective offer prospectus circulated to the members of the public.

The issuance of equity by DMBs in Nigeria was sustained during the year 2008 as depicted

by table 2.5. A total of 50.49 billion units of new share were issued during the year; and this was made up of 34.62 billion units issued through public offers, 11.05 billion units issued through rights issue, 4.55 billion units issued through private placement; and 278.26 million units issued through loan conversion. However, no share was issued through mergers and acquisition during the period. The volume of new issues increase during the year constitutes an additional 73.92% increase over the previous year, bringing the total number of shares issued over the last three years to approximately 215.35 billion units. As was the case in the previous years, banks continued to advance the need to raise more capital to finance larger investments as the main reason for issuing more shares during the year.

During the years 2009 and 2010 however, not a single unit of share was issued by any DMB in Nigeria. The absence of any equity issue during the period may not be unconnected with the downturn in the activities of the Nigerian stock market as a result of the spillover effect of the global financial crisis that was biting firms so hard. Hence, the Nigerian stock market meltdown made the primary issues market very unattractive to companies wishing to issue shares during the period.

In a nutshell, a close look at the trend of equity issues by DMBs over the period 2006 to 2010 suggests that most of the banks issued new equity to enable them finance various profitable and valuable projects such as branch network expansion and deployment of state-of-the art ICT facilities like new banking software and ATM machines to facilitate efficient operations and service delivery. If the existing shareholders and prospective investors read the signal correctly, the announcement of equity issues by these banks should result in positive stock prices reaction; and by implication, positive abnormal return.

2.9 Empirical Studies on Stock Prices Reaction to Corporate Events' Announcements in Nigeria

Generally speaking, there are few studies in Nigeria that sought to establish the informational efficiency of the Nigerian stock market to the announcement of corporate events. While studies have been conducted to investigate the reaction of the Nigerian stock market to dividends, stock splits, earnings and top management change announcements and price reaction to IPOs and Privatization Initial Public Offerings (PIPOs); none had to the best of the researcher's knowledge been conducted on the reaction of the market to the announcement of equity issues. Notwithstanding the absence of a study on stock prices reaction to equity issues announcement in Nigeria, a review of studies conducted on the reaction of the Nigerian stock market to these other corporate announcements is presented with a view to pinpointing areas of weaknesses for improvement by this study.

Ikoku (1994) is about the first known attempt to empirically investigate the reaction of stock prices to the announcement of corporate events in Nigeria. The study used a sample of sixty six new issues of equity, consisting of thirty seven IPOs and twenty nine PIPOs in Nigeria between January 1989 and June 1993. The aim was to test the reaction of stock prices to under-pricing of IPOs and PIPOs in the Nigerian stock market. He employed the market adjusted model to compute the return for new issues around the event window. His study revealed that IPOs earned a return of 15.6% for the six months after their issue, while PIPOs on the otherhand earned a return of 21% during the same period. However, market adjusted return for IPOs plummeted to a negative 18% one year after the issues, while the return of PIPOs for the same period improved to 25.6 percent. On this basis, he concluded that the issue of PIPOs in Nigeria are, all things being equal, more under-priced relative to IPOs.

Although the study was about the first attempt to establish the reaction of stock prices, it was conducted at a time when the NSE was not automated. The NSE was not fully automated until the 27th April 1999. Thus, the technical/operational inefficiency that the NSE suffered from before its automation may have seriously affected the speed with which market information was disseminated among the participants. Thus, the findings may not stand in the context of the current improvement in the efficiency of the NSE, especially after automation. Furthermore, the study also utilized monthly stock market data and failed to adjust for thin trading and ARCH effects in computed returns.

In another study, Olowe (1998) employed a sample of eighty six cases of stock split by fifty nine firms listed on the NSE between 1981 and 1992 to examine the response of stock prices to the announcement of stock split. He utilized monthly price and market index data to compute abnormal returns around the event window. The study found the existence of abnormal return within the event window. He therefore concluded that the Nigerian stock market is not semi-strong form efficient.

As was the previous case, the scope of the study fell within the period that the Nigerian stock market was not automated and a number of reforms and enactments that enhanced the operational and allocational efficiency of the market were not put in place. Furthermore, the fact that the study was conducted at a period before the introduction of a number of other reforms that boosted the efficiency of the Nigerian stock market suggests that the findings may not stand in the context of the rapid growth in market infrastructure experienced from when the study was conducted. In the same vein, the use of monthly time series data as against daily data makes it difficult to control for the occurrence of other firm events, thereby increasing the risk of occurrence of simultaneous corporate events that may contaminate the impact of the stock split announcement.

In a related study, Oludoyi (1999) investigated the reaction of stock prices to the announcement of earnings around the date of Annual General Meetings (AGMs) by firms listed on the NSE from 1986 to 1994. The study employed weekly trading data to examine the reaction of stock prices around the twenty-week event window. The study found evidence of the persistence of price drift ten weeks after the announcement of earnings. He interpreted the finding as evidence that the Nigerian stock market is not semi-strong form efficient with respect to earnings announcements.

A close look at the study reveals a number of methodological deficiencies. Aside the fact that the scope of the study covers the period when the NSE was believed to be technically inefficient, the use of weekly market data in the study makes it more difficult to control for confounding effects. In addition, the study did not correct for thin trading bias and the existence of volatility effects in the return series.

Furthermore, Adelegan (2003) investigated the reaction of the Nigerian stock market to dividends announcements between 1991 and 1999. She utilized a sample of 595 cases of annual dividend announcements by firms listed on the NSE. Using the standard event study to compute buy-and-hold abnormal return over the event window of 21 days and 61 days; the study detected the presence of significant abnormal returns and cummulative abnormal returns during the 30 days before the announcement and the 25 days preceding it. She interpreted her findings as consistent with the evidence that the Nigerian stock market is not informationally efficient with respect to the announcement of dividends.

The study improved on the methodological inadequacies of previous works by employing daily data as against the use of weekly and monthly data. However, the study was also conducted before the automation of the trading floors of the NSE. Similarly, the use of Buy-and-Hold Abnormal Returns (BHAR) for a short run study, as against ordinary abnormal

returns creates the problem of overstating abnormal returns. It is also evident that the study failed to correct for thin trading bias and volatility effects in stock returns.

Similarly, Adelegan (2009a) employed a sample of 606 dividend paying firms, 127 dividend initiating firms and 146 dividend omitting firms to test the reaction of stock prices to these announcements from 1991 to 1999. The sample of 606 dividend paying firms consists of 440 cases of increases in dividends, 34 cases of no-increase in dividend, and 29 cases of reduction in dividend. She employed the standard event study methodology to compute the abnormal returns over a sixty-day event window. She found the presence of positive and significant abnormal returns for firms that increased dividends, negative and significant abnormal returns for firms that maintained and those that reduced their dividends, positive and significant abnormal return for dividend initiating firms; and negative and statistically significant abnormal return for firms that omitted the payment of dividends. Hence, the study concluded that stock prices of firms listed on the Nigerian stock market react to dividend policy changes, and thus dividend policy change is value-relevant in Nigeria.

Although the study improved on the shortcomings of previous works by circumventing the problems associated with computing abnormal returns using economic-based models such as the CAPM, its use of BHAR for a short run study is inappropriate. In the same vein, the study failed to model for the effect of volatility in stock returns and correct for the inherent thin trading bias that may affect computed returns.

In another study, Adelegan (2009b) investigated the reaction of stock prices of firms listed on the NSE to the announcement of change in top management, with a view to establishing whether or not the Nigerian stock market is informationally efficient in that regard. She employed the traditional event study methodology on a sample of firms listed on the NSE from 1997 to 2005. The study documented a significant positive pre-announcement,

announcement and post-announcement price reaction. Furthermore, negative stock price reaction was recorded for the announcement of resignation of top management; while the concurrent announcement of resignation, retirement and new appointment of top management gave rise to a positive market reaction. The study concluded that top management change in Nigeria is perceived by the market as a positive signal in favour of shareholders' interest.

While the study presents a modest attempt to study market reaction to corporate governance concerns in Nigeria, a number of methodological gaps are glaring. Aside the fact that a proportion of the scope of the study falls within the period when the NSE was not automated, the study failed to correct for thin trading and volatility effects in the return series.

Olowe (2009) examined the effect of the introduction of the Automated Trading System (ATS) in all the trading floors of the NSE on stock prices using the period from December 1986 to December 2006. He utilized the event study approach on a monthly series of trading data obtained from the NSE to compute abnormal returns. He detected the presence of statistically significant negative abnormal return after the introduction of the ATS, and his results were robust to the use of different return models. He considered this finding as consistent with previous studies that the Nigerian stock market is not informationally efficient with respect to a number of corporate events.

The shortcomings of this study include its choice of weekly data to compute returns which magnifies the risk of the simultaneous occurrence of other firm-specific events. Similarly, the study also failed to correct for the effect of thin trading and asset return volatility.

Furthermore, Afego (2010) examined the reaction of stock prices to the announcement of earnings by firms listed on the NSE from 2005 to 2008. To achieve this, he utilized a sample of sixteen firms that made 44 annual earnings announcements. To control for the effect of

dividend, only firms with dividends and earnings announcements in the same direction were included in the final sample. The study used the standard event study approach as its methodology, and the market model was employed to compute daily abnormal returns over the forty-day event window. Results from the study revealed a negative and statistically significant CAR of 9.64%, 1.09% and 3.45% for the twenty days prior to the announcement, the three-day event window and the twenty days after the announcement respectively. He interpreted his findings as consistent with the evidence that poor dissemination of market information may have accounted for the sluggish response of the market. Furthermore, the large price drift prior to the announcement is indicative of the activities of corporate insiders, and not a market response to the information content of the announcement.

The study improved on the methodological loopholes of previous works on stock prices reaction to the announcement of corporate events in Nigeria such as the use of daily stock returns series, and correction for the simultaneous announcements of dividends and earnings. However, the absence of adjustment for the effect of thin trading and the modelling of ARCH effects in the computed returns puts the validity and replicability of the study to question.

In a nutshell, the foregoing review of literature reveals that there are relatively few studies on stock prices reaction to corporate events' announcements in Nigeria. However, there is little or no evidence of a study on the reaction of stock prices to the announcement of equity issues in Nigeria. Furthermore, the studies so far reviewed exhibited a number of methodological weaknesses which cast a lot of doubt on the validity and reliability of their findings. Some of such weaknesses include the use of monthly or weekly market time series data as against daily data, the choice of a scope that is associated with the period before market automation, liberalization and the enactment of a number of positive reforms, the absence of correction for the effect of thin trading; and the failure to model for volatility effects.

2.10 Theoretical Framework

There exist a number of theoretical explanations offered over the last five to six decades by scholars as explanation to the reaction of stock prices to the announcement of equity issues. The most prominent of these theories include the price pressure hypothesis, the leverage hypothesis, the agency theory, the information theory, the company life cycle theory and the soft information hypothesis.

The good investment signaling theory is one of the major forms of the information theory. The theory was part of the Myers-Majluf model which assumes that managers have superior information about the value of assets in place and investment opportunities. Their model was able to prove that increasing the NPV of the investment opportunity reduces the adverse selection problem of new equity issues and invariably reduces the price drop on the announcement date. The model also demonstrated that in extreme situations, very profitable investment opportunities have no adverse selection problem and hence no negative price reaction (Denis, 1994). The model of Ambarish, John and Williams (1987), which is an extension of the Myers-Majluf framework, also predicted a relationship between a firm's growth opportunities and equity issues within an asymmetric information framework and concluded that in equilibrium, the announcement effect of net new equity issues will depend on whether asymmetric information arises mainly as a result of assets in place or from investment opportunities. According to them, announcement effects are negative in the former and positive in the latter. Furthermore, Choe, Masulis and Nanda (1993) extended the Myers-Majluf model to take account of time-varying investment opportunities and predict that equity issues will be clustered around periods of particularly profitable investment opportunities. This is because adverse selection is less severe during such periods and the drop associated with equity issues announcement is drastically reduced.

The fact that firms issue equity to finance positive NPV projects substantially explains equity issues by DMBs in Nigeria. This is because; almost all the banks that raised funds through the issue of fresh equity did so to finance growth and expansion in operations that was induced by the unprecedented growth as a result of the consolidation exercise. Furthermore, the fact that the public offers of all these banks were oversubscribed attests to the fact that prospective investors strongly believed the proposed projects by the banks are valuable and profitable. Thus the theory is considered suitable to underpin the study.

Furthermore, the company life-cycle theory was developed by Black (1998) and is based on the assumption that companies like a human being; develop over time from a young condition to an old one. In general, the theory assumes that all firms pass through growth, mature, and stagnant stages and each of these stages offers unique and distinct profitability and growth opportunities. Firms develop their strategies in line with the dictates of the stage they find themselves in the life cycle. Bender and Ward (2002) documented that a firm's creative or growth stage is dominated by its focus on the development of new products or entry into new markets, and thus it tends to have high growth potential. When the same firm finds itself in the stagnant stage however, it tends to lose its rapid profitability and growth powers. Information relating to a firm's life-cycle stage is contained in its financial statements and is clearly observable by outsiders. Anthony and Ramesh (1992) have found that generally firms in the growth (stagnant) stages of the life-cycle obtain relatively positive (negative) reactions from the stock market.

The company life-cycle theory also partly explains the announcement of equity issues by DMBs in Nigeria because given that consolidation gave all the banks a sort of "rebirth," they appeared to be in their growth stages where the need for introducing new products and entry into new markets became crucial. Thus, the announcement of equity issues by DMBs should be partly or even wholly driven by the zeal by banks to raise money through equity issues in

order to finance their growth opportunities. If such is the case, the reaction of stock prices to equity issues announcements by DMBs in Nigeria should be positive.

Finally, the soft information hypothesis developed by Chemmanur and Jiao (2006) under the assumption of symmetric information framework predicts that in addition to equity issues announcements, investors obtain soft information about the firm through noisy voluntary disclosures. Outsiders may be able to get more information about the firm through their investor relations departments or information processing such as analysts' forecasts or ratings of a firm's stock and other accounting variables. Thus, when sufficiently precise soft information about the firm is realized, overvalued as well as undervalued firms both choose to issue equity. The preciseness of the soft information helps prospective investors to significantly distinguish overvalued firms from undervalued ones, and by implication reduce the information asymmetry facing the firm's decision to issue equity.

The soft information hypothesis is also relevant in explaining the announcement of equity issues by DMBs in Nigeria in that it suggests the convergence of opinion between the management and outside investors about the intrinsic value of the firm and the value of its planned investments. This explains why the investing public wholly agreed with management that the proceeds from the issues will be invested in positive NPV projects as evidenced by the oversubscription of all the issues made to the public within the period of this study.

In a nutshell, the good investment signaling hypothesis, the company life-cycle theory and the soft information hypothesis were adopted as the framework that underpin the study because of the their ability to adequately justify the stock prices reaction around equity issues by DMBs in Nigeria. In the same vein, the study failed to adopt the other theories because of their inability to best explain the supposed relationship between the announcement of equity issues and the behaviour of the stock prices of DMBs in Nigeria.

2.11 Summary

The chapter reviewed a number of empirical studies regarding the reaction of stock prices to the announcement of equity issues. In particular market reaction studies in developed and emerging markets were critically reviewed with the aim of pinpointing areas of weaknesses. Furthermore, the chapter also reviewed studies on insider trading before the announcement of equity issues in developed and emerging markets. In the absence of studies on stock prices reaction to equity issues announcement in Nigeria, the chapter reviewed studies on stock prices reaction to the announcement of other corporate events such as dividend, earnings, and management change announcements. Lastly, the theories upon which the study is anchored were also reviewed under the chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter deals with the design(s) employed by the study and the methods and procedures used in conducting the research work. Furthermore, the population, sample size and sampling technique utilized by the study are also presented under the chapter. Similarly, the sources from which data for the study was collected; and the techniques(s) used analyzing the data collected are also clearly spelt out in this chapter.

3.2 Research Design

This study utilizes the correlational research design. The choice of this design is warranted by the fact that it seeks to establish the existence and nature of relationships, associations and interdependence between variables (Kumar, 2005). The choice of this design is necessary in view of the fact that the objective of the study is to establish the relationship between announcement of equity issues by DMBs and the resultant behavior of stock returns. This design therefore provides the platform that enables the study to establish the direction and magnitude of stock prices reaction by the sample DMBs to the announcement of equity issues in Nigeria.

This study employed the standard event study methodology propounded by Ball and Brown (1968), Fama, Fisher, Jensen and Roll (1969), Brown and Warner (1985), and Mackinlay (1997). The methodology have been found over time to be consistent and valid in measuring the impact of important corporate events such as stock splits, bonus issues, mergers and acquisitions and equity issues announcements (Wooldridge & Snow, 1990; Shaheen, 2006).

In this study, the event is defined as the announcement of an equity issue by a DMB listed on the NSE, and the event date is the day the announcement appeared in the *Business Day,* the *Tribune, the Punch, the Leadership* or the *Daily Trust* newspaper; and the day preceding it (days -1 and 0). The announcement dates were further verified against those contained in the database of the African Financial Markets and the website of the Capital Assets Nigeria Limited. The inclusion of the preceding day is necessary because newspapers usually carry news of events that occurred the preceding day. Thus, it is possible that the market may have traded on the information on the actual day of announcement.

A parameter estimation window of 120 trading days, commencing from day -17 to day -136 was adopted by the study. According to Dyckman, Philbrick and Stephan (1984), Brown and Warner (1985) and Shaheen (2006), a parameter estimation period of 120 days is adequate since daily return data for the 120 days prior to the event can sufficiently formulate a benchmark for normal returns. In line with De Medeiros and Matsumoto (2006), an event window of thirty two trading days, covering fifteen trading days before the announcement, the two-day announcement date and another fifteen trading days after the announcement was utilized by the study.

Although Panayides and Gong (2002) opined that an event window of 11 trading days covering five days before the announcement and five days after it is sufficient to fully capture the effect of an event, the study utilizes a larger event window because emerging markets like Nigeria are generally known to be less efficient than matured markets and thus tend to be more sluggish in reflecting new information in stock prices (Afego, 2010). It is therefore expedient to choose a reasonably large event window to accommodate this speed of adjustment.

3.3 Population of the Study

The population of this study consists of the twenty one DMBs listed under the banking sector of the Nigerian Stock Exchange (NSE) as at 31st December, 2010 (NSE, 2010). The banking sector was chosen because within the scope of this study; the sector accounted for the highest volume of activities on the NSE (Okereke-Onyuike, 2006, 2007, 2008, 2009; Ikhazoboh, 2010). Being the most active sector, a study of the Nigerian banking sector was therefore not out of place.

Thus, considering the number of equity issues announcement by DMBs in Nigeria in the last five years; the need for conducting an empirical study on the resulting stock price reaction becomes more crucial in the banking sector. It is against this backdrop that the study chose the banking sector as its population.

3.4 Sample Size and Sampling Technique

This study utilized all equity issues announcements by DMBs in Nigeria during the period of the study. For an observation to be part of the sample however, the following criteria was set by the study:

(i) Data on daily share prices must be available for the bank over the period of the study.

(ii) The bank's stock must be one of the twenty most actively traded stocks on the NSE classification. The aim was to do away with thinly or infrequently traded stocks, if any.

(iii) The issue under consideration must be common stock.

(iv) Hybrid offers by the same bank at a time were considered as one offer.

(v) No other simultaneous important announcement such as earnings and bonus issues announcement have taken place and contaminated the effect of the event within the event window.

An application of the above criteria resulted in a total observation of fourteen announcements by thirteen DMBs between 2006 and 2010. Thus, the study systematically drew a sample of thirteen DMBs after applying the aforementioned filters.

3.5 Sources and Methods of Data Collection

This study relied solely on data collected from secondary sources. Specifically, the study utilized secondary data relating to the daily stock prices of sample DMBs for the period under study. Similarly, the corresponding NSE daily All Share Index (ASI) was collected for the same period. Both the daily series of stock prices of the sample DMBs and the corresponding NSE ASI were retrieved electronically from the online database of Cashcraft Asset Management Limited.

The daily share price data collected was then be converted to daily continuously compounded stock returns using the formula below as advocated by Strong (1992) Arsiraphongphisit (2008), Brooks (2008) and Adelegan (2009a):

$$R_{i,t} = \ln\left[\frac{P_{i,t} - D_{i,t}}{P_{i,t-1}}\right] \text{ x } 100 \qquad (1)$$

where $R_{i,t}$ is the return on the security of bank i at time t; $P_{i,t}$ is the share price of bank i at time t; $D_{i,t}$ is the dividend received from security i at time t; P_{it-1} is the share price of bank i at time t-1; and ln stands for natural logarithm. Given that the study utilized an event window and estimation window of less than a year, dividends would be constant at zero. The logarithmic transformation of the time series data became necessary in view of the need to

keep the effect of outliers under control. The same approach was also applied to the NSE ASI to create daily compounded market returns as follows:

$$R_{m,t} = \ln\left[\frac{ASI_t}{ASI_{t-1}}\right] \text{ x } 100 \qquad (2)$$

where R_{mt} is the return on the market at time t; ASI_t is the NSE ASI at time t; ASI_{t-1} is the NSE ASI at time t-1; and ln is as defined above. The log daily returns of sample DMBs and those of the NSE ASI were the main variables of the study.

Being an event study, log stock and Index returns were computed over the parameter estimation window of 120 trading days, starting from day -17 to day -136 and the event window of 32 trading days running from day -16 to day +15.

3.6 Techniques of Data Analysis

Analysis of the study begins with establishing the stationarity of computed daily sample DMB return and the return on the market Index. Financial time series data, especially those collected on daily basis are generally believed to be non-stationary (Brooks, 2008; Agung, 2009). This non-stationarity implies the existence of unit root in the data which often gives rise to the occurrence of spurious regressions (De Medeiros & Matsumoto, 2006).

Consequently, the study employed the Augmented Dickey-Fuller test for unit roots (Dickey and Fuller, 1979) to test for the stationarity of the whole 28 sample data series consisting of 14 stock return series and 14 market return series. The estimation was done based on the following model (Brooks, 2008):

$$y_t - y_{t-1} = \Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \varepsilon_t \qquad (3)$$

Where y is a non-stationary series; α_0 and α_1 are parameters to be estimated and ε_t is a random disturbance term. The null hypothesis for the presence of a unit root in the series is rejected if the Dickey Fuller test statistic is less than the critical value at a given apriori alpha level and the alternative hypothesis of a stationary time series is accepted. The reverse is true if the test statistic is greater than the critical value.

Although the daily sample and market returns were computed using the appropriate technique, they are not free from inherent statistical bias due to the effect of thin or infrequent trading. According to Abuzarour (2005) and Sohawon (2006), emerging markets like Nigeria are typically characterised by low liquidity and thin trading. Furthermore, the study by Tijjani, *et al.* (2009) clearly revealed the presence of significant thin trading in the Nigerian stock market, especially the petroleum and banking sectors. Thus, given that the observed index in thinly traded markets does not represent the true underlying index value, there is always a systematic bias towards rejecting the efficient market hypothesis (EMH).

Against this backdrop, this study corrected for the effect of thin trading in the series data. For the sample return series, the sample selection criterion which ensured that only banks whose securities are actively traded within the period of the study are selected eliminates the problem at the sample level. However, there was the apparent need to correct for thin trading in the daily market return series. To achieve this, the study employed the correction procedure introduced by Miller *et al.* (1994). According to them, thin trading correction reduces the negative correlation among returns.

The methodology proposed by Miller *et al.* (1994) suggests that a moving average model (MA) that reflects the actual number of non-trading days should be estimated and then returns

adjusted accordingly. However, given the difficulty in identifying the actual non-trading days, Miller *et al.* (1994) have shown that it is similar to estimating an AR (1) model from which the trading adjustment can be obtained. The model, as advanced by Miller *et al.* (1994), involves estimating the following equation:

$$R_t = \alpha_1 + \alpha_2 R_{t-1} + \varepsilon_t \qquad (4)$$

where R_t is the index return at time t; R_{t-1} is the index return at time t-1; and ε_t is a random disturbance term. Using the residuals from the regression, adjusted returns are estimated as follows:

$$R_t^{adj} = \frac{\varepsilon_t}{(1-\alpha_2)} \qquad (5)$$

Where R_t^{adj} is the return at time t adjusted for thin trading, and ε_t and α_2 are as defined above. The model above assumes that the adjustment for non-trading is constant overtime. While this assumption may hold for highly liquid markets, it may not be true for emerging markets like Nigeria. Consequently, equation (4) was estimated recursively.

In order to capture the abnormal returns in the event window, the study utilized the market model pioneered by Ball and Brown (1968), Fama *et al.* (1969) and Brown and Warner (1985) and Mackinlay (1997). When using the market model, abnormal returns are the difference between the actual stock return and the predicted stock return (the return that would have been earned had the event not occurred) based on Ordinary Least Squares (OLS) estimation that employs market return as the independent variable (Mackinlay, 1997). To

obtain the actual return over the parameter estimation window and the event window, the following linear model was estimated:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (6)$$

where $R_{i,t}$ is the actual return on bank i's security at time t; α_i and β_i are parameters to be estimated; $R_{m,t}$ is the market return at time t; and $\varepsilon_{i,t}$ is bank i's random disturbance term at time t. Assuming a constant beta value, the estimated return for bank i's security can be computed by substituting the estimated values of α_i and β_i over the estimation window in equation (6) above as follows:

$$\overline{E_{i,t}} = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} \quad (7)$$

where $\overline{E_{i,t}}$ is the expected return on bank i's security at time t; $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated parameters based on the estimation window; and $R_{m,t}$ is the market return at time t. The abnormal return is defined as the difference between equation (6) and equation (7) as follows:

$$AR = R_{i,t} - \overline{E_{i,t}} \quad (8)$$

Once the estimated equation has been obtained, the actual return on bank i's security is calculated as follows:

$$R_{i,t} = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} + \varepsilon_{i,t} \quad (9)$$

Since $\overline{E_{i,t}} = \hat{\alpha}_i + \hat{\beta}_i R_{m,t}$ equation (9) simplifies to:

$$R_{i,t} = \overline{E}_{m,t} + \varepsilon_{i,t} \quad (10)$$

This implies that abnormal return for bank i at time t is simply given as:

$$AR_{i,t} = \varepsilon_{i,t} \quad (11)$$

Thus, the abnormal return on the security of a given sample DMB is simply the residual of the OLS after regressing the bank's stock return on the market return. For the residuals to be considered as the abnormal return however, the parameters estimated over the estimation window must be integrated into the equation as shown above.

Although Brown and Warner (1985) have concluded that estimates from OLS using the market model are generally well specified and display no significant mean bias, it has been empirically documented that the OLS estimation fails to adequately capture ARCH effects in returns series. According to De Medeiros and Matsumoto (2006) and Brooks (2008), estimating a model that adequately captures ARCH effects is important because their existence renders the coefficient estimates inefficient and thus produces a downward bias in abnormal returns.

Studies by Bollerslev (1986), Akgiray (1989), and Chiang and Doong (2001) have shown that daily stock returns exhibit variable volatility along time, thus tending to show ARCH effects. Similarly, a recent study by Kalu (2010) concluded that the Nigerian stock market index return exhibits significant volatility and the presence of ARCH innovations. Consequently, this study employed the Engle (1982) test to check for the presence of ARCH effects in the residuals of the market model over the parameter estimation window and the event window.

The Engle (1982) test is a Lagrange Multiplier (LM) test for ARCH in the residuals that estimates the extent to which the magnitude of residuals appear to be related to the magnitude of recent residuals based on the model below:

$$e^2{}_t = \beta_0 + \left(\sum_{s=1}^{q} \beta e^2{}_{t-s} \right) + \upsilon_t \qquad (12)$$

where *e* is the residual. The significance of the t-statistic and the LM-statistic at an apriori alpha level results in the rejection of the null hypothesis of non-presence of ARCH effects in the sample, and vice versa (Agung, 2009). In the event that significant ARCH effects were detected, the OLS market model estimation for the affected sample DMBs was re-estimated using ARCH or GARCH models according to their best fits. When a GARCH (1,1) model is considered, equation (6) is replaced with:

$$\sigma_{i,t}^2 = \alpha_{i0} + \alpha_{i1} u_{i,t-1}^2 + \alpha_{i2} \sigma_{i,t-1}^2 \qquad (13)$$

Equation (13) becomes an ARCH (1) process if $\alpha_{i2} = 0$. To be sure that there are no traces of other forms of heteroskedasticity in the return series, the White (1980) test for heteroskedasticity was also conducted on the return series. Given a linear regression with two variables *x* and *z*, the test statistic is based on the following auxiliary regression:

$$e_{i,t}^2 = \alpha_0 + \alpha_1 x_t + \alpha_2 z_t + \alpha_3 x_t^2 + \alpha_4 z_t^2 + \alpha_5 x_t z_t + \upsilon_t \qquad (14)$$

The decision criteria for white (1980) test are the same with that of Engle (1982) test. Furthermore, the study also employed the Breusch-Godfrey test for serial correlation (Godfrey, 1988) to check for the presence of first order serial correlation in the residuals series. According to Gujarati (2003), serial correlation affects the efficiency of estimated

coefficients in a regression model. The Breusch-Godfrey test also belong to the family of asymptotic models called Lagrange Multipliers, and is estimated based on the following equation (EViews, 2001):

$$e_2 = X_t\gamma + \left(\sum_{s=1}^{p}\alpha_s e_{t-s}\right) + \upsilon_t \qquad (15)$$

where *e* is the residual. Like the other LM tests, this test is also based on a t-statistic and LM statistic. The significance of the t-statistic and the LM statistic at an apriori alpha level indicates the presence of serial correlation in the residuals, and vice versa (EViews, 2001).

Since the hypotheses of the study were tested using the standard t-test, the need to ensure that all assumptions regarding the use of the tool hold became crucial. The standard t-test assumes that individual firms' abnormal returns are normally distributed. Thus, the normality of residuals is necessary to validate t-tests (De Medeiros & Matsumoto, 2006). In the light of this, the study utilized the Jarque-Bera Normality test (Bera & Jarque, 1981) to test for the normality of the abnormal returns. The statistic is computed as follows (EViews, 2001):

$$\text{Jarque-Bera}=\frac{N-k}{6}\left(S^2+\frac{\left(K-3^2\right)}{4}\right) \qquad (16)$$

where *S* is the skewness, *K* is the kurtosis; and *k* is the number of estimated coefficients used to create the series. The null hypothesis of normality is rejected if the Jarque-Bera statistic is significant at an apriori alpha level, and vice versa.

The cummulative abnormal return of bank *i* in the sample for a given period was obtained by summing up the abnormal return in a given period. The procedure is demonstrated by the following formula (Peterson, 1989):

$$\text{CAR}_i\,(t_0,t_1) = \sum_{t=0}^{1} AR_{i,t} = \sum_{t=0}^{1} \varepsilon_{i,t} \qquad (17)$$

where $\text{CAR}_i\,(t_0,t_1)$ is the cummulative abnormal return of bank i from time t_0 to t_1; $AR_{i,t}$ is the abnormal return of bank i at time t; $\varepsilon_{i,t}$ is the residual of bank i at time t. Similarly, the sample average abnormal return at time t is simply the arithmetic mean of n number of stocks, as shown below:

$$\text{AAR}_t = \frac{1}{n}\sum_{i=1}^{n} AR_{i,t} \qquad (18)$$

where AAR_t is the sample average abnormal return at time t; n is the number of observations; and $\text{AAR}_{i,t}$ is the abnormal return of bank i at time t. As a consequence of the foregoing, the cummulative average abnormal return was computed as follows:

$$\text{CAAR}\,(t_0,t_1) = \sum_{t=0}^{1} AAR_t \qquad (19)$$

Where $\text{CAAR}\,(t_0,t_1)$ is the sample cummulative average abnormal return from time t_0 to t_1; and AAR_t is the sample average abnormal return at time t. The null hypotheses of no significant cummulative abnormal return for equity issues announcement fifteen trading days before the announcement, on the announcement date, fifteen trading days after the announcement and over the entire event window was tested using the t-test for the significance of abnormal returns. According to Brown and Warner (1985) and Panayides and Gong (2002), the test statistic is simply the ratio of period t_0 to period t_1 CAR to its estimated standard deviation over the estimation window as shown in the equation below:

$$t(\text{CAR}) = \text{CAR}\,(t_0,t_1) / \left[S\left(AAR_t\right)\right] \qquad (20)$$

where t(CAR) is the test statistic for cummulative abnormal return; $\text{CAR}\,(t_0,t_1)$ is as defined above; $S(AAR_t)$ is the standard deviation of average abnormal return over the parameter estimation window. For the decision criteria, the null hypothesis of no significant abnormal

return is rejected if the computed *t* value is greater than the critical value at a given apriori alpha level and vice versa.

The EViews 4.0 econometrics package was used for all statistical and econometrics tests in this study. The choice of this package among its peers was motivated by its robustness and flexibility in handling financial and time series data (Gujarati, 2003; Agung, 2009).

3.7 Summary

This chapter reviewed the methods employed for conducting the study. It discusses in detail the population and sampling criteria employed by the study, as well as the sources from which data for the study was collected. Similarly the technique of analyzing the data, which was essentially the event study methodology, was also elaborately discussed under this chapter

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter deals with the presentation and analysis of the results of the study. Results from the various diagnostic and specification tests as well as the descriptive statistics of the computed individual sample bank's abnormal return, the sample average abnormal return and the cummulative abnormal return are discussed under this chapter. Furthermore, the chapter also contains results from the test of the various hypotheses formulated in the course of the study and the discussion of the findings revealed by the tests.

4.2 Diagnostic and Specification Tests for Variables

A number of diagnostic and specification tests were conducted with the aim of ensuring the stationarity of the time series data employed by the study and the non-violation of any of the classical assumptions of the linear regression model. Ensuring that all the basic assumptions hold becomes very imperative as the violation of any of such assumptions will severely affect estimations and the inferences to be made thereafter. This is particularly important for a study of this nature which utilized the prediction errors from simple linear regressions as its abnormal returns. Thus, the study conducted stationarity tests for the existence of unit root in the time series data of stock and market returns, thin trading correction in market return series, serial correlation tests for the independence of residuals from first order autocorrelation, ARCH tests for the presence of ARCH effects in residuals, heteroskedasticity test for the presence of other forms of heteroskedasticity and model misspecification; and normality tests for the normal distribution of residuals within the event window.

4.2.1 Stationarity tests for banks' stock returns and market returns

To ensure the stationarity of all the fourteen series of sample banks' stock returns and the corresponding fourteen series of market returns in the event window, the Augmented Dickey-Fuller (ADF) test for unit root was employed. The summary of the results obtained from all the twenty eight series is presented in table 4.1.

Table 4.1 ADF Test for Event Window Variables

Variable	ADF Test Statistic	Order of Integration	Stationary
AccessShareRet	-3.278412**	I(0)	Yes
AccessIndexRet	-4.174949***	I(0)	Yes
DiamondShareRet	-2.461516	N/A	No
D(DiamondShareRet)	-4.177042***	I(1)	Yes
DiamondIndexRet	-3.490789**	I(0)	Yes
FCMBShareRet	-4.662106***	I(0)	Yes
FCMBIndexRet	-3.797890***	I(0)	Yes
FidelityShareRet	-3.396691**	I(0)	Yes
FidelityIndexRet	-3.344776**	I(0)	Yes
FinShareRet	-2.404315	N/A	No
D(FinShareRet)	-4.802149***	I(1)	Yes
FinIndexRet	-3.788340***	I(0)	Yes
FirstShareRet	-3.731313***	I(0)	Yes
FirstIndexRet	-3.545399**	I(0)	Yes
IntercontShareRet	-3.254427**	I(0)	Yes
IntercontIndexRet	-3.695056***	I(0)	Yes
OceanicShareRet	-8.003750***	I(0)	Yes
OceanicIndexRet	-3.785413***	I(0)	Yes
PHBShareRet	-4.182096***	I(0)	Yes
PHBIndexRet	-3.964277***	I(0)	Yes
SkyeShareRet	-4.294944***	I(0)	Yes
SkyeIndexRet	-4.599566***	I(0)	Yes
StanbicShareRet	-2.868387**	I(0)	Yes
StanbicIndexRet	-3.817493***	I(0)	Yes
UBAShareRet	-2.971192***	I(0)	Yes
UBAIndexRet	-3.226517**	I(0)	Yes
Zenith1ShareRet	-6.572307***	I(0)	Yes
Zenith1IndexRet	-3.311231**	I(0)	Yes
Zenith2ShareRet	-3.075461**	I(0)	Yes
Zenith2IndexRet	-3.551309**	I(0)	Yes

Source: Eviews 4.0 output, 2012

*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

NB: All ADF regressions contain an intercept and one lagged difference. D(X) connotes first difference of a variable X

Results from table 4.1 reveal that twelve out of the fourteen series of banks' stock returns were stationary at levels and thus integrated of the order I(0). Contrary to existing evidence that stock returns tend to be stationary (Brooks, 2008), the return series of Diamond and Fin bank were found to be non-stationary as the study failed to reject the hypothesis of the existence of unit root in their returns. However, the null hypothesis was rejected in the return series of the two banks when the test was conducted at first difference, so that their return series were integrated of the order I(1). It can also be seen from the table that the null hypothesis of a unit root in the banks' stock return series was rejected at one percent for Diamond, FCMB, Fin,First, Oceanic, PHB, Skye, UBA, and Zenith1; while it was rejected at the five percent level for Access, Fidelity, Intercont, Stanbic and Zenith2.

On the otherhand, the table also shows that the ADF test conducted on all the fourteen corresponding series of market return did not show any sign of non-stationarity. Thus, the null hypothesis of the existence of unit root was rejected in all the fourteen series of market return, which implies that all the series were integrated of the order I(0). However, the null hypothesis of unit root in the market return was rejected at the one percent level in Access, FCMB, Fin, Intercont, Oceanic, PHB, Skye, and stanbic; while it was rejected at the five percent level in Diamond, Fidelity, First, Uba, Zenith1 and Zenith2 series. The ADF test was also conducted for all the twenty eight time series variables of stock and market returns over the parameter estimation window.

4.2.2 Correction for thin trading in market (index) returns

The study estimated an autoregressive model with one lag [AR(1)] in line with the procedure of correcting for the effects of thin trading in market returns recommended by Miller, *et al.* (1994). Table 4.2 reports the results of the model coefficients and the values of α_2 that was used for the adjustment.

Table 4.2 Coefficients of AR(1) for Event Window Stationary Index Returns

Variable	Coefficients		
	α_1	α_2	$1-\alpha_2$
AccessIndexRet	0.262443	-0.121361	1.121361
DiamondIndexRet	1.185757	0.274946	0.725054
FCMBIndexRet	0.331182	0.019623	0.980377
FidelityIndexRet	0.362046	0.079207	0.920793
FinIndexRet	0.599559	0.087532	0.912468
FirstIndexRet	0.809250	0.071137	0.928863
IntercontIndexRet	0.563073	0.263876	0.736124
OceanicIndexRet	1.190849	0.001636	0.998364
PHBIndexRet	0.408450	-0.025497	1.025497
SkyeIndexRet	0.620053	-0.237186	1.237186
StanbicIndexRet	0.641458	0.156618	0.843382
UBAIndexRet	1.267410	0.003059	0.996941
Zenith1IndexRet	0.268809	0.058847	0.941153
Zenith2IndexRet	0.718700	0.014174	0.985826

Source: Eviews 4.0 output/researcher's computations, 2012

Table 4.2 reports the coefficients from the recursively estimated AR(1) model for all the fourteen time series market returns in the event window. The table shows that all the estimated values of the first coefficient (α_1) were positive and less than one, except for the coefficients of Diamond, Oceanic and UBA index returns. Furthermore, it can also be observed from the table that the α_2 coefficients of Access, PHB and Skye index returns were negative, though less than one. The remaining eleven market return series had positive α_2 values of less than one.

The last column in table 4.2 depicts the results for one minus the value of α_2 for each respective bank's index return. Accordingly, this was the value used to adjust the market index return of each sample bank for thin trading. A close look at the column shows that all the values are positive and less than one, except those of Access, PHB and Skye. The stationary index of each sample banks was multiplied by the value of 1- α_2 to obtain the thin

trading adjusted market return for each of the sample DMBs. The correction for thin trading in market return was also conducted for variables in the parameter estimation window.

4.2.3 Estimation of abnormal returns using the market model

The study estimated simple linear regressions using the market model in the event window. Parameters earlier estimated using the series of bank stock returns and market returns in the parameter estimation window (see appendix VII) were accordingly substituted. Consistent with MacKinlay (1997) the resultant prediction errors (residuals) are the abnormal returns over the event window. Table 4.3 provides a summary of the results from the market model estimated for each sample bank over the event window.

Table 4.3 Results of the Market Model Regression over the Event Window

	Intercept	Coefficient	t-statistic/ z-statistic	F-statistic	R^2	Std. Error	Obs.	Method of Estimation
Access	-242.4729	176.1559	1.1513	1.3253	0.0423	3.2939	32	OLS
Diamond	-0.2516	0.9981	1.1828	1.3990	0.0446	3.7977	32	OLS
FCMB	0.8828	0.2339	0.2457	0.0604	0.0020	3.1651	32	OLS
Fidelity(-1)	3.8819	-7.7593	-1.3552	2.9766**	0.2418	3.5727	32	OLS
Fin	-0.0280	0.1052	0.4777	0.2282	0.0076	3.5104	32	OLS
First(-2)	0.8484	0.2813	1.0590	4.5495**	0.4666	2.8152	32	OLS
Intercont	0.0222	-0.0905	-0.0536	-	-0.0300	3.5231	32	GARCH(1,1)
Oceanic	1.7759	0.3079	0.5765	0.3324	0.0103	5.7509	32	OLS
PHB	2.8184	-1.5751	-0.8383	0.7027	0.0229	5.8382	32	OLS
Skye	0.3825	1.5858	0.9340	0.8723	0.0283	2.7532	32	OLS
Stanbic(-2)	0.6905	-0.2436	-0.5380	10.2673***	0.6638	2.3639	32	OLS
UBA	1.4077	0.2596	0.7098	0.5038	0.0165	5.3618	32	OLS
Zenith1(-1)	1.7044	13.9510	0.8121	2.8773*	0.2356	7.5269	32	OLS
Zenith2	-0.9642	2.7355	4.1955***	10.2668***	0.5238	1.5390	32	OLS

Source; Eviews 4.0 output, 2012

*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

Table 4.3 depicts the results for fourteen regressions of the individual bank stock return series against the respective market return using an observation of thirty two time series data for each. From the table, it can be seen that the explanatory power of the relationship between the variables in most of the regressions (as shown by their respective values of the coefficient of determination) is weak. This implies that the chunk of the variation in the dependent variable is explained by other factors. As undesirable as this may be, the finding is practically harmless to the analysis of the study as the study is only concerned with the part not explained by the estimated regressions (residuals).

Furthermore, the table also reveals statistically insignificant t-statistic and z-statistic values in most of the regressions. Precisely, only the regressions for Fidelity, First, Stanbic Zenith1 and Zenith2 revealed statistically significant results at the one, five and ten percent levels respectively. These results also have no bearing on the analysis of the study as no null hypothesis was tested under any of the fourteen regressions estimated either in the event window or the parameter estimation window.

However, the table revealed also that the event window regressions estimated reported relatively low standard errors on the average, with the highest as approximately 5.88 and the lowest being approximately 1.54. Of the fourteen regressions, thirteen were estimated using OLS while one was estimated using ARCH models.

4.2.4 Autocorrelation tests for serial independence of residuals

The prediction errors of the market model for each sample DMB were subjected to the Breusch-Godfrey test for serial correlation. The test was conducted for first-order serial correlation as its presence can render statistical inferences about abnormal returns invalid. Results for the test are presented in table 4.4.

Table 4.4 Event Window Breusch-Godfrey Test for Serial Correlation in Residuals

Variable	F-Statistic	Breusch-Godfrey LM Test Statistic	Serial Correlation
Access	0.763210	0.820568	No
Diamond	3.07E-06	3.39E-06	No
FCMB	1.085710	1.154792	No
Fidelity	6.296740***	5.724823***	Yes
Fidelity(-1)	0.318358	0.372916	No
Fin	0.002785	0.003073	No
First	8.060354***	7.016118***	Yes
First(-1)	5.000890**	5.000755**	Yes
First(-2)	2.770323	3.192269*	No
Intercont	0.021618	0.023837	No
Oceanic	0.143860	0.157054	No
PHB	0.083065	0.091396	No
Skye	1.403199	1.476896	No
Stanbic	35.95412***	18.25788***	Yes
Stanbic(-1)	6.207745**	5.988574**	Yes
Stanbic(-2)	0.005425	0.006943	No
UBA	0.406135	0.441959	No
Zenith1	8.571133***	7.333136***	Yes
Zenith1(-1)	2.849004	3.054311	No
Zenith2	12.31375***	9.603348***	Yes
Zenith2(-1)	0.001632	0.001934	No

Source: Eviews 4.0 output, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

Table 4.4 shows that there is absence of serial correlation in the event window residuals of nine out of the fourteen banks. The statistical insignificance of both the F-statistic and the Breusch-Godfrey LM statistic in the nine banks resulted in the failure to reject the null hypothesis of the absence of serial correlation in the residuals' series. This implies that the residuals of these banks are serially independent of each other and are therefore valid for statistical inference. These nine banks include Access, Diamond, FCMB, Fin, Intercont, Oceanic, PHB, Skye and UBA.

On the otherhand, the table also revealed the evidence of significant serial correlation in the event window residuals of the remaining five banks. Results from the test as contained in table 4.4 clearly show that the null hypothesis of no serial correlation was rejected for Fidelity, First, Stanbic, Zenith1 and Zenith2 residuals series at the one percent level. Given

that the presence of autocorrelation violates one of the classical assumptions regarding the error term, the study corrected for the presence of serial correlation by including one lag of the independent variable. The re-estimation resulted in the disappearance of serial correlation in the residuals of Fidelity, Zenith1 and Zenith2. However, there was still statistically significant evidence of serial correlation in the residuals of First and Stanbic bank at the five percent level.

Consequently, the model for each of the two banks was further re-estimated using two lags of the independent variable; and that eventually eliminated the problem of serial correlation in the residuals of the two banks. The correction for serial correlation in the residuals of the affected banks implies that the study utilized the residuals at the various levels where no serial correlation was detected. Hence, the initial residuals for Fidelity, Zenith1 and Zenith2 were replaced with those of the one-lag model estimated while those of First and Stanbic were replaced with the residuals of the two-lag models.

For the parameter estimation window, six regressions revealed the presence of serial correlation in their residuals (see appendix VII). After introducing one lag of the independent variable, the traces of serial correlation disappeared in the residuals of Fidelity, Fin, Stanbic and Zenith2, while those of FCMB only disappeared after the introduction of two lags. Lastly, there was evidence of serial correlation in the residuals of Zenith1 even after two lags of the independent variable were introduced. However, the serial correlation in the residuals was eventually eliminated when the model was estimated as AR(1).

4.2.5 ARCH tests for the presence of ARCH effects in Residuals

The ARCH test for the presence of ARCH effects in the market model residuals was conducted using the Engle (1982) test for ARCH effects. Results for the event window ARCH test conducted on the residuals of the fourteen regressions are presented in table 4.5.

Table 4.5 Event Window Engle (1982) Test for ARCH Effects in Residuals

Variable	F-Statistic	Engle's LM Test Statistic	ARCH Effects	Final Model Estimated
Access	0.207348	0.220074	No	OLS
Diamond	0.113306	0.120649	No	OLS
FCMB	1.880911	1.888165	No	OLS
Fidelity(-1)	0.338412	0.357578	No	OLS
Fin	0.642985	0.672420	No	OLS
First(-2)	0.665623	0.695563	No	OLS
Intercont	22.58827***	13.57356***	Yes	OLS
Intercont	0.321077	0.339461	No	GARCH(1,1)
Oceanic	0.040279	0.042823	No	OLS
PHB	0.036795	0.039283	No	OLS
Skye	0.573941	0.601617	No	OLS
Stanbic(-2)	0.273844	0.289991	No	OLS
UBA	0.092303	0.098356	No	OLS
Zenith1(-1)	0.503306	0.528839	No	OLS
Zenith2(-1)	0.266786	0.282585	No	OLS

Source: Eviews 4.0 output, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

From table 4.5, it could be clearly seen that thirteen out of the fourteen sample banks had no traces of ARCH effects in their residuals. The evidence of this assertion comes from the statistical insignificance of both the F-statistic and Engle's LM statistic for the thirteen banks. This therefore implies that the return of these banks did not experience significant volatility over the period of the study. These thirteen banks include Access, Diamond, FCMB, Fidelity, Fin, First, Oceanic, PHB, Skye, Stanbic, UBA, Zenith1 and Zenith2. Thus, since no evidence of ARCH effects was recorded in the residuals of these banks, their original OLS estimations were maintained.

On the otherhand, significant evidence of volatility in the form of ARCH effects was recorded in the residuals of Intercont. This is buttressed by the strong statistical significance of both the F-statistic and the Engle's LM statistic at the one percent level. To correct for this, the original OLS equation for the bank was replaced with ARCH models since the OLS lacks the statistical power to model the effects of volatility in returns. Consequently, the model was re-estimated using ARCH(1) and GARCH(1,1) models; but the results from the GARCH(1,1) model fitted better. A repeat of the Engle (1982) test revealed no traces of ARCH effects in the residuals of Intercont and thus, the resultant residuals replaced the initial OLS residuals of the bank.

In the parameter estimation window however, the results appeared to be completely different as not less than five banks exhibited the presence of ARCH effects in their residuals. For such banks, the same correction procedure as the one applied to Intercont was employed to correct for the volatility effects.

4.2.6 Tests for the presence of other forms of heteroskedasticity

Having passed the ARCH test, the event window residuals of the fourteen sample banks were further subjected to the White (1980) test for heteroskedasticity with a view to confirming whether or not there were other forms of heteroskedasticity. Table 4.6 reports the results from the heteroskedasticity test on the residuals of the fourteen banks in the event window.

Table 4.6 Event Window White (1980) Test for Heteroskedasticity in Residuals

Variable	F-Statistic	White's LM Test Statistic	Heteroskedasticity
Access	2.294852	4.372487	No
Diamond	0.082526	0.181097	No
FCMB	0.154788	0.337994	No
Fidelity(-1)	0.286546	2.059071	No
Fin	0.771090	1.615789	No
First(-2)	0.971571	10.12194	No
Intercont	1.652634	3.274035	No
Oceanic	0.051265	0.112082	No
PHB	0.061446	0.135034	No
Skye	0.722147	1.518099	No
Stanbic(-2)	1.277145	12.10153	No
UBA	0.777591	1.628720	No
Zenith1(-1)	0.320638	2.286544	No
Zenith2(-1)	0.358652	2.536144	No

Source: Eviews 4.0 output, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

Table 4.6 shows that the F-statistic and the White LM statistic for all the residuals of the fourteen banks in the event window are not statistically significant at any level. This means that the study failed to reject the null hypothesis of no heteroskedasticity in the residuals. Thus, the table depicts that there is no evidence of any other form of heteroskedasticity in the regression residuals of all the fourteen sample banks.

Aside the fact that the White (1980) provides evidence on the presence of heteroskedasticity in the residuals of a regression model, it also performs other salient functions. Since the test was designed based on the assumption that error terms are homoscedastic and the linear model is correctly specified, it could serve as a test for general model misspecification (Eviews, 2001). Given the fact that there is no heteroskedasticity in the residuals, it can be confidently argued that the underlying regression models in the event window for the fourteen sample banks are correctly specified.

4.2.7 Tests for the normality of residuals

The last test conducted on the event window regression residuals of the fourteen sample banks was the Jarque-Bera Normality test. The aim of the test was to establish whethter or not the residuals of each of the sample banks are normally distributed. Table 4.7 presents a summary of the results from the test.

Table 4.7 Event Window Jarque-Bera Test for Normality of Residuals

Variable	Jarque-Bera Statistic	Normality
Access	2.011725	Yes
Diamond	0.454738	Yes
FCMB	1.355212	Yes
Fidelity(-1)	0.971249	Yes
Fin	1.357382	Yes
First(-2)	2.253395	Yes
Intercont	1.516302	Yes
Oceanic	5.977506	Yes
PHB	103.200200***	No
Skye	0.518941	Yes
Stanbic(-2)	0.500850	Yes
UBA	146.035600***	No
Zenith1(-1)	376.260600***	No
Zenith2(-1)	21.346360***	No

Source: Eviews 4.0 output, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

It can be seen from table 4.7 that the Jarque-Bera statistic for the residuals of ten out of the fourteen banks could not be rejected, signifying that the null hypothesis of normality in the residuals could not be rejected. This means that the residuals of Access, Diamond, FCMB, Fidelity, Fin, First, Intercont, Oceanic, Skye and Stanbic are normally distributed.

In the case of PHB, UBA, Zenith1 and Zenith2 however, the null hypothesis of normality of residuals was rejected because the Jarque-Bera statistic was statistically significant at the one percent level for all the three sample banks' residuals. This implies that the residuals of the three banks are not normally distributed. It is important to state that the non-normality of only three out of the fourteen residuals cannot significantly affect the distribution of abnormal

returns since the abnormal returns were arrived at by taking the average abnormal return for each day across the sample of banks in the event window. Thus, in line with the Central Limit Theorem; the non-normality of the three sample banks cannot significantly affect the distribution of average abnormal return (De Medeiros and Matsumoto, 2006). Furthermore, the fact that the average abnormal returns were further cummulated over the event window period eliminated any tendency of non-normality in the distribution of cummulative abnormal returns upon which the test of hypotheses was conducted.

4.3 Descriptive Statistics of Abnormal Return and Cummulative Abnormal Return

Having passed all the necessary diagnostic and specification tests, it becomes necessary to examine the descriptive statistics of the abnormal return (residuals) of each of the sample banks, the average abnormal return and the cummulative abnormal return. Consequently, the descriptive statistics of the abnormal return for each of the sample banks was discussed under one sub-heading, and those of average abnormal return and cummulative abnormal return were jointly discussed under another.

4.3.1 Descriptive statistics of individual sample bank's abnormal return

The summary of the descriptive statistics for the abnormal return of each of the sample banks is provided in appendix XIV. A close examination of the descriptive statistics for Access abnormal return reveals a mean daily abnormal return of 0.0000 percent and a standard deviation of 3.2403. The minimum and maximum abnormal return values of -4.8573 percent and 8.5095 percent respectively suggest high variability in the abnormal return over the event window. Furthermore, a positive skewness of 0.5968 indicates that the distribution of abnormal return has a long right tail and is asymmetric; while the positive kurtosis of 2.7099 is an indication of platykurtosis (flatness) in the distribution. However, the Jarque-Bera statistic reveals normality in the distribution.

For Diamond, the average daily abnormal return was also 0.0000 percent while the standard deviation stood at 3.7360. The variability of the changes in abnormal return of a minimum of -9.0746 percent and a maximum of 8.5311 percent for Diamond appeared to be even higher than what was recorded in the case of Access. The table also revealed a negative skewness of -0.01188, indicating that the distribution has a longer left tail. Furthermore, the kurtosis value of 3.5835 suggests that the distribution of abnormal return for Diamond is leptokurtic (peaked). However, the Jarque-Bera statistic depicts evidence of normal distribution in the series.

In the case of FCMB, the daily mean abnormal return was also 0.0000 percent, with a corresponding standard deviation of 3.1136. However, a relatively lower variability of the change in abnormal return was recorded from the minimum and maximum values of -6.0770 percent and 4.2759 percent respectively. On the otherhand, the skewness of -0.2739 and kurtosis of 2.1537 suggests a left long tail and flatness in the distribution respectively. As in the previous cases, the Jarque-Bera statistic portrayed evidence of normality in the abnormal return of the bank.

Furthermore, the descriptive statistics of Fidelity also revealed an average daily abnormal return of 0.0000 percent and a standard deviation of 3.3954. Similarly, significant variability in abnormal return changes was also recorded within the event window as indicated by the minimum and maximum values of -6.1385 percent and 3.3954 percent respectively. The respective skewness and kurtosis values of 0.3862 and 2.6371 are indicative of positive skewness and flatness in the distribution of abnormal returns. This not withstanding however, the Jarque-Bera statistic depicted a normal distribution in the series.

Like the previous cases, the mean daily abnormal return for Fin was also 0.0000 percent and the associated standard deviation was 3.4533. Similarly, there was also high variability in the

changes in abnormal return over the event window as depicted by a minimum value of -9.4894 percent and a maximum value of 6.0592 percent. In the same vein, the skewness of -0.4609 suggests a long left hand tail while the kurtosis of 3.4104 suggests peakedness in the distribution. However, the Jarque-Bera statistic revealed normality in the distribution.

In the case of First, a daily mean abnormal return of 0.0000 percent and a corresponding standard deviation of 2.5782 were recorded. There was also evidence of reasonable variability in abnormal return over the event window as reflected by the minimum and maximum values of -6.1266 percent and 3.3211 percent respectively. Similarly, the distribution was negatively skewed and platykurtic as indicated by the skewness and kurtosis values of -0.6122 and 2.5629 respectively. As expected, the Jarque-Bera statistic exhibited normal distribution in the series.

For Intercont, the mean abnormal return was 0.5659, and a corresponding standard deviation of 3.2373 was recorded. In terms of variability of abnormal returns, the minimum was -5.1814 percent while the maximum abnormal return within the event window was 4.8629 percent. Similarly, the distribution exhibited a negative skewness of -0.2484 and a kurtosis of 2.0564, implying that the distribution of abnormal returns for the bank has a long left tail and a flat surface. However, the series is normally distributed as indicated by the Jarque-Bera statistic.

The descriptive statistics of Oceanic revealed an average event window daily abnormal return of 0.7416 percent and a standard deviation of 3.2002. In the same vein, the variability of changes in abnormal return within the period was between -6.9411 percent and 3.7184 percent. The skewness value of -1.0490 suggests negative skewness, while the kurtosis of 2.7146 is indicative of flatness in the distribution. However, the Jarque-Bera statistic portrayed normality in the distribution of the series.

Furthermore, PHB recorded a mean daily abnormal return of 0.000 percent and an associated standard deviation of 5.7433. The extent of variability in abnormal return for the bank was interestingly high as the minimum was -24.0512 percent and the maximum abnormal return was 5.7955 percent. This shows that the severity of negative abnormal return was unequalled. In terms of skewness, the reported value of -2.2558 suggests long left tail, and the kurtosis of 10.5529 favours leptokurtosis in the distribution. Expectedly, the Jarque-Bera statistic revealed evidence of non-normality in the distribution of the bank's series of abnormal return.

In the case of Skye, the summary shows an average daily abnormal return of 0.000 percent and a standard deviation of 2.7084. Similarly, the extent of variability as measured by the gap between the minimum and maximum abnormal return was -5.9274 percent to 4.3374 percent. The 0.0391 for skewness and 2.381 for kurtosis depict a slight positive skewness towards the right and the platykurtic nature of the distribution of abnormal returns. Thus, the Jarque-Bera statistic suggests normality in the distribution as was the case in most of the previous sample banks' abnormal return series.

Similarly, the mean daily abnormal return for Stanbic was also 0.0000 percent, and the corresponding standard deviation of the abnormal return was 2.1648. Not so much variability in the change in daily abnormal return was relatively experienced by the bank as the minimum abnormal return was -4.9192 percent and the maximum was 5.7068 percent. In terms of skewness and kurtosis, the values of 0.1479 and 3.5368 suggest a right long tail and peakedness of the distribution. However, the Jarque-Bera statistic confirms the normal distribution of the series.

For UBA, the average daily abnormal return was also 0.0000 percent with a standard deviation of 5.2746. Similarly, the variability of between -22.8493 percent and 3.7597

percent in the abnormal return suggests that daily abnormal return within the event window was highly unstable. Furthermore, the value of -2.6791 is indicative of negative skewness in the distribution, while the high kurtosis value of 11.9898 is an evidence of asymmetry and leptokurtosis. This perhaps explains why the Jarque-Bera statistic exhibited highly significant evidence of non-normality in the distribution of the series.

The summary statistics for Zenith1 in the event window showed a mean daily abnormal return of 0.0000 percent with a corresponding standard deviation of 7.1534. Similarly, the bank exhibited the highest variability in daily abnormal return with a minimum of -13.6570 percent and a maximum of 34.4218 percent. This high variability gave rise to a positive skewness of 3.3414 and a whopping kurtosis of 18.4122, indicating significant asymmetry and leptokurtosis in the distribution. Consequently, the null hypothesis of normality in the series was rejected; suggesting that the series is not normally distributed.

Finally, the average daily abnormal return for Zenith2 was 0.000 percent, with a corresponding standard deviation of 1.4626. Furthermore the variability in abnormal return for the bank can be said to be relatively minimal, as evidenced by a minimum of -2.8344 and a maximum of 5.0142. The positive skewness of 1.3448 suggests a right long tail and the kurtosis of 5.9625 is indicative of luptokurtosis. In terms of normality, the Jarque-Bera statistic suggests that the abnormal return series for Zenith2 is not normally distributed.

4.3.2 Descriptive statistics of average abnormal return and cummulative abnormal return

As was earlier discussed, the abnormal return for individual sample firms may not be so informative and as such, the logical thing to do was to take the average of daily abnormal return across sample banks over the event window. The resultant figure becomes the average daily abnormal return over the sample window. Furthermore, it also becomes imperative to

aggregate the average abnormal return across the event period to arrive at daily cummulative abnormal return. Hence, table 4.8 presents the average abnormal return and the cummulative abnormal return for the entire sample over the event window.

Table 4.8 Sample Average Abnormal Return and Cummulative Abnormal Return

DAY	AR (%)	CAR (%)	DAY	AR (%)	CAR (%)
-16	0.5880	0.5880	+1	-0.1913	2.3741
-15	0.0047	0.5927	+2	1.9472	4.3213
-14	-0.2357	0.3570	+3	0.8927	5.2140
-13	-1.2057	-0.8487	+4	0.5352	5.7492
-12	0.2186	-0.6300	+5	-0.4683	5.2809
-11	0.3721	-0.2579	+6	0.6514	5.9323
-10	0.4774	0.2195	+7	1.4667	7.3990
-9	-2.3556	-2.1362	+8	-1.5291	5.8699
-8	1.6006	-0.5356	+9	-0.7787	5.0912
-7	0.1743	-0.3613	+10	-1.0038	4.0874
-6	1.1320	0.7708	+11	0.6900	4.7774
-5	-1.7551	-0.9843	+12	-0.1882	4.5892
-4	-0.2746	-1.2589	+13	1.0276	5.6168
-3	0.9975	-0.2614	+14	-1.8598	3.7570
-2	4.6216	4.3603	+15	-0.7685	2.9885
-1	**-1.5875**	**2.7727**			
0	**-0.2074**	**2.5653**			

Source: Researcher's Computations, 2012

The generation of cummulative abnormal return is particularly important as it was the series employed to test the hypotheses of the study. Given the importance of average and cummulative abnormal returns, it therefore became imperative to present the elaboration of their descriptive statistics. Table 4.9 presents a summary of the descriptive statistics for the average abnormal return and cummulative abnormal return in table 4.8.

Table 4.9 Descriptive Statistics of Average Abnormal Return and Cummulative Abnormal Return

	AR	CAR
Mean	0.093384	2.437506
Maximum	4.621600	7.399000
Minimum	-2.355600	-2.136200

Std. Dev.	1.353148	2.731798
Skewness	0.879221	0.008291
Kurtosis	5.234405	1.593305
Jarque-Bera	10.779580	2.638755
Probability	0.004563	0.267302
Observations	32	32

Source: Eviews 4.0 Output, 2012

From table 4.8, it can be seen that the average daily event window abnormal return is 0.0934 percent and the standard deviation is 1.3531. An interesting discovery is the fact that the averaging of individual sample banks' abnormal return has led to a significant decline in the standard deviation of average daily abnormal return over the event window. Similarly, the wide variability of change in abnormal return was also substantially reduced to a reasonable minimum of -2.3553 percent and a maximum of 4.6216 percent. Similarly, the skewness value of 0.8792 indicated only a slight deviation from normal skewness to the right. On the otherhand, the kurtosis of 5.2344 is an indication of the leptokurtic nature of the distribution. Surprisingly however, the Jarque-Bera statistic exhibited significant non-normality in the average abnormal return series. It is important to emphasize that the absence of normal distribution in the average abnormal return series is practically harmless as the test of hypothesis was conducted on cummulative abnormal return and not average abnormal return.

On the otherhand, the mean daily cummulative abnormal return within the event window was 2.4375 percent, with a corresponding standard deviation of 2.7318. Although the standard deviation of the cummulative abnormal return was slightly higher than that of the average abnormal return series, it is justified by the increased average abnormal return. In the same vein, the minimum cummulative abnormal return of -2.1362 percent and the maximum of 7.3990 percent pointed towards a relatively higher variability in cummulative abnormal

return relative to average abnormal return. In terms of skewness, the cummulative abnormal series exhibited an almost normally skewed value of 0.0083 which was far better than the skewness of average abnormal return. Contrary to the statistics of average abnormal return, the cummulative abnormal return series revealed a kurtosis value of 1.5933 which suggests the evidence of flatness in the distribution. Lastly and most importantly, the Jarque-Bera statistic provided strong evidence of the normality of the cummulative abnormal return series. Thus, the fact that the cummulative abnormal return series is normally distributed made it very safe to conduct the test of hypotheses and report the results without any fear of reporting spurious results or drawing misleading inferences therefrom.

4.4 Test of Hypotheses

The hypotheses of the study were tested using the t-test for the significance of abnormal return over four periods. In each of the cases, the t-statistic sought to establish whether the cummulative abnormal return over the period of interest is significantly different from zero. Thus, the four periods that made up the four hypotheses over which the significance of cummulative abnormal return was tested include fifteen trading days before the announcement date of equity issues, the announcement date itself, fifteen trading days after the announcement, and thirty trading days around the announcement date.

4.4.1 Significance of cummulative abnormal return before the announcement date of equity issues by DMBs in Nigeria

Test of hypothesis was conducted on the statistical significance of the fifteen trading days' cummulative abnormal return before the announcement of equity issues. Table 4.10 presents

the abnormal return and cummulative abnormal return fifteen trading days before the announcement of equity issues.

Table 4.10 Abnormal Return and Cummulative Abnormal Return Before the Announcement Date

DAY	AR	CAR
-16	0.5880	0.5880
-15	0.0047	0.5927
-14	-0.2357	0.3570
-13	-1.2057	-0.8487
-12	0.2186	-0.6300
-11	0.3721	-0.2579
-10	0.4774	0.2195
-9	-2.3556	-2.1362
-8	1.6006	-0.5356
-7	0.1743	-0.3613
-6	1.1320	0.7708
-5	-1.7551	-0.9843
-4	-0.2746	-1.2589
-3	0.9975	-0.2614
-2	4.6216	4.3603

Source: Eviews 4.0 Output/Researcher's Computations, 2012

The test of hypothesis one of the study was based on the cummulative abnormal return in table 4.10. The t-test was employed to test the statistical significance of cummulative abnormal return fifteen trading days before the announcement of equity issues by sample DMBs. Table 4.11 presents the results from the test of hypothesis one.

Table 4.11 Results for the Test of Hypothesis One

Details	Values
Cummulative Abnormal Return (-16, -2)	4.3603
Estimation Window Standard Deviation Of Average Abnormal Return	1.1091
Degrees of Freedom (N – 1)	14
t – Statistic	3.9315**

Source: Eviews 4.0 Output/Researcher's Computations, 2012

*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

It can be seen from table 4.11 that the null hypothesis of no significant cummulative abnormal return before the date of equity issues announcement was tested over the period running from day -16 to day -2. The table also revealed that the cummulative abnormal return over the period if interest is 4.3603 percent and the standard deviation of average abnormal return over the parameter estimation window is 1.1091. Under the assumption of normal distribution, the t-statistic follows a t-distribution with N – 1 degrees of freedom, and this equals fourteen degrees of freedom (15 – 1) for hypothesis one. From the table, the reported t-statistic of 3.9315 is greater than the critical values of 2.1448 and 1.7613 under the one and five percent levels of significance.

The results therefore suggested the rejection of the null hypothesis that stock prices of DMBs in Nigeria do not exhibit significant cumulative abnormal return fifteen trading days before the announcement date of equity issues. This implies that there is significant cummulative abnormal return of 4.3603 percent fifteen trading days before the announcement of equity issues by DMBs in Nigeria.

4.4.2 Significance of cummulative abnormal return on the announcement date of equity issues by DMBs in Nigeria

The study also tested the statistical significance of the two-day announcement date of equity issues by DMBs in Nigeria using the t-test for the significance of abnormal return. The two-day announcement date abnormal return and cummulative abnormal return are reported in table 4.12.

Table 4.12 Abnormal Return and Cummulative Abnormal Return on the Announcement Date

DAY	AR	CAR
-1	0.5880	0.5880
0	0.0047	0.5927

Source: Eviews 4.0 Output/Researcher's Computations, 2012

The t-test was also employed to establish the statistical significance of the two-day announcement date using the cummulative abnormal return reported in table 4.12. The two-day announcement date runs from day -1 to day 0 in the event window. The results for the test of hypothesis two, which sought to test the significance of announcement date cummulative abnormal return are reported in table 4.13

Table 4.13 Results for the Test of Hypothesis Two

Details	Values
Cummulative Abnormal Return (-1, 0)	-0.3986
Estimation Window Standard Deviation Of Average Abnormal Return	1.1091
Degrees of Freedom (N – 1)	1
t – Statistic	-0.3594

Source: Eviews 4.0 Output/Researcher's Computations, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

Table 4.13 depicts a cummulative announcement date abnormal return of -0.3986 percent over the two-day window, while the parameter estimation window standard deviation still remained 1.1091. Furthermore, the degree of freedom for the window of interest was one, and the computed t-statistic was -0.3594.

Since the value of the computed test statistic was less than the critical values of 31.8205 and 6.3138 at the one and five percent levels of significance respectively, the study failed to reject the null hypothesis which states that stock prices of DMBs in Nigeria do not exhibit significant cumulative abnormal return on the announcement date of equity issues. This result implies that the two-day cummulative abnormal return of -0.3986 is not significantly different from zero at both the one and five percent levels.

4.4.3 Significance of cummulative abnormal return after the announcement date of equity issues by DMBs in Nigeria

Another hypothesis tested by the study was that of the significance of cummulative abnormal return after the announcement of equity issues by DMBs in Nigeria. Thus, hypothesis three sought to test the statistical significance of cummulative abnormal return fifteen trading days after the announcement date of equity issues by DMBs in Nigeria. The abnormal return and corresponding cummulative abnormal return over the fifteen-day event window are presented in table 4.14.

Table 4.14 Abnormal Return and Cummulative Abnormal Return After the Announcement Date

DAY	AR	CAR
1	-0.1913	-0.1913
2	1.9472	1.7560
3	0.8927	2.6487
4	0.5352	3.1839
5	-0.4683	2.7155
6	0.6514	3.3670
7	1.4667	4.8336
8	-1.5291	3.3045
9	-0.7787	2.5258
10	-1.0038	1.5221
11	0.6900	2.2121
12	-0.1882	2.0238
13	1.0276	3.0515
14	-1.8598	1.1917
15	-0.7685	0.4232

Source: Eviews 4.0 Output/Researcher's Computations, 2012

The test of hypothesis three was based on the cummulative abnormal return reported in table 4.14. In the same vein, the t-test was also employed to test the statistical significance of cummulative abnormal return fifteen trading days after the announcement date of equity issues by DMBs. Results from the test of hypothesis three are presented in table 4.15.

Table 4.15 Results for the Test of Hypothesis Three

Details	Values
Cummulative Abnormal Return (+1, +15)	0.4232
Estimation Window Standard Deviation Of Average Abnormal Return	1.1091
Degrees of Freedom (N – 1)	14
t – Statistic	0.3816

Source: Eviews 4.0 Output/Researcher's Computations, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

From table 4.15, it can be seen that the fifteen trading days' cummulative abnormal return spanning the period from day one to day fifteen after the announcement date is 0.4232 percent. Similarly, the estimation window standard deviation of average abnormal return is still 0.1091, while the degrees of freedom under the t-distribution for the window is fourteen. Most importantly, the table reported a computed t-value of 0.3816 over the fifteen-day period. The reported t-statistic was less than the critical values of 2.6245 and 1.7613 at the one and five percent levels respectively.

The fact that the computed value of the t-statistic is less than the apriori critical values means that the null hypothesis which states that stock prices of DMBs in Nigeria do not exhibit significant cumulative abnormal return fifteen trading days after the announcement date of equity issues could not be rejected. This therefore implies that the cummulative abnormal return of 0.4232 percent for the period from day plus one to day plus fifteen is not significantly different from zero at the one and five percent levels.

4.4.4 Significance of cummulative abnormal return over the event window of equity issues announcement by DMBs in Nigeria

The last hypothesis tested by the study relates to the statistical significance of the mean cummulative abnormal return over the entire event window. Thus, the cummulative abnormal

return employed for the test of hypothesis four is reported in table 4.8. Accordingly, results from the test of the hypothesis are reported in table 4.16

Table 4.16 Results for the Test of Hypothesis Four

Details	Values
Mean Cummulative Abnormal Return (-16, +15)	2.4375
Estimation Window Standard Deviation of Average Abnormal Return	1.1091
Degrees of Freedom (N – 1)	31
t – Statistic	2.1978**

Source: Eviews 4.0 Output/Researcher's Computations, 2012
*,**and*** imply significance at the 10%, 5% and 1% levels respectively.

Table 4.16 reveals a mean cummulative abnormal return of 2.4375 percent over the thirty two-day event window period and an estimation window standard deviation of 1.1091. Under the assumption of normality, the event window has thirty one degrees of freedom. The table further revealed a computed t-statistic of 2.1978 which is less than the critical value of 2.4573 at one percent, but greater than the value of 1.6973 at the five percent significance level.

Since the value of the computed t-statistic is greater than the critical value at five percent level of significance, the study rejected the null hypothesis that stock prices of DMBs in Nigeria do not exhibit significant cumulative abnormal return over the thirty two trading days' event window of equity issues announcement. This implies that the mean positive cummulative abnormal return of 2.4375 percent over the thirty two days' event window running from day -16 to day +15 is significantly different from zero.

4.5 Discussion of Findings

Results from the test of hypotheses conducted have yielded a number of interesting findings. First and foremost, the study revealed the presence of a statistically significant cummulative abnormal return of 4.3603 percent fifteen trading days before the announcement of equity issues by DMBs in Nigeria. The evidence of abnormal return before the official

announcement date suggests that the Nigerian banking sector is not semi-strong form efficient with respect to the announcement of equity issues. Similarly, the presence of abnormal return within the period clearly indicates that there was leakage of the information by corporate insiders. Thus, the observed cummulative abnormal return was as a result of trading by privileged corporate insiders on the information before its official announcement. Conversely, the positive abnormal return could be as a result of the positive price run-ups that precede equity issues reported in other studies.

Furthermore, the fact that the observed cummulative abnormal return over the period is positive suggests that managers of these banks and other corporate insiders assessed the announcement of equity issues during the period as good information. It was therefore this belief that resulted in the positive signal sent to the market in the form of increased return on their stocks.

Although there is, to the best of the researcher's knowledge, no evidence of the existence of a study of this nature in Nigeria; the finding is consistent with those of Shahid *et al.* (2010) who found positive and statistically significant average abnormal return prior to equity issues announcement on the Shanghai and Shenzhen stock Exchanges. However, it contradicts the findings of developed market studies such as Barclay and Litzenberger (1988) who found small but statistically significant drop in average stock prices one hour prior to the announcement of equity issues on the NYSE/AMEX; and Lee and Karpoff (1991), Kahle (1995) and Gombola *et al.* (1999) who variously found evidence of increases in insider sales prior to equity issues announcements on the NYSE/AMEX. For emerging markets, the study by Bhattacharya *et al.* (2000) found no evidence of abnormal return prior to equity issues announcement on the Mexican Stock Exchange, while De Medeiros and Matsumoto (2006)

reported significant abnormal return three weeks to the announcement of equity issues using data from the Brazilian Stock Exchange.

Secondly, the study also established the presence of a negative but statistically insignificant cummulative abnormal return of -0.3986 percent on the announcement date of equity issues by DMBs in Nigeria. The presence of abnormal return on the announcement date also signifies the semi-strong form inefficiency of the Nigerian banking sector with respect to the announcement of equity issues. Similarly, the negative cummulative abnormal return suggests that contrary to the perception of managers and corporate insiders; market participants assessed the information of new equity issues by DMBs as a negative signal about the future prospects of the announcing bank.

The finding of negative cummulative abnormal return over the two-day announcement window is consistent with the mature market studies of Asquith and Mullins (1986), Dierkens (1991) and Jain (1992) who variously established the presence of significant negative abnormal on the announcement date of equity issues using the NYSE/AMEX data. Similarly, Jeanneret (2003) also found that the announcement date of equity issues on the French stock market was associated with negative abnormal return over the three-day interval. However, Hertzel *et al.* (2002) found evidence of positive and statistically significant abnormal return on private placement in the U.S. stock market.

On the otherhand, emerging market studies such as Bhana (1998), Castillo (2004), De Medeiros and Matsumoto (2005) and Bayer (2008) variously established evidence of significant negative abnormal return using data from the Johannesburg, Chilean, Brazilian and Istanbul Stock Exchanges respectively. However, Wu *et al.* (2005) established the presence of positive and significant announcement date cummulative abnormal return on the three-day interval for private and public placements on the Hong Kong Stock Exchange,

while Shahid *et al.* (2010) found negative but statistically insignificant average abnormal return on the announcement date of right issues but significant negative abnormal return for the announcement of public issues on the Shanghai and Shenzen Stock Exchanges.

Thirdly, the study also found evidence of positive but statistically insignificant cummulative abnormal return of 0.4232 percent fifteen trading days after the announcement of equity issues by DMBs in Nigeria. The presence of abnormal return several days after the announcement of equity issues further attests to the inefficiency of the Nigerian banking sector with respect to equity issues announcements. Thus, this finding implies that it is possible to profitably trade on the information even fifteen days after it has become public. Furthermore, the fact that cummulative abnormal return did not disappear fifteen trading days after the announcement date indicates the sluggish nature of stock prices adjustment to equity issues announcement in the Nigerian banking sector.

The presence of positive cummulative abnormal return after the announcement date of equity issues is consistent with the findings of Wu *et al.* (2005) who found positive and statistically significant cummulative abnormal return three days after the announcement of private and public placements on the Hong Kong Stock Exchange. However, the finding is inconsistent with those of Bhana (1998) who found the persistence of negative abnormal return up to one month after the announcement of equity issues on the JSE and De Medeiros and Matsumoto (2005) who also found the evidence of price drop fifteen days after the announcement of equity issues in Brazil.

Lastly, the study also established evidence of the existence of a positive average cummulative abnormal return of 2.4375 percent over the thirty two-day event window of equity issues announcements by DMBs in Nigeria. The existence of abnormal return is a general pointer towards the semi-strong form inefficiency of the Nigerian banking sector with respect to the

announcement of equity issues. This finding implies that an investor who buys and holds the stock of a bank that announced its decision to issue new equity fifteen trading days before the announcement and another fifteen trading days after it would have, on the average, earned 2.4375 percent return over the period.

This finding is consistent with that of Wu *et al.* (2005) who documented positive and significant average cummulative abnormal return around private and public placements in Hong Kong. However, it negates the studies of Dierkens (1991), Chiou, *et al.* (2009) who variously used the NYSE/AMEX data to establish evidence of negative abnormal return around the announcement period and De Medeiros and Matsumoto (2005) who found also found negative and significant average cummulative abnormal return around the announcement of equity issues in Brazil.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study analysed the reaction of stock prices to the announcement of equity issues by DMBs listed on the Nigerian Stock Exchange. The first chapter of the work, which is introductory in nature, provides a background on the importance of information to the efficient functioning of capital markets and the need for capital markets to rapidly impound value-relevant information into stock prices. Similarly, the background also discussed the importance of the banking sector to the Nigerian economy and the need for stock prices of listed banks in Nigeria to react to an important capital structure decision such as equity issues announcement. Furthermore, the statement of the problem which essentially centred on the absence of empirical studies on the reaction of stock prices to equity issues announcements in Nigeria was also captured under this chapter. In the same vein, the salient issues of the research questions raised by the study, the objectives it hopes to achieve and the hypotheses formulated in the null form for testing in the course of the study were also discussed under the chapter. The chapter also contained the significance of the study, its scope of coverage and the limitations encountered in the course of the study. The last sub-heading under the chapter presented a list of the technical terms that require definition with a view to enhancing the better understanding of such concepts.

Chapter two of the study which is referred to as literature review and theoretical framework presented a review of concepts and variables related to the study. The chapter reviewed literature on the concept of market efficiency, its forms and empirically documented anomalies. Furthermore, previous works relating to the concept of equity issues, its forms, motives for the issue of equity and the behaviour of stock prices around the announcement of equity issues were modestly reviewed. Similarly, a review of empirical studies on the market

reaction to equity issues announcements in developed/mature and emerging markets was extensively undertaken under this chapter; and this was followed by the review of the existing evidence on equity issues and insider trading in developed and emerging markets. The chapter also presented the trend of equity issues in the Nigerian banking sector over the period of the study and the few studies on stock prices reaction to corporate events' announcements in Nigeria. The chapter concluded with the discussion of the various theoretical explanations relating to the announcement of equity issues by firms, out of which the study adopted those hypothetical/theoretical explanations that best underpin the study.

The third chapter of the study dwelt on the methodology employed by the study. Under this chapter the design of the study, which is correlational in nature, was discussed. In the same vein the population of the study, which essentially consisted of all the twenty one DMBs listed on the NSE as at the end of 2010 was also discussed under this chapter. Furthermore, the chapter also contains the sampling technique employed by the study which required a bank to fulfil a number of stated criteria before it is considered part of the final sample. The source of data, which was basically secondary, was also discussed at length in this chapter. The final sub-heading of the chapter dealt with the technique of data analysis which among other things included the design of the event study employed by the research and the series of diagnostic and specification tests conducted to ensure that the data is as much as possible free from any statistical bias.

The fourth chapter of the study is concerned with presentation and analysis of the data utilized by the study. The first sub-section in the chapter presented results from the series of diagnostic and specification tests such as the ADF, thin trading correction, Breusch-Godfrey serial correlation test, Engle (1982) test for ARCH effects, White (1980) test for heteroskedasticity and Jarque-Bera normality test. Furthermore, the chapter also presented

and analysed the results from the various regressions in the event window that gave rise to the individual sample bank abnormal return; and the descriptive statistics of the individual bank abnormal return. Having aggregated individual bank abnormal return across the sample, the study further presented an analysis of the sample average abnormal return and cummulative abnormal return over the event window. Importantly, the chapter also presented results from the test of the four hypotheses initially formulated, and the results revealed the presence of positive and significant abnormal return fifteen trading days before the announcement of equity issues by DMBs in Nigeria. This finding implies the semi-strong form inefficiency of the Nigerian banking sector with respect to equity issues announcement as well as the presence of insider trading before the official announcement of equity issues. Another important finding was that of the evidence of negative but statistically insignificant cummulative abnormal return on the announcement date of equity issues by DMBs in Nigeria. This finding attests further to the inefficiency of the Nigerian banking sector with respect to equity issues announcement. In the same vein, positive but statistically insignificant cummulative abnormal return was recorded over the fifteen trading days after the announcement of equity issues. Finally, the study documented a positive and statistically significant average cummulative abnormal return over the event window.

5.2 Conclusion

This study was conducted to empirically establish the reaction of stock prices around the announcement of equity issues by DMBs in Nigeria. Consequent upon the findings of the study, the following conclusions are drawn. First and foremost, the presence of significant cummulative abnormal return before the announcement of equity issues by DMBs in Nigeria is evidence of trading by managers and other corporate insiders on the information before its official announcement. Similarly, the observed positive cumulative abnormal return is explained by the belief by managers and other corporate insiders that the proceeds from the

issues will be invested in projects that will yield positive NPV in the future, consistent with the good investment signalling hypothesis. In the same vein, the fact that managers and insiders believe that these issuing banks are in the growth stage of their life cycle where the prospects for rapid growth in the form of valuable investments are very high also adequately explains the observed cummulative abnormal return.

Secondly, the presence of negative cummulative abnormal return on the announcement date is consistent with the evidence that the market, in stark contrast to insiders, initially assessed the announcements as a signal that the banks have poor future cashflow expectations and as such the expected cashflow cannot entirely finance their projects. Even though the observed cummulative abnormal return on the announcement of equity issues is not statistically significant, it is economically and practically important to understanding the behaviour of stock prices around equity issues announcements by DMBs in Nigeria. Thus, the initial market response at the announcement of equity issues resulted in decline in the stock prices of the announcing banks. Contrary to the apriori expectation of the study, the announcement date abnormal return is explained by the cash flow signalling hypothesis rather than the good investment signalling hypothesis.

Furthermore, the presence of positive cummulative abnormal return after the announcement date suggests that the market later corrected and realigned its assessment of the information content of equity issues announcement with that of corporate insiders. Thus, the evidence of positive cummulative abnormal return up to fifteen trading days after the announcement is an indication of the sluggish nature of price adjustment to the announcement of equity issues. This sluggish nature of adjustment is an indication of semi-strong form inefficiency as investors could earn excess return by trading on the information even after it has become public. The sudden change of cummulative abnormal return from negative on the announcement date to positive fifteen days after is best explained by the fact that investors

got hold of soft information that enabled them to reassess their value of the issuing banks. Also, the positive cummulative abnormal return observed over the period is consistent with the good investment signalling explanation and the life cycle hypothesis in that the issuing DMBs were assessed by investors to have good projects and to be in their growth stages where growth prospects in the form of product development and new market entry are very high.

Lastly, the evidence of significant positive average cummulative abnormal return over the study's event window is consistent with the notion of semi-strong form inefficiency of the Nigerian banking sector as regards the announcement of equity issues. The observed positive cummulative abnormal return is also better explained by the fact that the issuing DMBs intend to invest in viable projects. In the same vein, investors also assessed the issuing DMBs to be in the growth stages of their life cycle, which implies the pursuance of growth opportunities in the form of product development and entry into new markets. On the whole, the announcement of equity issues by DMBs in Nigeria generated positive cummulative abnormal return, and this observed inefficiency emanates from the Nigerian stock market rather than the banking sector itself.

5.3 Recommendations

Following from the findings and conclusions, the study makes the following recommendations with a view to enhancing the market value of DMBs in Nigeria around periods of equity issues announcements.

(i) There is the cogent need for the policy makers of the Nigerian capital market such as the NSE and the SEC to put in place enabling laws that will compel corporate insiders to report details of their transactions such as the volume sold and the price at which it was sold to the regulatory authorities not later than forty eight hours after the

execution of such transactions on the Nigerian stock market. This will in no small measure help the Nigerian capital market regulators tame the incidence of insider trading before the announcement of equity issues, which adversely affects the efficiency of the market.

(ii) Similarly, it is also recommended that the Nigerian capital market regulators need to maintain a functional and up-to-date information dissemination mechanism on daily basis such as the setting up of a dedicated Nigerian capital market journal in both print and electronic form that will be reporting important and value-relevant information on firms listed in the market. This will no doubt reduce the asymmetry between managers and market participants on the announcement date and conversely ensure the accurate and consensus assessment of information releases by corporate insiders and other market participants.

(iii) There is also the need for the Nigerian capital market regulators, especially the NSE to improve the technical and operational efficiency of the market by deploying the technology that ensures prompt and timely execution of transactions instantly as this will lead to the rapid adjustment of prices to information releases in the market within the shortest time after the announcement of equity issues.

(iv) Finally, there is also the need for the regulators in the Nigerian capital market to ensure that the execution of equity issues is done within the framework of transparency, accuracy and timeliness as unnecessary delays associated with allotment and other processes unnecessarily and inadvertently contributes to the persistence of abnormal return observed around the period of equity issues announcement by DMBs in Nigeria. Similarly, there is also the need to ensure that the process is devoid of manipulations by any individual or group for the purpose of gaining undue advantage.

This is important because a well-developed communication framework that elaborates the purpose of an equity issue helps to mitigate the level of information asymmetry around the announcement period.

5.4 Suggestions for Further Research

This study assessed the reaction of stock prices to the announcement of equity issues by DMBs in Nigeria. While the study made a modest attempt to study the reaction of stock prices to the announcement of equity issues by the biggest sector listed on the NSE in terms of the volume of activities, it is by no means all encompassing. First and foremost, there is the need in the future to assess the reaction of all the firms listed on the NSE to equity issues announcement as the findings of such a study will provide more general basis for understanding the reaction of the Nigerian stock market to the announcement of equity issues.

Furthermore, in view of the fact that a number of empirical studies, especially on developed markets have documented evidence of poor performance in the two to five years following equity issues; there is also the need to undertake a long run study with a view to investigating the behaviour of abnormal return for Nigerian firms over a long time period as opposed to the short run analysis undertaken by this study. In view of the difficulties associated with data collection in Nigeria, a long run period of between two to three years may be sufficient for the Nigerian stock market.

Finally, in the event that the observed announcement date abnormal return (if any) from either the sample of all listed firms in Nigeria or the long run study turned out to be statistically significant, there is also the need to cross-sectionally regress the significant abnormal return on a number of price and balance sheet variables to test the impact of the issue on the overall performance of the issuing firms.

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Appendix I: DMBs Listed on the NSE as at 31st December 2010

Table1: Banks Listed on the NSE as at 31st December 2010 and their Authorised and Paid-up Share Capital

S/N	Bank Name	Authorised Share Capital (N)	Paid-up Share Capital (N)
1	ACCESS BANK PLC	9,000,000,000	8,131,024,189
2	AFRIBANK NIGERIA PLC	7,500,000,000	6,788,000,000
3	BANK PHB PLC	11,000,000,000	10,052,497,000
4	DIAMOND BANK PLC	10,000,000,000	7,237,621,553
5	ECOBANK NIGERIA PLC	15,000,000,000	3,609,038,000
6	FIDELITY BANK PLC	16,000,000,000	14,481,293,000
7	FINBANK PLC	12,500,000,000	8,606,245,178
8	FIRST BANK OF NIGERIA PLC	15,000,000,000	14,504,000,000
9	FIRST CITY MONUMENT BANK PLC	10,000,000,000	8,135,596,000
10	GUARANTY TRUST BANK PLC	15,000,000,000	9,326,875,000
11	INTERCONTINENTAL BANK PLC	12,250,000,000	9,453,342,460
12	OCEANIC BANK INTERNATIONAL PLC	12,000,000,000	11,110,685,000
13	SKYE BANK PLC	12,500,000,000	5,792,000,000
14	SPRING BANK PLC	23,000,000,000	5,660,572,000
15	STANBIC IBTC BANK PLC	10,000,000,000	9,375,000,000
16	STERLING BANK PLC	12,000,000,000	6,281,545,000
17	UNION BANK OF NIGERIA PLC	10,000,000,000	5,790,000,000
18	UNITED BANK FOR AFRICA PLC	17,500,000,000	10,778,231,231
19	UNITY BANK PLC	30,000,000,000	7,976,047,000
20	WEMA BANK PLC	10,000,000,000	5,034,971,587
21	ZENITH BANK PLC	20,000,000,000	12,559,000,000

Source: NSE Fact Book, 2010/2011

Appendix II: DMBs that Issued Equity Between 2006 and 2010

Table2: Equity Issues Announcement by Banks in Nigeria between from 2006-2010

S/N	Bank Name	Date of Announcement	Method of Issue
1	ZENITH BANK PLC	16-01-2006	Public offer
2	INTERCONTINENTAL BANK PLC	09-08-2006	Public offer
3	UNITED BANK FOR AFRICA PLC	05-02-2007	Public offer
4	OCEANIC BANK INTERNATIONAL PLC	13-02-2007	Public offer
5	DIAMOND BANK PLC	19-02-2007	Public offer
6	STANBIC IBTC BANK PLC	19-03-2007	Public offer
7	FIRST BANK NIGERIA PLC	10-04-2007	Public offer/Rights issue
8	ACCESS BANK PLC	21-05-2007	Public offer
9	GUARANTY TRUST BANK PLC*	12-07-2007*	GDR*
10	FIDELITY BANK PLC	31-07-2007	Public offer
11	AFRIBANK PLC*	15-08-2007*	Public offer*
12	FCMB PLC	27-08-2007	Public offer
13	BANK PHB PLC	15-10-2007	Public offer
14	ZENITH BANK PLC	01-11-2007	Public offer
15	FIN BANK PLC	16-11-2007	Public offer/Rights issue
16	SKYE BANK PLC	05-12-2007	Public offer

*Bank not included in the study sample because it did not meet stated selection criteria

Source: (i) *Business Day, Daily Times, the Punch, Daily Trust and Leadership* newspapers
(ii) AfricanFinancialMarkets.com
(iii) CapitalAssetsNg.com
(iv) Securities and Investment Services Department, SEC, 2010

Appendix III: Event Window Stock Prices and Market Index for Sample DMBs

DAY	ACCESS SHARE	ACCESS INDEX	DIAMOND SHARE	DIAMOND INDEX	FCMB SHARE	FCMB INDEX	FIDELITY SHARE	FIDELITY INDEX	FIN SHARE	FIN INDEX	FIRST SHARE	FIRST INDEX	INTERCONT SHARE	INTERCONT INDEX
-16	15.5	47262.3	9.5	36279.65	15.7	51068.07	11.55	51708.97	12.07	51359.11	38.2	41030.7	11.4	27087.47
-15	15.49	47108.77	9.97	36426.3	16	51340.25	12.12	51627.8	12.2	51344.92	37	40663.76	11.15	27095.44
-14	15.49	47124.14	10.19	36073.7	16	51894.04	12.71	51469.89	12	50997.01	37.99	40663.76	11.68	27275.24
-13	15.37	47124.14	10.13	35593.77	15.99	51894.04	12.31	51469.89	11.84	50528.79	39.5	40663.76	12.2	27476.35
-12	15.4	47123.99	9.99	35896.31	16.7	51894.04	11.7	51469.72	11.9	50528.79	40.5	41721.54	12.3	27638.65
-11	15.01	47123.99	10.3	35896.31	16.3	53759.8	12.28	51469.72	11.8	50146.2	39.05	41694.81	12	27340.78
-10	15.4	46925.33	10.5	36152.94	15.99	53759.8	11.8	51514.23	11.95	50201.82	38.6	41694.81	12.4	27426.04
-9	15.07	47422.51	10.88	36784.51	16	53786.63	11.21	51514.06	11.93	50482.94	37.15	41694.69	12.5	27502.09
-8	16.45	47767.33	11.42	38462.26	16.18	53786.63	10.65	51514.6	12.52	50482.94	37	42009.36	13	27672.3
-7	16.8	47529.8	11.99	38462.26	16	53880.04	10.33	51349.69	13.14	50482.94	36.8	42009.36	13.19	27880.5
-6	16.89	47293.12	12.58	40295.09	16.05	53568.32	10.79	51349.69	13.79	51356.97	37.01	42009.36	13.4	28233.55
-5	16.11	47826.16	12	40706.02	15.85	53568.32	10.7	51363.69	14.4	51147.37	37.4	42108.55	13.12	28233.48
-4	16.91	47142.23	11.4	40706.02	16	51465.48	10.5	51068.4	14.34	51596.62	37.3	42350.9	13.7	28592.14
-3	17.75	47142.23	10.83	39168.94	16.5	51465.48	10.55	51068.4	14.5	51669.82	38	42671.77	13.95	28918.67
-2	18.63	47327.46	10.55	39168.94	17.32	50900.06	11.4	51068.07	14.64	51958.49	38	43456.14	14.64	29264.02
-1	18.4	47613.7	11	38984.33	18.1	50437.74	11.93	51340.25	14	51958.32	38.5	43870.27	15.37	29768.65
0	**19.32**	**47567.7**	**10.7**	**41254.25**	**17.8**	**50295.08**	**11.99**	**51894.04**	**13.3**	**53291.68**	**40.4**	**44643.4**	**16.13**	**30320.7**
1	18.92	50596.11	11.23	48328.26	17.45	54551.96	11.83	57487.73	12.64	66120.19	42.42	51068.07	15.33	31356.61
2	19.86	50596.11	11.79	49159.3	17.94	54456.27	11.24	57530.47	12.01	66121.93	44.54	51340.25	16.09	31362.12
3	20.85	50596.11	12.37	49930.19	18	54456.27	11.17	58130.74	11.41	66120.19	46.76	51894.04	15.29	31362.12
4	21.5	50915.25	12.98	49930.19	17.1	54456.1	11.01	58406.36	11.29	65616.08	49.09	51894.04	14.53	31632.54
5	20.95	50952.23	13.62	51383.64	16.25	54456.1	11.56	58406.36	11.31	65616.08	51.54	51894.04	13.81	31632.54
6	20.37	51037.54	13.62	51383.64	17.04	54678.83	12.13	58192.1	11.87	65529	54.11	53759.8	14.4	31632.46
7	19.79	51037.54	15.01	51473.2	17.89	54678.83	12.73	58113.66	12.46	64635.22	56.81	53759.8	14.25	32571.34
8	19	51363.92	15.76	51083.28	17.99	54678.83	13	58211.69	11.84	65005.48	56	53786.63	14.25	32883.2
9	19.74	51363.92	16.54	51341.36	18.88	57990.22	12.7	58187.48	11.84	64635.22	53.2	53786.63	14.25	32466.15
10	19.74	51037.54	17.36	51342.49	19.5	58579.77	12.08	58358.49	11.45	64482.68	50.8	53318.48	14	32333.41
11	19.49	51363.92	18.22	51342.13	20.47	59257.16	11.66	57936.39	11.41	63098.46	52.08	53001.69	14.2	32333.41
12	19.25	51316.89	19.13	51342.13	21.49	58850.58	11.36	57837.34	11.01	63098.46	54.68	53091.99	14	32333.41
13	19.5	51359.11	20.08	51341.96	21.6	58195.36	11.39	57845.5	11.35	63147.04	57.41	53091.81	14	32482.8
14	19.3	51359.11	19.98	51341.96	20.6	57581.74	11.16	57902.89	10.8	63016.56	54.91	53880.04	14	32482.8
15	18.68	51344.92	18.99	51702.66	21.5	57487.73	11.05	58147.3	10.49	63016.56	53	53880.04	13.98	32777.97

Source: NSE Daily Official Pricelist

Appendix III Continued

DAY	OCEANIC SHARE	OCEANIC INDEX	PHB SHARE	PHB INDEX	SKYE SHARE	SKYE INDEX	STANBIC SHARE	STANBIC INDEX	UBA SHARE	UBA INDEX	ZENITH1 SHARE	ZENITH1 INDEX	ZENITH2 SHARE	ZENITH2 INDEX
-16	13.75	35580.92	33.49	52264.11	16	51669.82	11.01	40893.69	26.65	34450.45	15.9	23764.93	44.85	50596.11
-15	13.98	36279.65	31.82	52127.1	15.99	51958.49	11.56	40693.13	27	34450.36	16	23764.93	44	50915.25
-14	14.25	36426.3	30.23	52127.1	15.75	51958.32	12.13	40693.13	28.35	34372.27	15.99	23733.02	44.3	50952.23
-13	13.8	36073.7	29.7	52547.81	16	52768.77	12	40689.46	29.76	34488.52	15.75	23756.92	44.01	51037.54
-12	13.31	35593.77	31	50893.63	15.94	53291.68	11.4	40689.46	31.24	34598.22	15.85	23650.58	45.48	51037.54
-11	13.97	35896.31	32.55	50893.63	15.56	53291.68	10.83	40689.46	32.8	34940.04	16.05	23650.52	44.01	51363.92
-10	14.66	35896.31	33.5	50959.8	15.6	53714.37	10.29	40313.02	34.44	35580.92	16	23650.47	45.5	51363.92
-9	15.39	36152.94	32	50332.34	15.58	54544.47	10	40332.19	27.86	36279.65	16.17	23739.52	45	51037.54
-8	16.15	36784.51	33.59	49709.59	15.4	54544.47	10.4	40491.51	28.05	36426.3	16.1	23739.52	44.01	51363.92
-7	16.95	38462.26	35.26	50229.17	15.6	54544.47	10.92	40491.39	27.11	36073.7	16.5	23921.6	44.39	51316.89
-6	17	38462.26	34.95	50229.01	16.38	55215.5	11.45	40889.22	28.46	35593.77	17	23921.6	44.5	51359.11
-5	16.65	40295.09	34	50596.11	17.19	52215.31	11.6	40889.22	29.88	35896.31	17	24085.71	44.44	51359.11
-4	16.52	40706.02	34.5	50596.11	17.49	54611.27	11.3	41030.7	31.37	35896.31	16.99	23945.29	44.05	51344.92
-3	16.88	40706.02	33	50596.11	17.8	54611.27	10.81	41030.7	32.93	36152.94	17.83	24105.91	44.05	50997.01
-2	17.72	39168.94	34	50915.25	17.24	54126.82	10.8	40663.76	34.57	36784.51	25	24105.85	44	50528.79
-1	18.6	39168.94	26.64	50952.23	17.2	54285.22	10.85	40663.76	36.29	38462.26	18.72	24116.67	43.99	50528.79
0	**19.53**	**38984.33**	**25.51**	**51037.54**	**17.19**	**54172.18**	**11**	**41721.54**	**37.99**	**38462.26**	**19.64**	**24033.51**	**46.09**	**50201.82**
1	20.5	48328.26	26.78	58192.1	16.84	64482.68	10.7	49709.59	39.88	48328.26	20.1	24836.58	48.39	59382.44
2	21.52	49159.3	28.11	58113.66	17.68	63098.46	11.23	50229.17	41.87	49159.3	20.2	25021.24	50.8	60289.7
3	22.59	49930.19	29.51	58211.69	18.5	63098.46	11.79	50229.01	43.96	49930.19	20	25021.24	49.8	61618.39
4	23.71	49930.19	30.98	58187.48	18.31	63147.04	12.37	50596.11	46.15	49930.19	20.02	25219.29	50.8	62245.79
5	24.89	51383.64	30.9	58358.49	17.4	63016.56	12.98	50596.11	48.45	51383.64	20.18	25668.69	49.52	62516.07
6	26.13	51383.64	29.39	57936.39	16.84	63016.56	13.62	50596.11	50.87	51383.64	20.51	25668.69	49.98	62516.07
7	27.43	51473.2	29.49	57837.34	17.68	62812.33	14.3	50915.25	48.33	51473.2	21.4	25920.74	49.38	62847.66
8	28.8	51083.28	29.49	57845.5	17.3	62595.15	15.01	50952.23	48	51083.28	21.23	25889.8	49.42	62846.68
9	28.55	51341.36	28.1	57902.89	17.36	62595.15	15.76	51037.54	47	51341.36	20.6	25836.54	49.99	62846.68
10	27.53	51342.49	29.5	58147.3	17.39	62227.86	16.54	51037.54	47	51342.49	20.51	26161.15	49.11	62961.79
11	27.99	51342.13	29.75	58593.43	18.01	63276.02	17.36	51363.92	45.71	51342.13	21.33	26118.26	49.75	63584.46
12	29.38	51342.13	28.99	58570.55	18	63629.87	18.15	51363.92	45.53	51342.13	21.45	26268.81	49.05	63753.66
13	30.84	51341.96	29	58570.55	18.9	63854.31	19	51037.54	46.02	51341.96	21.15	26268.75	49.11	63863.87
14	32	51341.96	28.5	59382.44	19.78	63736.14	19.95	51363.92	45.01	51341.96	21.18	26374.74	48.9	63936.64
15	30.4	51702.66	29.92	60289.7	19.85	63075.34	20.94	51316.89	45.5	51702.66	21.5	26701.97	49	64129.69

Source: NSE Daily Official Pricelist

Appendix IV: ADF Test Results for Event Window Data

ADF Test Statistic	-3.278412	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ACCESSSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 14:43
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCESSSHARERET(-1)	-0.853891	0.260459	-3.278412	0.0026
D(ACCESSSHARERET(-1))	-0.114098	0.185947	-0.613602	0.5441
C	0.377339	0.611675	0.616895	0.5420
R-squared	0.479220	Mean dependent var		-0.123666
Adjusted R-squared	0.444501	S.D. dependent var		4.549011
S.E. of regression	3.390459	Akaike info criterion		5.366316
Sum squared resid	344.8563	Schwarz criterion		5.502362
Log likelihood	-85.54421	F-statistic		13.80295
Durbin-Watson stat	1.862279	Prob(F-statistic)		0.000056
ADF Test Statistic	-4.174949	1% Critical Value*		-3.6422
		5% Critical Value		-2.9527
		10% Critical Value		-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ACCESSINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 14:47
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACCESSINDEXRET(-1)	-1.143705	0.273945	-4.174949	0.0002
D(ACCESSINDEXRET(-1))	0.019792	0.182764	0.108294	0.9145
C	0.300891	0.221889	1.356046	0.1852
R-squared	0.560415	Mean dependent var		-0.009216
Adjusted R-squared	0.531109	S.D. dependent var		1.754076
S.E. of regression	1.201114	Akaike info criterion		3.290884
Sum squared resid	43.28025	Schwarz criterion		3.426930
Log likelihood	-51.29959	F-statistic		19.12310
Durbin-Watson stat	1.990987	Prob(F-statistic)		0.000004

Appendix IV: Continue

ADF Test Statistic	-2.461516	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DIAMONDSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:01
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIAMONDSHARERET(-1)	-0.512452	0.208185	-2.461516	0.0198
D(DIAMONDSHARERET(-1))	-0.044519	0.193527	-0.230040	0.8196
C	1.073254	0.803193	1.336234	0.1915

R-squared	0.242551	Mean dependent var	-0.170880
Adjusted R-squared	0.192054	S.D. dependent var	3.945656
S.E. of regression	3.546585	Akaike info criterion	5.456355
Sum squared resid	377.3479	Schwarz criterion	5.592401
Log likelihood	-87.02986	F-statistic	4.803310
Durbin-Watson stat	1.890250	Prob(F-statistic)	0.015499

ADF Test Statistic	-4.177042	1% Critical Value*	-3.6496
		5% Critical Value	-2.9558
		10% Critical Value	-2.6164

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DIAMONDSHARERET,2)
Method: Least Squares
Date: 05/21/12 Time: 15:03
Sample(adjusted): 5 36
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DIAMONDSHARERET(-1))	-1.361969	0.326061	-4.177042	0.0002
D(DIAMONDSHARERET(-1),2)	0.041649	0.200125	0.208115	0.8366
C	-0.182589	0.698807	-0.261287	0.7957

R-squared	0.642963	Mean dependent var	-0.143112
Adjusted R-squared	0.618339	S.D. dependent var	6.396517
S.E. of regression	3.951684	Akaike info criterion	5.675221
Sum squared resid	452.8583	Schwarz criterion	5.812633
Log likelihood	-87.80353	F-statistic	26.11200
Durbin-Watson stat	1.876008	Prob(F-statistic)	0.000000

Appendix IV: Continued

ADF Test Statistic	-3.490789	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DIAMONDINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:06
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIAMONDINDEXRET(-1)	-0.767075	0.219743	-3.490789	0.0015
D(DIAMONDINDEXRET(-1))	0.057998	0.182462	0.317863	0.7528
C	0.909464	0.608246	1.495222	0.1453

R-squared	0.364465	Mean dependent var	-0.008577
Adjusted R-squared	0.322096	S.D. dependent var	3.823563
S.E. of regression	3.148128	Akaike info criterion	5.218001
Sum squared resid	297.3214	Schwarz criterion	5.354047
Log likelihood	-83.09702	F-statistic	8.602152
Durbin-Watson stat	2.022971	Prob(F-statistic)	0.001115

ADF Test Statistic	-4.662106	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FCMBSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:08
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FCMBSHARERET(-1)	-1.046651	0.224502	-4.662106	0.0001
D(FCMBSHARERET(-1))	0.331277	0.192233	1.723311	0.0951
C	0.988087	0.555016	1.780285	0.0852

R-squared	0.446418	Mean dependent var	0.091464
Adjusted R-squared	0.409513	S.D. dependent var	3.863924
S.E. of regression	2.969162	Akaike info criterion	5.100944
Sum squared resid	264.4777	Schwarz criterion	5.236991
Log likelihood	-81.16558	F-statistic	12.09626
Durbin-Watson stat	1.780259	Prob(F-statistic)	0.000141

Appendix IV: Continued

ADF Test Statistic	-3.797890	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FCMBINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:10
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FCMBINDEXRET(-1)	-0.974747	0.256655	-3.797890	0.0007
D(FCMBINDEXRET(-1))	-0.007877	0.183460	-0.042936	0.9660
C	0.349801	0.379738	0.921163	0.3643

R-squared	0.492397	Mean dependent var	0.012520
Adjusted R-squared	0.458556	S.D. dependent var	2.873850
S.E. of regression	2.114661	Akaike info criterion	4.422174
Sum squared resid	134.1537	Schwarz criterion	4.558220
Log likelihood	-69.96587	F-statistic	14.55063
Durbin-Watson stat	2.000761	Prob(F-statistic)	0.000038

ADF Test Statistic	-3.396691	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FIDELITYSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:13
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FIDELITYSHARERET(-1)	-0.619964	0.182520	-3.396691	0.0019
D(FIDELITYSHARERET(-1))	0.133694	0.177171	0.754602	0.4564
C	0.060734	0.628007	0.096709	0.9236

R-squared	0.298300	Mean dependent var	-0.175120
Adjusted R-squared	0.251520	S.D. dependent var	4.130777
S.E. of regression	3.573731	Akaike info criterion	5.471605
Sum squared resid	383.1466	Schwarz criterion	5.607651
Log likelihood	-87.28149	F-statistic	6.376662
Durbin-Watson stat	2.032292	Prob(F-statistic)	0.004923

Appendix IV: Continued

ADF Test Statistic	-3.344776	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FIDELITYINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:18
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FIDELITYINDEXRET(-1)	-0.823601	0.246235	-3.344776	0.0022
D(FIDELITYINDEXRET(-1))	-0.105011	0.181490	-0.578604	0.5672
C	0.308356	0.335205	0.919904	0.3650

R-squared	0.466406	Mean dependent var	0.012764
Adjusted R-squared	0.430833	S.D. dependent var	2.458045
S.E. of regression	1.854426	Akaike info criterion	4.159536
Sum squared resid	103.1669	Schwarz criterion	4.295582
Log likelihood	-65.63234	F-statistic	13.11126
Durbin-Watson stat	1.993826	Prob(F-statistic)	0.000081

ADF Test Statistic	-2.404315	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FINSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:20
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINSHARERET(-1)	-0.489235	0.203482	-2.404315	0.0226
D(FINSHARERET(-1))	-0.173197	0.183514	-0.943784	0.3528
C	-0.224506	0.567392	-0.395680	0.6951

R-squared	0.316265	Mean dependent var	-0.052178
Adjusted R-squared	0.270683	S.D. dependent var	3.803807
S.E. of regression	3.248453	Akaike info criterion	5.280743
Sum squared resid	316.5735	Schwarz criterion	5.416789
Log likelihood	-84.13226	F-statistic	6.938330
Durbin-Watson stat	1.967008	Prob(F-statistic)	0.003337

Appendix IV: Continued

ADF Test Statistic	-4.802149	1% Critical Value*	-3.6496
		5% Critical Value	-2.9558
		10% Critical Value	-2.6164

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FINSHARERET,2)
Method: Least Squares
Date: 05/21/12 Time: 15:22
Sample(adjusted): 5 36
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FINSHARERET(-1))	-1.545989	0.321937	-4.802149	0.0000
D(FINSHARERET(-1),2)	0.076353	0.196508	0.388551	0.7004
C	-0.093069	0.633881	-0.146825	0.8843

R-squared	0.718634	Mean dependent var	0.078218
Adjusted R-squared	0.699229	S.D. dependent var	6.535016
S.E. of regression	3.583972	Akaike info criterion	5.479880
Sum squared resid	372.5008	Schwarz criterion	5.617293
Log likelihood	-84.67809	F-statistic	37.03423
Durbin-Watson stat	1.855256	Prob(F-statistic)	0.000000

ADF Test Statistic	-3.788340	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FININDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:25
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FININDEXRET(-1)	-0.934739	0.246741	-3.788340	0.0007
D(FININDEXRET(-1))	0.024408	0.182615	0.133655	0.8946
C	0.582546	0.706014	0.825121	0.4158

R-squared	0.456609	Mean dependent var	0.002776
Adjusted R-squared	0.420383	S.D. dependent var	5.195407
S.E. of regression	3.955399	Akaike info criterion	5.674548
Sum squared resid	469.3554	Schwarz criterion	5.810594
Log likelihood	-90.63004	F-statistic	12.60442
Durbin-Watson stat	2.001751	Prob(F-statistic)	0.000106

Appendix IV: Continued

ADF Test Statistic	-3.731313	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FIRSTSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:29
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FIRSTSHARERET(-1)	-0.633629	0.169814	-3.731313	0.0008
D(FIRSTSHARERET(-1))	0.388877	0.176435	2.204083	0.0353
C	0.535477	0.523437	1.023003	0.3145

R-squared	0.318285	Mean dependent var	-0.191026
Adjusted R-squared	0.272837	S.D. dependent var	3.274043
S.E. of regression	2.791903	Akaike info criterion	4.977832
Sum squared resid	233.8417	Schwarz criterion	5.113878
Log likelihood	-79.13423	F-statistic	7.003315
Durbin-Watson stat	1.999596	Prob(F-statistic)	0.003192

ADF Test Statistic	-3.545399	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FIRSTINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:32
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FIRSTINDEXRET(-1)	-0.880322	0.248300	-3.545399	0.0013
D(FIRSTINDEXRET(-1))	-0.051758	0.182548	-0.283530	0.7787
C	0.736764	0.483742	1.523051	0.1382

R-squared	0.465559	Mean dependent var	0.000000
Adjusted R-squared	0.429930	S.D. dependent var	3.331061
S.E. of regression	2.515050	Akaike info criterion	4.768971
Sum squared resid	189.7643	Schwarz criterion	4.905017
Log likelihood	-75.68801	F-statistic	13.06673
Durbin-Watson stat	2.002144	Prob(F-statistic)	0.000083

Appendix IV: Continued

ADF Test Statistic	-3.254427	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTERCONTSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:34
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCONTSHARERET(-1)	-0.813736	0.250040	-3.254427	0.0028
D(INTERCONTSHARERET(-1))	-0.160385	0.179528	-0.893371	0.3788
C	0.459374	0.582016	0.789280	0.4361

R-squared	0.497741	Mean dependent var	0.000875
Adjusted R-squared	0.464257	S.D. dependent var	4.443083
S.E. of regression	3.252092	Akaike info criterion	5.282982
Sum squared resid	317.2830	Schwarz criterion	5.419028
Log likelihood	-84.16920	F-statistic	14.86505
Durbin-Watson stat	1.960441	Prob(F-statistic)	0.000033

ADF Test Statistic	-3.695056	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTERCONTINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:38
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTERCONTINDEXRET(-1)	-0.811659	0.219661	-3.695056	0.0009
D(INTERCONTINDEXRET(-1))	0.095479	0.182313	0.523708	0.6043
C	0.469894	0.204552	2.297189	0.0288

R-squared	0.378376	Mean dependent var	0.027419
Adjusted R-squared	0.336934	S.D. dependent var	1.167881
S.E. of regression	0.950992	Akaike info criterion	2.823886
Sum squared resid	27.13158	Schwarz criterion	2.959932
Log likelihood	-43.59412	F-statistic	9.130335
Durbin-Watson stat	1.967299	Prob(F-statistic)	0.000800

Appendix IV: Continued

ADF Test Statistic	-8.003750	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OCEANICSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 15:40
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OCEANICSHARERET(-1)	-1.012108	0.126454	-8.003750	0.0000
D(OCEANICSHARERET(-1))	0.117828	0.101671	1.158906	0.2556
C	2.697215	0.610785	4.415980	0.0001

R-squared	0.741885	Mean dependent var	0.601264
Adjusted R-squared	0.724678	S.D. dependent var	6.091167
S.E. of regression	3.196106	Akaike info criterion	5.248251
Sum squared resid	306.4528	Schwarz criterion	5.384297
Log likelihood	-83.59615	F-statistic	43.11373
Durbin-Watson stat	1.009088	Prob(F-statistic)	0.000000

ADF Test Statistic	-3.785413	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OCEANICINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 15:43
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OCEANICINDEXRET(-1)	-0.976728	0.258024	-3.785413	0.0007
D(OCEANICINDEXRET(-1))	-0.023158	0.182556	-0.126852	0.8999
C	1.188998	0.776435	1.531355	0.1362

R-squared	0.500474	Mean dependent var	0.011591
Adjusted R-squared	0.467172	S.D. dependent var	5.593887
S.E. of regression	4.083261	Akaike info criterion	5.738177
Sum squared resid	500.1906	Schwarz criterion	5.874223
Log likelihood	-91.67992	F-statistic	15.02846
Durbin-Watson stat	1.987509	Prob(F-statistic)	0.000030

Appendix IV: Continued

ADF Test Statistic	-4.182096	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PHBSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 22:14
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PHBSHARERET(-1)	-1.036530	0.247849	-4.182096	0.0002
D(PHBSHARERET(-1))	0.125789	0.183275	0.686344	0.4978
C	-0.061022	1.029752	-0.059259	0.9531

R-squared	0.464029	Mean dependent var	0.097254
Adjusted R-squared	0.428298	S.D. dependent var	7.818825
S.E. of regression	5.911890	Akaike info criterion	6.478316
Sum squared resid	1048.513	Schwarz criterion	6.614362
Log likelihood	-103.8922	F-statistic	12.98661
Durbin-Watson stat	2.014222	Prob(F-statistic)	0.000087

ADF Test Statistic	-3.964277	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PHBINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 22:16
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PHBINDEXRET(-1)	-1.043182	0.263146	-3.964277	0.0004
D(PHBINDEXRET(-1))	0.015795	0.183411	0.086120	0.9319
C	0.445791	0.445222	1.001277	0.3247

R-squared	0.512518	Mean dependent var	0.054190
Adjusted R-squared	0.480020	S.D. dependent var	3.467568
S.E. of regression	2.500452	Akaike info criterion	4.757328
Sum squared resid	187.5678	Schwarz criterion	4.893374
Log likelihood	-75.49591	F-statistic	15.77039
Durbin-Watson stat	1.994653	Prob(F-statistic)	0.000021

Appendix IV: Continued

ADF Test Statistic	-4.294944	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SKYESHARERET)
Method: Least Squares
Date: 05/21/12 Time: 22:19
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SKYESHARERET(-1)	-0.991731	0.230907	-4.294944	0.0002
D(SKYESHARERET(-1))	0.178605	0.180777	0.987980	0.3311
C	0.624290	0.500560	1.247183	0.2220

R-squared	0.450029	Mean dependent var	-0.113077
Adjusted R-squared	0.413364	S.D. dependent var	3.552217
S.E. of regression	2.720720	Akaike info criterion	4.926179
Sum squared resid	222.0696	Schwarz criterion	5.062225
Log likelihood	-78.28195	F-statistic	12.27414
Durbin-Watson stat	1.953861	Prob(F-statistic)	0.000127

ADF Test Statistic	-4.599566	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SKYEINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 22:20
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SKYEINDEXRET(-1)	-1.325413	0.288160	-4.599566	0.0001
D(SKYEINDEXRET(-1))	0.072864	0.182801	0.398599	0.6930
C	0.852357	0.617831	1.379596	0.1779

R-squared	0.618274	Mean dependent var	-0.019189
Adjusted R-squared	0.592825	S.D. dependent var	5.271805
S.E. of regression	3.363953	Akaike info criterion	5.350618
Sum squared resid	339.4853	Schwarz criterion	5.486665
Log likelihood	-85.28520	F-statistic	24.29515
Durbin-Watson stat	2.000249	Prob(F-statistic)	0.000001

Appendix IV: Continued

ADF Test Statistic	-2.868387	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(STANBICSHARERET)
Method: Least Squares
Date: 05/21/12 Time: 22:22
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
STANBICSHARERET(-1)	-0.388333	0.135384	-2.868387	0.0075
D(STANBICSHARERET(-1))	0.260031	0.174423	1.490807	0.1465
C	0.835309	0.507313	1.646536	0.1101
R-squared	0.218336	Mean dependent var		0.227219
Adjusted R-squared	0.166225	S.D. dependent var		2.883128
S.E. of regression	2.632621	Akaike info criterion		4.860345
Sum squared resid	207.9208	Schwarz criterion		4.996391
Log likelihood	-77.19569	F-statistic		4.189827
Durbin-Watson stat	2.039837	Prob(F-statistic)		0.024849

ADF Test Statistic	-3.817493	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(STANBICINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 22:25
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
STANBICINDEXRET(-1)	-0.903262	0.236611	-3.817493	0.0006
D(STANBICINDEXRET(-1))	0.070162	0.182130	0.385231	0.7028
C	0.589577	0.572214	1.030343	0.3111
R-squared	0.424608	Mean dependent var		-0.009004
Adjusted R-squared	0.386249	S.D. dependent var		4.039195
S.E. of regression	3.164398	Akaike info criterion		5.228310
Sum squared resid	300.4024	Schwarz criterion		5.364357
Log likelihood	-83.26712	F-statistic		11.06919
Durbin-Watson stat	2.002450	Prob(F-statistic)		0.000251

Appendix IV: Continued

ADF Test Statistic	-2.971192	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UBASHARERET)
Method: Least Squares
Date: 05/21/12 Time: 22:27
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UBASHARERET(-1)	-0.694580	0.233772	-2.971192	0.0058
D(UBASHARERET(-1))	-0.221902	0.175331	-1.265619	0.2154
C	1.152784	0.980833	1.175311	0.2491
R-squared	0.485034	Mean dependent var		0.176002
Adjusted R-squared	0.450703	S.D. dependent var		7.096775
S.E. of regression	5.259746	Akaike info criterion		6.244550
Sum squared resid	829.9477	Schwarz criterion		6.380597
Log likelihood	-100.0351	F-statistic		14.12813
Durbin-Watson stat	1.881800	Prob(F-statistic)		0.000047

ADF Test Statistic	-3.226517	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UBAINDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 22:30
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UBAINDEXRET(-1)	-0.819145	0.253879	-3.226517	0.0030
D(UBAINDEXRET(-1))	-0.178031	0.179812	-0.990097	0.3300
C	1.060258	0.787059	1.347113	0.1880
R-squared	0.514700	Mean dependent var		0.015008
Adjusted R-squared	0.482347	S.D. dependent var		5.700510
S.E. of regression	4.101408	Akaike info criterion		5.747046
Sum squared resid	504.6465	Schwarz criterion		5.883092
Log likelihood	-91.82626	F-statistic		15.90875
Durbin-Watson stat	1.987555	Prob(F-statistic)		0.000020

Appendix IV: Continued

ADF Test Statistic	-6.572307	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ZENITH1SHARERET)
Method: Least Squares
Date: 05/21/12 Time: 22:33
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ZENITH1SHARERET(-1)	-1.932540	0.294043	-6.572307	0.0000
D(ZENITH1SHARERET(-1))	0.324929	0.172119	1.887820	0.0688
C	1.669986	1.240943	1.345739	0.1885

R-squared	0.758209	Mean dependent var	0.043547
Adjusted R-squared	0.742089	S.D. dependent var	13.76834
S.E. of regression	6.992238	Akaike info criterion	6.813987
Sum squared resid	1466.742	Schwarz criterion	6.950033
Log likelihood	-109.4308	F-statistic	47.03698
Durbin-Watson stat	2.139036	Prob(F-statistic)	0.000000

ADF Test Statistic	-3.311231	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ZENITH1INDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 22:35
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ZENITH1INDEXRET(-1)	-0.838961	0.253368	-3.311231	0.0024
D(ZENITH1INDEXRET(-1))	-0.114376	0.183853	-0.622103	0.5386
C	0.247505	0.159186	1.554818	0.1305

R-squared	0.473553	Mean dependent var	0.047063
Adjusted R-squared	0.438456	S.D. dependent var	1.134647
S.E. of regression	0.850262	Akaike info criterion	2.599964
Sum squared resid	21.68837	Schwarz criterion	2.736010
Log likelihood	-39.89940	F-statistic	13.49287
Durbin-Watson stat	1.957974	Prob(F-statistic)	0.000066

Appendix IV: Continued

ADF Test Statistic	-3.075461	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ZENITH2SHARERET)
Method: Least Squares
Date: 05/21/12 Time: 22:37
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ZENITH2SHARERET(-1)	-0.797246	0.259228	-3.075461	0.0045
D(ZENITH2SHARERET(-1))	-0.293769	0.172578	-1.702245	0.0991
C	0.277307	0.364047	0.761735	0.4522
R-squared	0.602125	Mean dependent var		0.013776
Adjusted R-squared	0.575600	S.D. dependent var		3.133042
S.E. of regression	2.041052	Akaike info criterion		4.351315
Sum squared resid	124.9767	Schwarz criterion		4.487362
Log likelihood	-68.79670	F-statistic		22.70027
Durbin-Watson stat	1.905829	Prob(F-statistic)		0.000001

ADF Test Statistic	-3.551309	1% Critical Value*	-3.6422
		5% Critical Value	-2.9527
		10% Critical Value	-2.6148

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ZENITH2INDEXRET)
Method: Least Squares
Date: 05/21/12 Time: 22:39
Sample(adjusted): 4 36
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ZENITH2INDEXRET(-1)	-0.908171	0.255729	-3.551309	0.0013
D(ZENITH2INDEXRET(-1))	-0.078647	0.182015	-0.432093	0.6688
C	0.651407	0.560360	1.162480	0.2542
R-squared	0.495864	Mean dependent var		-0.012931
Adjusted R-squared	0.462254	S.D. dependent var		4.139309
S.E. of regression	3.035403	Akaike info criterion		5.145073
Sum squared resid	276.4101	Schwarz criterion		5.281119
Log likelihood	-81.89371	F-statistic		14.75385
Durbin-Watson stat	1.989118	Prob(F-statistic)		0.000035

Appendix V: AR(1) Results for Event Window Market Index Thin Trading Correction

Dependent Variable: ACCESSINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:15
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.262443	0.177898	1.475245	0.1499
AR(1)	-0.121361	0.175501	-0.691512	0.4942

R-squared	0.014723	Mean dependent var	0.262355
Adjusted R-squared	-0.016067	S.D. dependent var	1.153972
S.E. of regression	1.163205	Akaike info criterion	3.197258
Sum squared resid	43.29750	Schwarz criterion	3.287044
Log likelihood	-52.35339	F-statistic	0.478189
Durbin-Watson stat	2.002603	Prob(F-statistic)	0.494231

Inverted AR Roots	-.12

Dependent Variable: DIAMONDINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:27
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.185757	0.722212	1.641841	0.1104
AR(1)	0.274946	0.169818	1.619058	0.1153

R-squared	0.075715	Mean dependent var	1.181491
Adjusted R-squared	0.046831	S.D. dependent var	3.127405
S.E. of regression	3.053298	Akaike info criterion	5.127344
Sum squared resid	298.3241	Schwarz criterion	5.217130
Log likelihood	-85.16485	F-statistic	2.621348
Durbin-Watson stat	1.967891	Prob(F-statistic)	0.115250

Inverted AR Roots	.27

Dependent Variable: FCMBINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:31
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.331182	0.359304	0.921733	0.3636
AR(1)	0.019623	0.176843	0.110962	0.9123

R-squared	0.000385	Mean dependent var	0.331294
Adjusted R-squared	-0.030853	S.D. dependent var	2.022992
S.E. of regression	2.053963	Akaike info criterion	4.334441
Sum squared resid	135.0004	Schwarz criterion	4.424227
Log likelihood	-71.68550	F-statistic	0.012313
Durbin-Watson stat	1.996735	Prob(F-statistic)	0.912340

Inverted AR Roots	.02

Appendix V: Continued

Dependent Variable: FIDELITYINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:38
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.362046	0.336514	1.075872	0.2900
AR(1)	0.079207	0.176207	0.449508	0.6561

R-squared	0.006275	Mean dependent var	0.362260
Adjusted R-squared	-0.024779	S.D. dependent var	1.784797
S.E. of regression	1.806775	Akaike info criterion	4.077986
Sum squared resid	104.4619	Schwarz criterion	4.167772
Log likelihood	-67.32577	F-statistic	0.202058
Durbin-Watson stat	2.014213	Prob(F-statistic)	0.656095

Inverted AR Roots	.08

Dependent Variable: FININDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:44
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.599559	0.720418	0.832238	0.4114
AR(1)	0.087532	0.176168	0.496869	0.6227

R-squared	0.007656	Mean dependent var	0.601358
Adjusted R-squared	-0.023355	S.D. dependent var	3.788975
S.E. of regression	3.832965	Akaike info criterion	5.582177
Sum squared resid	470.1318	Schwarz criterion	5.671963
Log likelihood	-92.89700	F-statistic	0.246879
Durbin-Watson stat	1.994015	Prob(F-statistic)	0.622678

Inverted AR Roots	.09

Dependent Variable: FIRSTINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:51
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.809250	0.451077	1.794037	0.0823
AR(1)	0.071137	0.176634	0.402739	0.6898

R-squared	0.005043	Mean dependent var	0.811452
Adjusted R-squared	-0.026049	S.D. dependent var	2.411687
S.E. of regression	2.442896	Akaike info criterion	4.681268
Sum squared resid	190.9678	Schwarz criterion	4.771054
Log likelihood	-77.58156	F-statistic	0.162198
Durbin-Watson stat	1.998511	Prob(F-statistic)	0.689819

Inverted AR Roots	.07

Appendix V: Continued

Dependent Variable: INTERCONTINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:55
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.563073	0.216457	2.601318	0.0139
AR(1)	0.263876	0.170447	1.548142	0.1314

R-squared	0.069679	Mean dependent var	0.555181
Adjusted R-squared	0.040607	S.D. dependent var	0.948070
S.E. of regression	0.928622	Akaike info criterion	2.746792
Sum squared resid	27.59483	Schwarz criterion	2.836578
Log likelihood	-44.69547	F-statistic	2.396743
Durbin-Watson stat	1.946486	Prob(F-statistic)	0.131422

Inverted AR Roots	.26

Dependent Variable: OCEANICINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 14:58
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.190849	0.679865	1.751597	0.0894
AR(1)	0.001636	0.176691	0.009257	0.9927

R-squared	0.000003	Mean dependent var	1.190832
Adjusted R-squared	-0.031247	S.D. dependent var	3.897336
S.E. of regression	3.957758	Akaike info criterion	5.646255
Sum squared resid	501.2432	Schwarz criterion	5.736041
Log likelihood	-93.98634	F-statistic	8.57E-05
Durbin-Watson stat	2.001051	Prob(F-statistic)	0.992672

Inverted AR Roots	.00

Dependent Variable: PHBINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 15:03
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.408450	0.405534	1.007190	0.3214
AR(1)	-0.025497	0.177250	-0.143847	0.8865

R-squared	0.000646	Mean dependent var	0.409559
Adjusted R-squared	-0.030584	S.D. dependent var	2.388279
S.E. of regression	2.424525	Akaike info criterion	4.666171
Sum squared resid	188.1063	Schwarz criterion	4.755957
Log likelihood	-77.32490	F-statistic	0.020692
Durbin-Watson stat	1.994452	Prob(F-statistic)	0.886523

Inverted AR Roots	-.03

Appendix V: Continued

Dependent Variable: SKYEINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 15:09
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.620053	0.453194	1.368184	0.1808
AR(1)	-0.237186	0.172160	-1.377704	0.1779

R-squared	0.055993	Mean dependent var	0.604498
Adjusted R-squared	0.026493	S.D. dependent var	3.312848
S.E. of regression	3.268669	Akaike info criterion	5.263665
Sum squared resid	341.8943	Schwarz criterion	5.353451
Log likelihood	-87.48231	F-statistic	1.898068
Durbin-Watson stat	2.017705	Prob(F-statistic)	0.177854

Inverted AR Roots -.24

Dependent Variable: STANBICINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 15:13
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.641458	0.624695	1.026833	0.3122
AR(1)	0.156618	0.174632	0.896850	0.3765

R-squared	0.024519	Mean dependent var	0.641958
Adjusted R-squared	-0.005964	S.D. dependent var	3.062953
S.E. of regression	3.072074	Akaike info criterion	5.139606
Sum squared resid	302.0045	Schwarz criterion	5.229391
Log likelihood	-85.37329	F-statistic	0.804340
Durbin-Watson stat	1.977274	Prob(F-statistic)	0.376497

Inverted AR Roots .16

Dependent Variable: UBAINDEXRET
Method: Least Squares
Date: 05/25/12 Time: 15:16
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.267410	0.694993	1.823629	0.0776
AR(1)	0.003059	0.176832	0.017298	0.9863

R-squared	0.000009	Mean dependent var	1.267465
Adjusted R-squared	-0.031240	S.D. dependent var	3.978369
S.E. of regression	4.040034	Akaike info criterion	5.687406
Sum squared resid	522.3001	Schwarz criterion	5.777192
Log likelihood	-94.68590	F-statistic	0.000299
Durbin-Watson stat	1.998139	Prob(F-statistic)	0.986306

Inverted AR Roots .00

Appendix V: Continued

Dependent Variable: ZENITH1INDEXRET
Method: Least Squares
Date: 05/25/12 Time: 15:21
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.268809	0.152321	1.764758	0.0871
AR(1)	0.058847	0.180174	0.326614	0.7461

R-squared	0.003323	Mean dependent var	0.266541
Adjusted R-squared	-0.027824	S.D. dependent var	0.823548
S.E. of regression	0.834927	Akaike info criterion	2.534077
Sum squared resid	22.30728	Schwarz criterion	2.623862
Log likelihood	-41.07930	F-statistic	0.106677
Durbin-Watson stat	1.970839	Prob(F-statistic)	0.746086

Inverted AR Roots	.06

Dependent Variable: ZENITH2INDEXRET
Method: Least Squares
Date: 05/25/12 Time: 15:24
Sample(adjusted): 3 36
Included observations: 34 after adjusting endpoints
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.718700	0.512875	1.401316	0.1707
AR(1)	0.014174	0.176651	0.080237	0.9365

R-squared	0.000201	Mean dependent var	0.718573
Adjusted R-squared	-0.031043	S.D. dependent var	2.903429
S.E. of regression	2.948149	Akaike info criterion	5.057255
Sum squared resid	278.1307	Schwarz criterion	5.147041
Log likelihood	-83.97333	F-statistic	0.006438
Durbin-Watson stat	2.001526	Prob(F-statistic)	0.936548

Inverted AR Roots	.01

Appendix VI: AR(1) Coefficients for the Parameter Estimation Window

Table 3 AR(1) Coefficients for the Parameter Estimation Window

Variable	Coefficients: α_2	1- α_2
AccessIndexRet	0.224092	0.775908
AfriIndexRet	0.007225	0.992775
DiamondIndexRet	0.403833	0.596167
FCMBIndexRet	0.146372	0.853628
FidelityIndexRet	0.138773	0.861227
FinIndexRet	0.038595	0.961405
FirstIndexRet	0.199208	0.800792
IntercontIndexRet	0.161772	0.838228
OceanicIndexRet	0.396947	0.603053
PHBIndexRet	0.125208	0.874792
SkyeIndexRet	0.059935	0.940065
StanbicIndexRet	0.278711	0.721289
UBAIndexRet	0.397415	0.602585
Zenith1IndexRet	0.502908	0.497092
Zenith2IndexRet	0.064235	0.935765

Source: Eviews output/Researcher's Computations, 2012

Appendix VII: Parameter Estimation Window Regression Coefficients

Table 4 Parameter Estimation Window Regression Coefficients

Sample	Coefficients	Model
Access	ACCESSSHARERET = 1.379709173 - 0.003675000982*ACCESSINDEXRET	OLS
Diamond	DIAMONDSHARERET = 0.2579703841 + 0.1890699618*DIAMONDINDEXRET	ARCH(1)
FCMB(-2)	0.184257811*FCMBSHARERET(-2) - 0.2815295568*FCMBINDEXRET(-2)	OLS
Fidelity(-1)	0.3951124366*FIDELITYSHARERET(-1) + 0.05630042744*FIDELITYINDEXRET(-1)	OLS
Fin(-1)	0.2926590305*FINSHARERET(-1) - 0.6711295268*FININDEXRET(-1)	OLS
First	FIRSTSHARERET = -0.09767618279 + 0.7593903317*FIRSTINDEXRET	ARCH(1)
Intercont	INTERCONTSHARERET = 0.06293121979 - 0.257915003*INTERCONTINDEXRET	GARCH(1,1)
Oceanic	OCEANICSHARERET = 0.351675 + 0.4801837968*OCEANICINDEXRET	OLS
PHB	PHBSHARERET = 1.932464749 - 0.2328056608*PHBINDEXRET	OLS
Skye	SKYESHARERET = 0.1981300688 - 0.1085946863*SKYEINDEXRET	ARCH(1)
Stanbic(-1)	0.05838395219*STANBICSHARERET(-1) + 0.2745644376*STANBICINDEXRET(-1)	GARCH(1,1)
UBA	UBASHARERET = 0.4856471358 + 0.6407546407*UBAINDEXRET	OLS
Zenith1[AR(1)]	ZENITH1SHARERET = -0.01634117045 + 0.09011286516*ZENITH1INDEXRET + [AR(1)=0.1668249017]	ARCH(1)
Zenith2(-1)	0.2663562003*ZENITH2SHARERET(-1) + 0.1518972135*ZENITH2INDEXRET(-1)	OLS

Source: Eviews output, 2012

Appendix VIII: Event Window OLS/ARCH/GARCH regression Output

Dependent Variable: ACCESSSHARERET
Method: Least Squares
Date: 05/27/12 Time: 15:37
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-242.4729	211.1116	-1.148553	0.2598
ACCESSINDEXRET	176.1559	153.0149	1.151234	0.2587
R-squared	0.042309	Mean dependent var		0.565072
Adjusted R-squared	0.010386	S.D. dependent var		3.311150
S.E. of regression	3.293910	Akaike info criterion		5.282489
Sum squared resid	325.4953	Schwarz criterion		5.374098
Log likelihood	-82.51983	F-statistic		1.325339
Durbin-Watson stat	1.644320	Prob(F-statistic)		0.258729

Dependent Variable: DIAMONDSHARERET
Method: Least Squares
Date: 05/27/12 Time: 15:41
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.251594	0.704243	-0.357255	0.7234
DIAMONDINDEXRET	0.998129	0.843886	1.182777	0.2462
R-squared	0.044554	Mean dependent var		-5.55E-17
Adjusted R-squared	0.012706	S.D. dependent var		3.822086
S.E. of regression	3.797726	Akaike info criterion		5.567143
Sum squared resid	432.6817	Schwarz criterion		5.658752
Log likelihood	-87.07429	F-statistic		1.398960
Durbin-Watson stat	1.873008	Prob(F-statistic)		0.246187

Dependent Variable: FCMBSHARERET
Method: Least Squares
Date: 05/27/12 Time: 15:42
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.882780	0.583345	1.513307	0.1407
FCMBINDEXRET	0.233886	0.951992	0.245681	0.8076
R-squared	0.002008	Mean dependent var		0.923325
Adjusted R-squared	-0.031258	S.D. dependent var		3.116754
S.E. of regression	3.165091	Akaike info criterion		5.202702
Sum squared resid	300.5341	Schwarz criterion		5.294311
Log likelihood	-81.24324	F-statistic		0.060359
Durbin-Watson stat	1.564167	Prob(F-statistic)		0.807602

Appendix VIII: Continued

Dependent Variable: FIDELITYSHARERET
Method: Least Squares
Date: 05/27/12 Time: 15:43
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.881909	3.272429	1.186247	0.2455
FIDELITYINDEXRET	-2.226416	5.728212	-0.388676	0.7005
FIDELITYSHARERET(-1)	0.418085	0.161190	2.593742	0.0149
FIDELITYINDEXRET(-1)	-7.759263	5.725724	-1.355158	0.1862

R-squared	0.241806	Mean dependent var	0.014175
Adjusted R-squared	0.160571	S.D. dependent var	3.899439
S.E. of regression	3.572679	Akaike info criterion	5.500977
Sum squared resid	357.3930	Schwarz criterion	5.684194
Log likelihood	-84.01564	F-statistic	2.976625
Durbin-Watson stat	1.861967	Prob(F-statistic)	0.048470

Dependent Variable: FINSHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:05
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.028018	0.623322	-0.044949	0.9644
FININDEXRET	0.105239	0.220292	0.477727	0.6363

R-squared	0.007550	Mean dependent var	-3.13E-06
Adjusted R-squared	-0.025532	S.D. dependent var	3.466431
S.E. of regression	3.510404	Akaike info criterion	5.409801
Sum squared resid	369.6880	Schwarz criterion	5.501409
Log likelihood	-84.55681	F-statistic	0.228223
Durbin-Watson stat	1.877832	Prob(F-statistic)	0.636307

Dependent Variable: FIRSTSHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:09
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.848369	0.554392	1.530269	0.1380
FIRSTINDEXRET	0.165176	0.267596	0.617258	0.5424
FIRSTSHARERET(-1)	0.699096	0.185571	3.767279	0.0009
FIRSTINDEXRET(-1)	0.269971	0.270578	0.997757	0.3276
FIRSTSHARERET(-2)	-0.475191	0.189068	-2.513331	0.0185
FIRSTINDEXRET(-2)	0.281262	0.265592	1.059001	0.2993

R-squared	0.466641	Mean dependent var	0.910816
Adjusted R-squared	0.364072	S.D. dependent var	3.530211
S.E. of regression	2.815169	Akaike info criterion	5.075282
Sum squared resid	206.0546	Schwarz criterion	5.350108
Log likelihood	-75.20452	F-statistic	4.549537

Durbin-Watson stat	2.245727	Prob(F-statistic)	0.004107

Appendix VIII: Continued

Dependent Variable: INTERCONTSHARERET
Method: ML - ARCH (Marquardt)
Date: 05/27/12 Time: 16:11
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints
Failure to improve Likelihood after 102 iterations
Variance backcast: ON

	Coefficient	Std. Error	z-Statistic	Prob.
C	0.022154	0.258645	0.085654	0.9317
INTERCONTINDEXRET	-0.090546	1.689974	-0.053578	0.9573
Variance Equation				
C	-0.272169	0.994911	-0.273561	0.7844
ARCH(1)	0.641955	0.592720	1.083066	0.2788
GARCH(1)	0.457323	0.340396	1.343504	0.1791

R-squared	-0.030019	Mean dependent var	0.583187
Adjusted R-squared	-0.182615	S.D. dependent var	3.239663
S.E. of regression	3.523072	Akaike info criterion	5.157860
Sum squared resid	335.1250	Schwarz criterion	5.386881
Log likelihood	-77.52576	Durbin-Watson stat	1.885895

Dependent Variable: OCEANICSHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:12
Sample: 1 34
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.775855	1.003997	1.768785	0.0865
OCEANICINDEXRET	0.307910	0.534064	0.576541	0.5683

R-squared	0.010281	Mean dependent var	1.884138
Adjusted R-squared	-0.020648	S.D. dependent var	5.692444
S.E. of regression	5.750912	Akaike info criterion	6.393616
Sum squared resid	1058.336	Schwarz criterion	6.483402
Log likelihood	-106.6915	F-statistic	0.332399
Durbin-Watson stat	1.147473	Prob(F-statistic)	0.568284

Dependent Variable: PHBSHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:13
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.818363	3.759511	0.749662	0.4593
PHBINDEXRET	-1.575084	1.879011	-0.838252	0.4085

R-squared	0.022886	Mean dependent var	-0.211981
Adjusted R-squared	-0.009684	S.D. dependent var	5.810138
S.E. of regression	5.838203	Akaike info criterion	6.427185
Sum squared resid	1022.539	Schwarz criterion	6.518793
Log likelihood	-100.8350	F-statistic	0.702666
Durbin-Watson stat	1.850348	Prob(F-statistic)	0.408519

Appendix VIII: Continued

Dependent Variable: SKYESHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:14
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.382501	0.589636	0.648707	0.5215
SKYEINDEXRET	1.585778	1.697859	0.933987	0.3578

R-squared	0.028256	Mean dependent var	0.693387
Adjusted R-squared	-0.004135	S.D. dependent var	2.747501
S.E. of regression	2.753177	Akaike info criterion	4.923849
Sum squared resid	227.3994	Schwarz criterion	5.015458
Log likelihood	-76.78159	F-statistic	0.872331
Durbin-Watson stat	1.573114	Prob(F-statistic)	0.357768

Dependent Variable: STANBICSHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:16
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.690463	0.473338	1.458710	0.1566
STANBICINDEXRET	-0.915211	0.421024	-2.173771	0.0390
STANBICSHARERET (-1)	1.069970	0.177361	6.032726	0.0000
STANBICINDEXRET(-1)	1.160938	0.444456	2.612042	0.0148
STANBICSHARERET (-2)	-0.419910	0.174553	-2.405624	0.0236
STANBICINDEXRET(-2)	-0.243553	0.452660	-0.538049	0.5951

R-squared	0.663806	Mean dependent var	1.980675
Adjusted R-squared	0.599153	S.D. dependent var	3.733623
S.E. of regression	2.363849	Akaike info criterion	4.725820
Sum squared resid	145.2823	Schwarz criterion	5.000645
Log likelihood	-69.61312	F-statistic	10.26726
Durbin-Watson stat	1.944084	Prob(F-statistic)	0.000016

Dependent Variable: UBASHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:19
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.407722	0.964401	1.459686	0.1548
UBAINDEXRET	0.259633	0.365796	0.709776	0.4833

R-squared	0.016515	Mean dependent var	1.534003
Adjusted R-squared	-0.016267	S.D. dependent var	5.318746
S.E. of regression	5.361833	Akaike info criterion	6.256950
Sum squared resid	862.4776	Schwarz criterion	6.348559
Log likelihood	-98.11120	F-statistic	0.503782
Durbin-Watson stat	1.731472	Prob(F-statistic)	0.483324

Appendix VIII: Continued

Dependent Variable: ZENITH1SHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:21
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.704442	1.389294	1.226840	0.2301
ZENITH1INDEXRET	9.285415	17.99736	0.515932	0.6100
ZENITH1SHARERET (-1)	-0.473953	0.166171	-2.852202	0.0081
ZENITH1INDEXRET(-1)	13.95099	17.17791	0.812147	0.4236

R-squared	0.235640	Mean dependent var	0.952766
Adjusted R-squared	0.153744	S.D. dependent var	8.182091
S.E. of regression	7.526884	Akaike info criterion	6.991308
Sum squared resid	1586.312	Schwarz criterion	7.174525
Log likelihood	-107.8609	F-statistic	2.877311
Durbin-Watson stat	2.233211	Prob(F-statistic)	0.053744

Dependent Variable: ZENITH2SHARERET
Method: Least Squares
Date: 05/27/12 Time: 16:24
Sample(adjusted): 3 34
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.964168	0.369333	-2.610566	0.0144
ZENITH2INDEXRET	2.867507	0.679306	4.221228	0.0002
ZENITH2SHARERET (-1)	-0.611920	0.158018	-3.872469	0.0006
ZENITH2INDEXRET(-1)	2.735517	0.652016	4.195473	0.0002

R-squared	0.523812	Mean dependent var	0.336344
Adjusted R-squared	0.472792	S.D. dependent var	2.119537
S.E. of regression	1.538977	Akaike info criterion	3.816581
Sum squared resid	66.31660	Schwarz criterion	3.999798
Log likelihood	-57.06530	F-statistic	10.26677
Durbin-Watson stat	1.938765	Prob(F-statistic)	0.000100

Appendix IX: Event Window Breusch-Godfrey Serial Correlation Test Output

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.763210	Probability	0.389503
Obs*R-squared	0.820568	Probability	0.365014

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 00:17
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-47.23867	218.7385	-0.215960	0.8305
ACCESSINDEXRET	34.22350	158.5385	0.215869	0.8306
RESID(-1)	0.169678	0.194224	0.873619	0.3895
R-squared	0.025643	Mean dependent var		-3.09E-14
Adjusted R-squared	-0.041554	S.D. dependent var		3.240347
S.E. of regression	3.306987	Akaike info criterion		5.319012
Sum squared resid	317.1488	Schwarz criterion		5.456425
Log likelihood	-82.10419	F-statistic		0.381605
Durbin-Watson stat	1.965696	Prob(F-statistic)		0.686142

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.07E-06	Probability	0.998613
Obs*R-squared	3.39E-06	Probability	0.998531

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 00:26
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.73E-05	0.718427	0.000135	0.9999
DIAMONDINDEXRET	-0.000128	0.861417	-0.000149	0.9999
RESID(-1)	-0.000342	0.195156	-0.001753	0.9986
R-squared	0.000000	Mean dependent var		1.11E-16
Adjusted R-squared	-0.068965	S.D. dependent var		3.735970
S.E. of regression	3.862649	Akaike info criterion		5.629643
Sum squared resid	432.6816	Schwarz criterion		5.767056
Log likelihood	-87.07429	F-statistic		1.54E-06
Durbin-Watson stat	1.872427	Prob(F-statistic)		0.999998

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.085710	Probability	0.306033
Obs*R-squared	1.154792	Probability	0.282548

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 00:41
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.027555	0.583114	0.047254	0.9626
FCMBINDEXRET	-0.042974	0.951529	-0.045163	0.9643
RESID(-1)	0.193844	0.186035	1.041974	0.3060
R-squared	0.036087	Mean dependent var		3.33E-16
Adjusted R-squared	-0.030389	S.D. dependent var		3.113623
S.E. of regression	3.160580	Akaike info criterion		5.228448
Sum squared resid	289.6887	Schwarz criterion		5.365861
Log likelihood	-80.65517	F-statistic		0.542855
Durbin-Watson stat	1.807292	Prob(F-statistic)		0.586877

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	6.296740	Probability	0.017727
Obs*R-squared	5.724823	Probability	0.016727

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 00:56
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.193340	2.424232	0.079753	0.9370
FIDELITYINDEXRET	-0.525072	5.906914	-0.088891	0.9298
RESID(-1)	0.417342	0.166316	2.509330	0.0177
R-squared	0.173479	Mean dependent var		1.35E-17
Adjusted R-squared	0.118378	S.D. dependent var		3.926006
S.E. of regression	3.686312	Akaike info criterion		5.533638
Sum squared resid	407.6669	Schwarz criterion		5.669684
Log likelihood	-88.30503	F-statistic		3.148370
Durbin-Watson stat	1.818157	Prob(F-statistic)		0.057386

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.318358	Probability	0.577253
Obs*R-squared	0.372916	Probability	0.541419

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 01:00
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.021141	3.313216	-0.006381	0.9950
FIDELITYINDEXRET	0.331334	5.828892	0.056843	0.9551
FIDELITYSHARERET (-1)	-0.150809	0.313162	-0.481570	0.6340
FIDELITYINDEXRET(-1)	-0.205455	5.808143	-0.035374	0.9720
RESID(-1)	0.207223	0.367266	0.564232	0.5773

R-squared	0.011654	Mean dependent var	6.88E-16
Adjusted R-squared	-0.134768	S.D. dependent var	3.395410
S.E. of regression	3.616977	Akaike info criterion	5.551755
Sum squared resid	353.2281	Schwarz criterion	5.780776
Log likelihood	-83.82808	F-statistic	0.079590
Durbin-Watson stat	1.949644	Prob(F-statistic)	0.987936

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.002785	Probability	0.958277
Obs*R-squared	0.003073	Probability	0.955796

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 01:19
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000194	0.633958	0.000306	0.9998
FININDEXRET	-0.002078	0.227480	-0.009133	0.9928
RESID(-1)	0.009967	0.188882	0.052771	0.9583

R-squared	0.000096	Mean dependent var	1.11E-16
Adjusted R-squared	-0.068863	S.D. dependent var	3.453320
S.E. of regression	3.570244	Akaike info criterion	5.472205
Sum squared resid	369.6525	Schwarz criterion	5.609617
Log likelihood	-84.55527	F-statistic	0.001392
Durbin-Watson stat	1.896762	Prob(F-statistic)	0.998609

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	8.060354	Probability	0.007916
Obs*R-squared	7.016118	Probability	0.008078

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 09:41
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.087140	0.523306	-0.166517	0.8688
FIRSTINDEXRET	-0.280000	0.286771	-0.976388	0.3364
RESID(-1)	0.495788	0.174630	2.839076	0.0079
R-squared	0.206356	Mean dependent var		1.04E-16
Adjusted R-squared	0.155154	S.D. dependent var		3.309842
S.E. of regression	3.042259	Akaike info criterion		5.147175
Sum squared resid	286.9155	Schwarz criterion		5.281854
Log likelihood	-84.50197	F-statistic		4.030177
Durbin-Watson stat	1.608619	Prob(F-statistic)		0.027810

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	5.000890	Probability	0.033482
Obs*R-squared	5.000755	Probability	0.025336

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 09:48
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.567377	0.584261	0.971102	0.3398
FIRSTINDEXRET	-0.058511	0.268622	-0.217818	0.8292
FIRSTSHARERET(-1)	-0.562298	0.299397	-1.878105	0.0708
FIRSTINDEXRET(-1)	0.274329	0.290013	0.945922	0.3523
RESID(-1)	0.766944	0.342957	2.236267	0.0335
R-squared	0.151538	Mean dependent var		6.73E-17
Adjusted R-squared	0.030329	S.D. dependent var		2.874671
S.E. of regression	2.830742	Akaike info criterion		5.057682
Sum squared resid	224.3669	Schwarz criterion		5.284426
Log likelihood	-78.45176	F-statistic		1.250223
Durbin-Watson stat	2.124332	Prob(F-statistic)		0.312767

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.770323	Probability	0.108512
Obs*R-squared	3.192269	Probability	0.073987

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 09:55
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.320830	0.570011	-0.562849	0.5786
FIRSTINDEXRET	-0.020134	0.259208	-0.077674	0.9387
FIRSTSHARERET(-1)	0.587713	0.396134	1.483622	0.1504
FIRSTINDEXRET(-1)	-0.145535	0.276027	-0.527249	0.6027
FIRSTSHARERET(-2)	-0.253920	0.238205	-1.065972	0.2966
FIRSTINDEXRET(-2)	-0.102475	0.264259	-0.387783	0.7015
RESID(-1)	-0.732070	0.439833	-1.664429	0.1085

R-squared	0.099758	Mean dependent var	2.29E-16
Adjusted R-squared	-0.116300	S.D. dependent var	2.578163
S.E. of regression	2.723960	Akaike info criterion	5.032690
Sum squared resid	185.4989	Schwarz criterion	5.353320
Log likelihood	-73.52304	F-statistic	0.461721
Durbin-Watson stat	1.821381	Prob(F-statistic)	0.829807

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.021618	Probability	0.884125
Obs*R-squared	0.023837	Probability	0.877301

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 10:22
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007194	0.599762	0.011994	0.9905
INTERCONTINDEXRET	-0.119613	1.998992	-0.059836	0.9527
RESID(-1)	-0.029915	0.203457	-0.147031	0.8841

R-squared	0.000745	Mean dependent var	-8.33E-17
Adjusted R-squared	-0.068169	S.D. dependent var	3.227953
S.E. of regression	3.336163	Akaike info criterion	5.336580
Sum squared resid	322.7695	Schwarz criterion	5.473992
Log likelihood	-82.38527	F-statistic	0.010809
Durbin-Watson stat	1.979523	Prob(F-statistic)	0.989253

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.143860	Probability	0.707059
Obs*R-squared	0.157054	Probability	0.691884

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 11:15
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.007297	1.017885	-0.007168	0.9943
OCEANICINDEXRET	-0.019853	0.543880	-0.036502	0.9711
RESID(-1)	0.069940	0.184398	0.379289	0.7071
R-squared	0.004619	Mean dependent var		-1.83E-16
Adjusted R-squared	-0.059599	S.D. dependent var		5.663107
S.E. of regression	5.829422	Akaike info criterion		6.447810
Sum squared resid	1053.447	Schwarz criterion		6.582489
Log likelihood	-106.6128	F-statistic		0.071930
Durbin-Watson stat	1.260352	Prob(F-statistic)		0.930751

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.083065	Probability	0.775236
Obs*R-squared	0.091396	Probability	0.762410

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 11:30
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.124339	3.842611	0.032358	0.9744
PHBINDEXRET	-0.060492	1.919909	-0.031508	0.9751
RESID(-1)	0.054370	0.188646	0.288210	0.7752
R-squared	0.002856	Mean dependent var		4.44E-16
Adjusted R-squared	-0.065912	S.D. dependent var		5.743267
S.E. of regression	5.929523	Akaike info criterion		6.486825
Sum squared resid	1019.618	Schwarz criterion		6.624237
Log likelihood	-100.7892	F-statistic		0.041533
Durbin-Watson stat	1.954820	Prob(F-statistic)		0.959375

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.403199	Probability	0.245806
Obs*R-squared	1.476896	Probability	0.224261

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 11:41
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.050366	0.587254	0.085766	0.9322
SKYEINDEXRET	-0.277717	1.702781	-0.163096	0.8716
RESID(-1)	0.217076	0.183254	1.184567	0.2458
R-squared	0.046153	Mean dependent var		1.70E-16
Adjusted R-squared	-0.019630	S.D. dependent var		2.708406
S.E. of regression	2.734860	Akaike info criterion		4.939097
Sum squared resid	216.9043	Schwarz criterion		5.076510
Log likelihood	-76.02556	F-statistic		0.701599
Durbin-Watson stat	1.925216	Prob(F-statistic)		0.504013

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	35.95412	Probability	0.000001
Obs*R-squared	18.25788	Probability	0.000019

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 11:48
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.071170	0.442003	0.161018	0.8731
STANBICINDEXRET	-0.134519	0.455115	-0.295572	0.7695
RESID(-1)	0.740998	0.123578	5.996175	0.0000
R-squared	0.536996	Mean dependent var		1.31E-16
Adjusted R-squared	0.507125	S.D. dependent var		3.663150
S.E. of regression	2.571716	Akaike info criterion		4.811121
Sum squared resid	205.0255	Schwarz criterion		4.945800
Log likelihood	-78.78906	F-statistic		17.97706
Durbin-Watson stat	1.359262	Prob(F-statistic)		0.000007

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	6.207745	Probability	0.018915
Obs*R-squared	5.988574	Probability	0.014399

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 11:52
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.404642	0.471675	0.857883	0.3982
STANBICINDEXRET	-0.094029	0.407388	-0.230808	0.8191
STANBICSHARERET (-1)	-0.228034	0.143188	-1.592550	0.1225
STANBICINDEXRET(-1)	-0.150632	0.416328	-0.361812	0.7202
RESID(-1)	0.557020	0.223565	2.491535	0.0189
R-squared	0.181472	Mean dependent var		-6.90E-17
Adjusted R-squared	0.064539	S.D. dependent var		2.369295
S.E. of regression	2.291564	Akaike info criterion		4.635073
Sum squared resid	147.0354	Schwarz criterion		4.861817
Log likelihood	-71.47871	F-statistic		1.551936
Durbin-Watson stat	1.987042	Prob(F-statistic)		0.214560

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.005425	Probability	0.941869
Obs*R-squared	0.006943	Probability	0.933593

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 11:57
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.018019	0.541112	-0.033299	0.9737
STANBICINDEXRET	-0.002354	0.430503	-0.005467	0.9957
STANBICSHARERET (-1)	0.027430	0.413997	0.066257	0.9477
STANBICINDEXRET(-1)	0.023016	0.550488	0.041810	0.9670
STANBICSHARERET (-2)	-0.020409	0.329329	-0.061973	0.9511
STANBICINDEXRET(-2)	-0.023455	0.560762	-0.041828	0.9670
RESID(-1)	-0.033807	0.458973	-0.073657	0.9419
R-squared	0.000217	Mean dependent var		4.60E-16
Adjusted R-squared	-0.239731	S.D. dependent var		2.164839
S.E. of regression	2.410401	Akaike info criterion		4.788103
Sum squared resid	145.2508	Schwarz criterion		5.108733
Log likelihood	-69.60965	F-statistic		0.000904
Durbin-Watson stat	1.928629	Prob(F-statistic)		1.000000

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.406135	Probability	0.528938
Obs*R-squared	0.441959	Probability	0.506178

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 12:14
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.021819	0.974691	0.022385	0.9823
UBAINDEXRET	-0.047609	0.376948	-0.126302	0.9004
RESID(-1)	0.119909	0.188155	0.637287	0.5289

R-squared	0.013811	Mean dependent var	4.32E-16
Adjusted R-squared	-0.054202	S.D. dependent var	5.274643
S.E. of regression	5.415704	Akaike info criterion	6.305543
Sum squared resid	850.5657	Schwarz criterion	6.442956
Log likelihood	-97.88868	F-statistic	0.203067
Durbin-Watson stat	1.994474	Prob(F-statistic)	0.817374

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	8.571133	Probability	0.006460
Obs*R-squared	7.333136	Probability	0.006769

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 12:21
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.067205	1.299461	0.051718	0.9591
ZENITH1INDEXRET	4.800568	16.42793	0.292220	0.7721
RESID(-1)	-0.473770	0.161826	-2.927650	0.0065

R-squared	0.222216	Mean dependent var	-1.15E-16
Adjusted R-squared	0.170364	S.D. dependent var	8.053182
S.E. of regression	7.335189	Akaike info criterion	6.909751
Sum squared resid	1614.150	Schwarz criterion	7.045797
Log likelihood	-111.0109	F-statistic	4.285566
Durbin-Watson stat	2.276311	Prob(F-statistic)	0.023061

Appendix IX: Continued

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.849004	Probability	0.102951
Obs*R-squared	3.054311	Probability	0.080523

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 12:25
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.836009	1.433838	-0.583057	0.5647
ZENITH1INDEXRET	-23.17507	22.18912	-1.044434	0.3055
ZENITH1SHARERET (-1)	0.643023	0.413562	1.554842	0.1316
ZENITH1INDEXRET(-1)	-3.586923	16.77253	-0.213857	0.8323
RESID(-1)	-0.811313	0.480664	-1.687899	0.1030
R-squared	0.095447	Mean dependent var		-2.08E-17
Adjusted R-squared	-0.038561	S.D. dependent var		7.153415
S.E. of regression	7.290030	Akaike info criterion		6.953493
Sum squared resid	1434.903	Schwarz criterion		7.182515
Log likelihood	-106.2559	F-statistic		0.712251
Durbin-Watson stat	2.082778	Prob(F-statistic)		0.590766

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	12.31375	Probability	0.001442
Obs*R-squared	9.603348	Probability	0.001942

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/26/12 Time: 12:43
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.327904	0.356181	-0.920609	0.3646
ZENITH2INDEXRET	1.233362	0.747967	1.648952	0.1096
RESID(-1)	-0.611132	0.174157	-3.509095	0.0014
R-squared	0.291011	Mean dependent var		9.85E-17
Adjusted R-squared	0.243745	S.D. dependent var		1.950959
S.E. of regression	1.696611	Akaike info criterion		3.981651
Sum squared resid	86.35468	Schwarz criterion		4.117697
Log likelihood	-62.69724	F-statistic		6.156874
Durbin-Watson stat	2.087162	Prob(F-statistic)		0.005749

Appendix X: Event Window Engle (1982) Test for ARCH Effects Output

ARCH Test:

F-statistic	0.207348	Probability	0.652245
Obs*R-squared	0.220074	Probability	0.638984

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 00:13
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.29950	3.088637	3.658408	0.0010
RESID^2(-1)	-0.083912	0.184278	-0.455354	0.6522

R-squared	0.007099	Mean dependent var	10.46236
Adjusted R-squared	-0.027139	S.D. dependent var	13.63492
S.E. of regression	13.81870	Akaike info criterion	8.152263
Sum squared resid	5537.738	Schwarz criterion	8.244779
Log likelihood	-124.3601	F-statistic	0.207348
Durbin-Watson stat	2.031935	Prob(F-statistic)	0.652245

ARCH Test:

F-statistic	0.113306	Probability	0.738835
Obs*R-squared	0.120649	Probability	0.728332

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 00:22
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.55685	4.746372	2.645569	0.0130
RESID^2(-1)	0.063538	0.188760	0.336610	0.7388

R-squared	0.003892	Mean dependent var	13.36797
Adjusted R-squared	-0.030457	S.D. dependent var	22.42868
S.E. of regression	22.76767	Akaike info criterion	9.150901
Sum squared resid	15032.64	Schwarz criterion	9.243417
Log likelihood	-139.8390	F-statistic	0.113306
Durbin-Watson stat	1.922091	Prob(F-statistic)	0.738835

Appendix X: Continued

ARCH Test:

F-statistic	1.880911	Probability	0.180750
Obs*R-squared	1.888165	Probability	0.169409

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 00:37
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.129137	2.494953	2.857423	0.0078
RESID^2(-1)	0.246831	0.179977	1.371463	0.1807

R-squared	0.060909	Mean dependent var	9.434371
Adjusted R-squared	0.028526	S.D. dependent var	10.41534
S.E. of regression	10.26571	Akaike info criterion	7.557836
Sum squared resid	3056.160	Schwarz criterion	7.650352
Log likelihood	-115.1465	F-statistic	1.880911
Durbin-Watson stat	2.000412	Prob(F-statistic)	0.180750

ARCH Test:

F-statistic	0.338412	Probability	0.565242
Obs*R-squared	0.357578	Probability	0.549854

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 01:02
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.985157	3.434662	2.907173	0.0069
RESID^2(-1)	0.108432	0.186394	0.581732	0.5652

R-squared	0.011535	Mean dependent var	11.23514
Adjusted R-squared	-0.022550	S.D. dependent var	14.75359
S.E. of regression	14.91901	Akaike info criterion	8.305491
Sum squared resid	6454.731	Schwarz criterion	8.398006
Log likelihood	-126.7351	F-statistic	0.338412
Durbin-Watson stat	1.989448	Prob(F-statistic)	0.565242

Appendix X: Continued

ARCH Test:

F-statistic	0.642985	Probability	0.429154
Obs*R-squared	0.672420	Probability	0.412209

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 01:14
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.44363	3.872946	3.212963	0.0032
RESID^2(-1)	-0.143280	0.178684	-0.801863	0.4292

R-squared	0.021691	Mean dependent var	10.74109
Adjusted R-squared	-0.012044	S.D. dependent var	17.92678
S.E. of regression	18.03441	Akaike info criterion	8.684781
Sum squared resid	9431.958	Schwarz criterion	8.777296
Log likelihood	-132.6141	F-statistic	0.642985
Durbin-Watson stat	1.932938	Prob(F-statistic)	0.429154

ARCH Test:

F-statistic	0.665623	Probability	0.421233
Obs*R-squared	0.695563	Probability	0.404279

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 09:59
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.511063	1.930948	3.889833	0.0005
RESID^2(-1)	-0.150468	0.184430	-0.815857	0.4212

R-squared	0.022438	Mean dependent var	6.518385
Adjusted R-squared	-0.011272	S.D. dependent var	8.301516
S.E. of regression	8.348170	Akaike info criterion	7.144303
Sum squared resid	2021.066	Schwarz criterion	7.236818
Log likelihood	-108.7367	F-statistic	0.665623
Durbin-Watson stat	1.979860	Prob(F-statistic)	0.421233

Appendix X: Continued

ARCH Test:

F-statistic	22.58827	Probability	0.000050
Obs*R-squared	13.57356	Probability	0.000229

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 10:11
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.339724	2.121024	1.574581	0.1262
RESID^2(-1)	0.666888	0.140317	4.752712	0.0001
R-squared	0.437857	Mean dependent var		10.27249
Adjusted R-squared	0.418472	S.D. dependent var		11.24235
S.E. of regression	8.573182	Akaike info criterion		7.197496
Sum squared resid	2131.484	Schwarz criterion		7.290011
Log likelihood	-109.5612	F-statistic		22.58827
Durbin-Watson stat	2.295061	Prob(F-statistic)		0.000050

ARCH Test:

F-statistic	0.036795	Probability	0.849219
Obs*R-squared	0.039283	Probability	0.842889

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 11:25
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	33.37080	19.55937	1.706128	0.0987
RESID^2(-1)	-0.035600	0.185587	-0.191821	0.8492
R-squared	0.001267	Mean dependent var		32.22173
Adjusted R-squared	-0.033172	S.D. dependent var		101.9910
S.E. of regression	103.6689	Akaike info criterion		12.18262
Sum squared resid	311669.7	Schwarz criterion		12.27514
Log likelihood	-186.8306	F-statistic		0.036795
Durbin-Watson stat	2.003901	Prob(F-statistic)		0.849219

Appendix X: Continued

ARCH Test:

F-statistic	0.573941	Probability	0.454809
Obs*R-squared	0.601617	Probability	0.437962

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 11:37
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.315819	2.046281	3.086487	0.0044
RESID^2(-1)	0.139152	0.183677	0.757589	0.4548

R-squared	0.019407	Mean dependent var	7.334938
Adjusted R-squared	-0.014407	S.D. dependent var	8.524135
S.E. of regression	8.585317	Akaike info criterion	7.200325
Sum squared resid	2137.522	Schwarz criterion	7.292840
Log likelihood	-109.6050	F-statistic	0.573941
Durbin-Watson stat	1.997115	Prob(F-statistic)	0.454809

ARCH Test:

F-statistic	0.273844	Probability	0.604741
Obs*R-squared	0.289991	Probability	0.590226

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 11:59
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.920025	1.598972	2.451591	0.0205
RESID^2(-1)	0.096457	0.184324	0.523301	0.6047

R-squared	0.009355	Mean dependent var	4.371390
Adjusted R-squared	-0.024806	S.D. dependent var	7.405055
S.E. of regression	7.496336	Akaike info criterion	6.929047
Sum squared resid	1629.656	Schwarz criterion	7.021562
Log likelihood	-105.4002	F-statistic	0.273844
Durbin-Watson stat	1.779348	Prob(F-statistic)	0.604741

Appendix X: Continued

ARCH Test:

F-statistic	0.092303	Probability	0.763439
Obs*R-squared	0.098356	Probability	0.753812

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 12:10
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	28.33321	17.60398	1.609477	0.1183
RESID^2(-1)	-0.056405	0.185658	-0.303814	0.7634

R-squared	0.003173	Mean dependent var	26.76414
Adjusted R-squared	-0.031201	S.D. dependent var	92.27346
S.E. of regression	93.70190	Akaike info criterion	11.98045
Sum squared resid	254621.3	Schwarz criterion	12.07297
Log likelihood	-183.6971	F-statistic	0.092303
Durbin-Watson stat	1.994781	Prob(F-statistic)	0.763439

ARCH Test:

F-statistic	0.503306	Probability	0.483716
Obs*R-squared	0.528839	Probability	0.467095

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 12:29
Sample(adjusted): 4 34
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.40468	39.79076	1.115955	0.2736
RESID^2(-1)	0.130621	0.184118	0.709441	0.4837

R-squared	0.017059	Mean dependent var	51.08597
Adjusted R-squared	-0.016835	S.D. dependent var	213.4616
S.E. of regression	215.2509	Akaike info criterion	13.64383
Sum squared resid	1343656.	Schwarz criterion	13.73634
Log likelihood	-209.4793	F-statistic	0.503306
Durbin-Watson stat	2.001471	Prob(F-statistic)	0.483716

Appendix XI: Event Window White (1980) Test for Heteroskedasticity Output

White Heteroskedasticity Test:

F-statistic	2.294852	Probability	0.118790
Obs*R-squared	4.372487	Probability	0.112338

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 00:15
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-307964.6	144992.0	-2.124011	0.0423
ACCESSINDEXRET	449027.7	211319.3	2.124878	0.0422
ACCESSINDEXRET^2	-163664.1	76994.91	-2.125649	0.0422

R-squared	0.136640	Mean dependent var	10.17173
Adjusted R-squared	0.077098	S.D. dependent var	13.51358
S.E. of regression	12.98220	Akaike info criterion	8.054095
Sum squared resid	4887.587	Schwarz criterion	8.191508
Log likelihood	-125.8655	F-statistic	2.294852
Durbin-Watson stat	2.117534	Prob(F-statistic)	0.118790

White Heteroskedasticity Test:

F-statistic	0.082526	Probability	0.921003
Obs*R-squared	0.181097	Probability	0.913430

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 00:24
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.94844	4.222444	3.303404	0.0025
DIAMONDINDEXRET	0.519949	9.781030	0.053159	0.9580
DIAMONDINDEXRET^2	-0.801518	3.158005	-0.253805	0.8014

R-squared	0.005659	Mean dependent var	13.52130
Adjusted R-squared	-0.062916	S.D. dependent var	22.08101
S.E. of regression	22.76504	Akaike info criterion	9.177389
Sum squared resid	15029.16	Schwarz criterion	9.314802
Log likelihood	-143.8382	F-statistic	0.082526
Durbin-Watson stat	1.810074	Prob(F-statistic)	0.921003

Appendix XI: Continued

White Heteroskedasticity Test:

F-statistic	0.154788	Probability	0.857299
Obs*R-squared	0.337994	Probability	0.844511

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 00:39
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.26367	2.447638	4.193295	0.0002
FCMBINDEXRET	-2.066207	4.023360	-0.513553	0.6115
FCMBINDEXRET^2	-1.368373	2.821910	-0.484910	0.6314

R-squared	0.010562	Mean dependent var	9.391691
Adjusted R-squared	-0.057675	S.D. dependent var	10.24882
S.E. of regression	10.54022	Akaike info criterion	7.637335
Sum squared resid	3221.793	Schwarz criterion	7.774747
Log likelihood	-119.1974	F-statistic	0.154788
Durbin-Watson stat	1.518805	Prob(F-statistic)	0.857299

White Heteroskedasticity Test:

F-statistic	0.286546	Probability	0.937822
Obs*R-squared	2.059071	Probability	0.914186

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 01:06
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.04294	115.7511	0.147238	0.8841
FIDELITYINDEXRET	-45.47545	293.2062	-0.155097	0.8780
FIDELITYINDEXRET^2	15.31921	217.9557	0.070286	0.9445
FIDELITYSHARERET(-1)	-0.009096	0.779114	-0.011675	0.9908
FIDELITYSHARERET(-1)^2	-0.149866	0.248105	-0.604043	0.5513
FIDELITYINDEXRET(-1)	55.11899	298.4310	0.184696	0.8550
FIDELITYINDEXRET(-1)^2	-59.12888	220.5481	-0.268100	0.7908

R-squared	0.064346	Mean dependent var	11.16853
Adjusted R-squared	-0.160211	S.D. dependent var	14.51857
S.E. of regression	15.63840	Akaike info criterion	8.527976
Sum squared resid	6113.989	Schwarz criterion	8.848606
Log likelihood	-129.4476	F-statistic	0.286546
Durbin-Watson stat	1.743358	Prob(F-statistic)	0.937822

Appendix XI: Continued

White Heteroskedasticity Test:

F-statistic	0.771090	Probability	0.471760
Obs*R-squared	1.615789	Probability	0.445796

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 01:17
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.07462	5.058198	3.177935	0.0035
FININDEXRET	-4.973145	4.627664	-1.074656	0.2914
FININDEXRET^2	-0.399443	0.334051	-1.195755	0.2415

R-squared	0.050493	Mean dependent var	11.55275
Adjusted R-squared	-0.014990	S.D. dependent var	18.22317
S.E. of regression	18.35924	Akaike info criterion	8.747203
Sum squared resid	9774.790	Schwarz criterion	8.884616
Log likelihood	-136.9552	F-statistic	0.771090
Durbin-Watson stat	2.187870	Prob(F-statistic)	0.471760

White Heteroskedasticity Test:

F-statistic	0.971571	Probability	0.494898
Obs*R-squared	10.12194	Probability	0.429861

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 10:02
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.979860	3.180120	1.251481	0.2245
FIRSTINDEXRET	0.591189	2.441883	0.242104	0.8110
FIRSTINDEXRET^2	-0.129847	0.266873	-0.486552	0.6316
FIRSTSHARERET(-1)	0.466997	0.604684	0.772299	0.4485
FIRSTSHARERET(-1)^2	0.039775	0.204294	0.194696	0.8475
FIRSTINDEXRET(-1)	0.451691	2.614655	0.172754	0.8645
FIRSTINDEXRET(-1)^2	-0.188102	0.279470	-0.673066	0.5082
FIRSTSHARERET(-2)	-0.332841	0.715117	-0.465436	0.6464
FIRSTSHARERET(-2)^2	0.383843	0.200197	1.917328	0.0689
FIRSTINDEXRET(-2)	1.835749	2.382544	0.770499	0.4496
FIRSTINDEXRET(-2)^2	-0.318995	0.257715	-1.237780	0.2295

R-squared	0.316311	Mean dependent var	6.439206
Adjusted R-squared	-0.009256	S.D. dependent var	8.178797
S.E. of regression	8.216559	Akaike info criterion	7.316467
Sum squared resid	1417.749	Schwarz criterion	7.820313
Log likelihood	-106.0635	F-statistic	0.971571
Durbin-Watson stat	2.262377	Prob(F-statistic)	0.494898

Appendix XI: Continued

White Heteroskedasticity Test:

F-statistic	1.652634	Probability	0.209078
Obs*R-squared	3.274035	Probability	0.194559

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 10:18
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.516366	2.286524	4.161936	0.0003
INTERCONTINDEXRET	-8.418909	6.051587	-1.391190	0.1747
INTERCONTINDEXRET^2	9.585695	10.61445	0.903080	0.3739

R-squared	0.102314	Mean dependent var	10.09407
Adjusted R-squared	0.040404	S.D. dependent var	11.10549
S.E. of regression	10.87882	Akaike info criterion	7.700573
Sum squared resid	3432.114	Schwarz criterion	7.837986
Log likelihood	-120.2092	F-statistic	1.652634
Durbin-Watson stat	0.652659	Prob(F-statistic)	0.209078

White Heteroskedasticity Test:

F-statistic	0.051265	Probability	0.950107
Obs*R-squared	0.112082	Probability	0.945500

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 11:12
Sample: 1 34
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	32.36264	21.83547	1.482114	0.1484
OCEANICINDEXRET	-4.725590	30.41996	-0.155345	0.8776
OCEANICINDEXRET^2	0.120750	3.260667	0.037032	0.9707

R-squared	0.003297	Mean dependent var	31.12752
Adjusted R-squared	-0.061007	S.D. dependent var	121.0855
S.E. of regression	124.7244	Akaike info criterion	12.57419
Sum squared resid	482241.1	Schwarz criterion	12.70887
Log likelihood	-210.7612	F-statistic	0.051265
Durbin-Watson stat	1.041714	Prob(F-statistic)	0.950107

Appendix XI: Continued

White Heteroskedasticity Test:

F-statistic	0.061446	Probability	0.940525
Obs*R-squared	0.135034	Probability	0.934712

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 11:28
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.116508	76.66440	0.118914	0.9062
PHBINDEXRET	11.22234	56.73988	0.197786	0.8446
PHBINDEXRET^2	0.311474	31.52836	0.009879	0.9922
R-squared	0.004220	Mean dependent var		31.95433
Adjusted R-squared	-0.064455	S.D. dependent var		100.3439
S.E. of regression	103.5273	Akaike info criterion		12.20661
Sum squared resid	310819.0	Schwarz criterion		12.34402
Log likelihood	-192.3057	F-statistic		0.061446
Durbin-Watson stat	2.068617	Prob(F-statistic)		0.940525

White Heteroskedasticity Test:

F-statistic	0.722147	Probability	0.494237
Obs*R-squared	1.518099	Probability	0.468111

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 11:39
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.029266	2.814261	1.787065	0.0844
SKYEINDEXRET	8.445401	7.898559	1.069233	0.2938
SKYEINDEXRET^2	3.492997	8.152571	0.428453	0.6715
R-squared	0.047441	Mean dependent var		7.106232
Adjusted R-squared	-0.018253	S.D. dependent var		8.484738
S.E. of regression	8.561824	Akaike info criterion		7.221564
Sum squared resid	2125.840	Schwarz criterion		7.358976
Log likelihood	-112.5450	F-statistic		0.722147
Durbin-Watson stat	1.719452	Prob(F-statistic)		0.494237

Appendix XI: Continued

White Heteroskedasticity Test:

F-statistic	1.277145	Probability	0.303832
Obs*R-squared	12.10153	Probability	0.278319

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 12:01
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.797978	4.135123	1.160299	0.2589
STANBICINDEXRET	-11.60812	6.475036	-1.792750	0.0874
STANBICINDEXRET^2	2.336360	1.324010	1.764610	0.0922
STANBICSHARERET(-1)	-0.112874	0.585393	-0.192817	0.8490
STANBICSHARERET(-1)^2	-0.261928	0.157396	-1.664131	0.1109
STANBICINDEXRET(-1)	-16.67975	7.534692	-2.213726	0.0380
STANBICINDEXRET(-1)^2	2.778879	1.460541	1.902636	0.0709
STANBICSHARERET(-2)	0.335025	0.606082	0.552771	0.5863
STANBICSHARERET(-2)^2	0.020919	0.163812	0.127699	0.8996
STANBICINDEXRET(-2)	-4.832947	6.976224	-0.692774	0.4960
STANBICINDEXRET(-2)^2	0.486101	1.359684	0.357510	0.7243

R-squared	0.378173	Mean dependent var	4.540072
Adjusted R-squared	0.082065	S.D. dependent var	7.346869
S.E. of regression	7.038957	Akaike info criterion	7.007084
Sum squared resid	1040.485	Schwarz criterion	7.510930
Log likelihood	-101.1133	F-statistic	1.277145
Durbin-Watson stat	2.495129	Prob(F-statistic)	0.303832

Appendix XI: Continued

White Heteroskedasticity Test:

F-statistic	0.777591	Probability	0.468857
Obs*R-squared	1.628720	Probability	0.442923

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 12:12
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	27.88213	16.46669	1.693244	0.1011
UBAINDEXRET	29.48058	24.31078	1.212655	0.2350
UBAINDEXRET^2	-2.196645	1.761954	-1.246710	0.2225
R-squared	0.050897	Mean dependent var		26.95242
Adjusted R-squared	-0.014558	S.D. dependent var		90.77923
S.E. of regression	91.43762	Akaike info criterion		11.95825
Sum squared resid	242464.3	Schwarz criterion		12.09566
Log likelihood	-188.3320	F-statistic		0.777591
Durbin-Watson stat	2.181670	Prob(F-statistic)		0.468857

White Heteroskedasticity Test:

F-statistic	0.320638	Probability	0.919966
Obs*R-squared	2.286544	Probability	0.891550

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 12:32
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	57.69315	55.35613	1.042218	0.3073
ZENITH1INDEXRET	-349.5110	722.5352	-0.483729	0.6328
ZENITH1INDEXRET^2	697.6492	4048.573	0.172320	0.8646
ZENITH1SHARERET(-1)	3.651351	5.126229	0.712288	0.4829
ZENITH1SHARERET(-1)^2	0.073882	0.172408	0.428531	0.6719
ZENITH1INDEXRET(-1)	466.0121	604.9125	0.770379	0.4483
ZENITH1INDEXRET(-1)^2	-2434.972	3367.003	-0.723187	0.4763
R-squared	0.071455	Mean dependent var		49.57224
Adjusted R-squared	-0.151396	S.D. dependent var		210.1650
S.E. of regression	225.5136	Akaike info criterion		13.86528
Sum squared resid	1271410.	Schwarz criterion		14.18591
Log likelihood	-214.8444	F-statistic		0.320638
Durbin-Watson stat	2.002045	Prob(F-statistic)		0.919966

Appendix XI: Continued

White Heteroskedasticity Test:

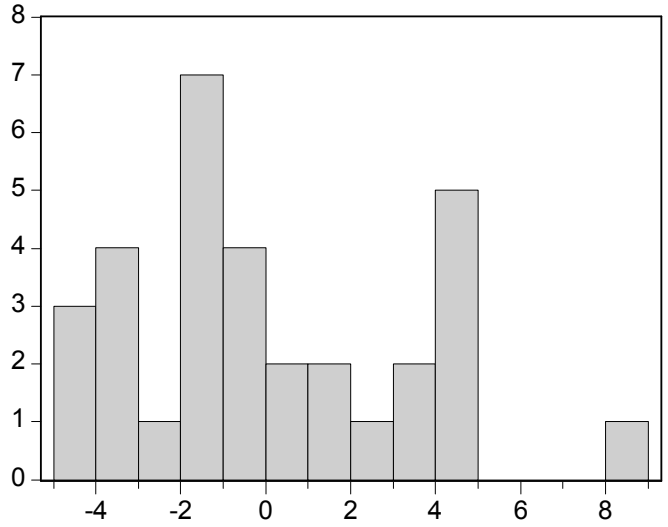
F-statistic	0.358652	Probability	0.897966
Obs*R-squared	2.536144	Probability	0.864401

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/26/12 Time: 12:51
Sample: 3 34
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.909322	2.790353	1.759391	0.0907
ZENITH2INDEXRET	-15.41640	15.33165	-1.005528	0.3243
ZENITH2INDEXRET^2	5.071268	5.210244	0.973326	0.3397
ZENITH2SHARERET(-1)	0.264265	0.595320	0.443904	0.6609
ZENITH2SHARERET(-1)^2	-0.074548	0.242958	-0.306835	0.7615
ZENITH2INDEXRET(-1)	0.803600	14.99816	0.053580	0.9577
ZENITH2INDEXRET(-1)^2	-0.230084	4.989988	-0.046109	0.9636

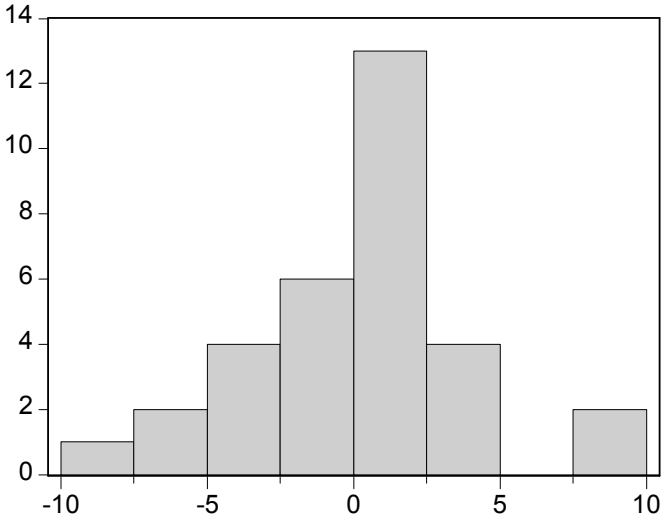
R-squared	0.079254	Mean dependent var	2.072394
Adjusted R-squared	-0.141724	S.D. dependent var	4.690426
S.E. of regression	5.011790	Akaike info criterion	6.252103
Sum squared resid	627.9511	Schwarz criterion	6.572733
Log likelihood	-93.03365	F-statistic	0.358652
Durbin-Watson stat	2.066948	Prob(F-statistic)	0.897966

Appendix XII: Event Window Jarque-Bera Test for Normality of Residuals Output



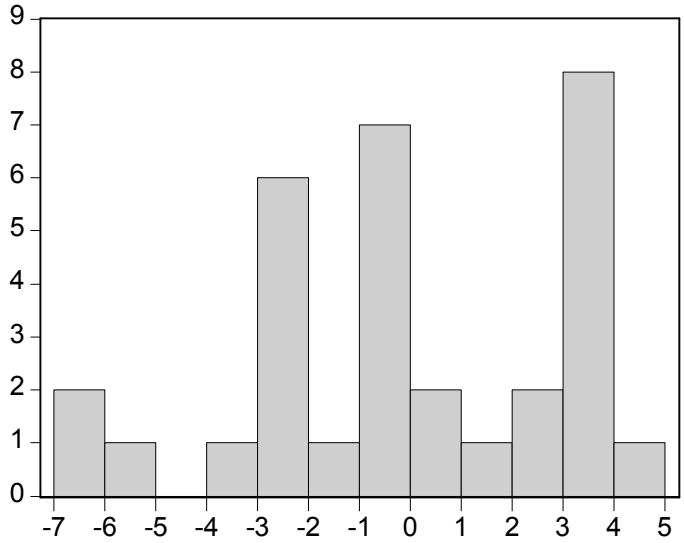
Series: ACCESSRESIDUALS
Sample 1 32
Observations 32

Mean	9.38E-06
Median	-0.857150
Maximum	8.509500
Minimum	-4.857300
Std. Dev.	3.240347
Skewness	0.596787
Kurtosis	2.709868
Jarque-Bera	2.011725
Probability	0.365729

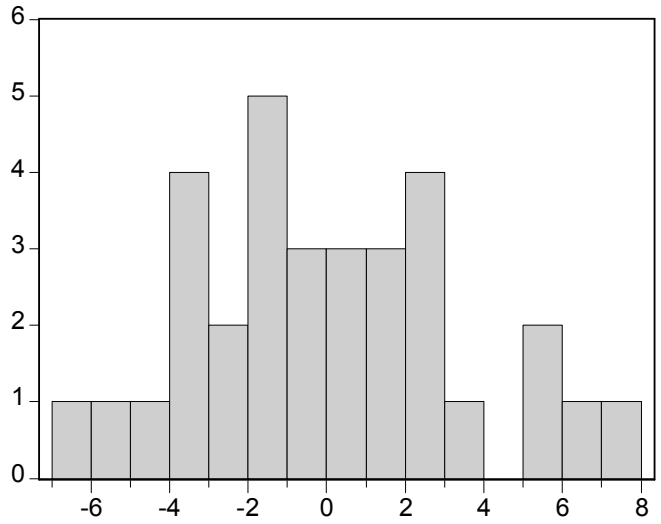


Series: DIAMONDRESIDUALS
Sample 1 32
Observations 32

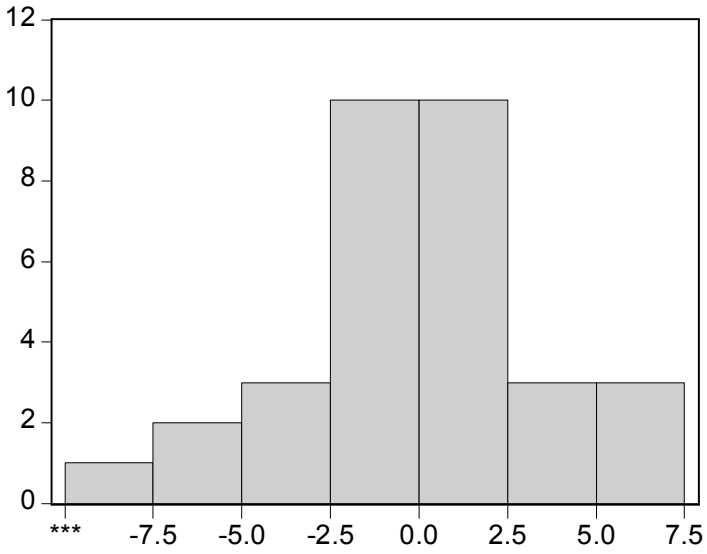
Mean	3.13E-06
Median	0.391850
Maximum	8.531100
Minimum	-9.074600
Std. Dev.	3.735968
Skewness	-0.011876
Kurtosis	3.583515
Jarque-Bera	0.454738
Probability	0.796627



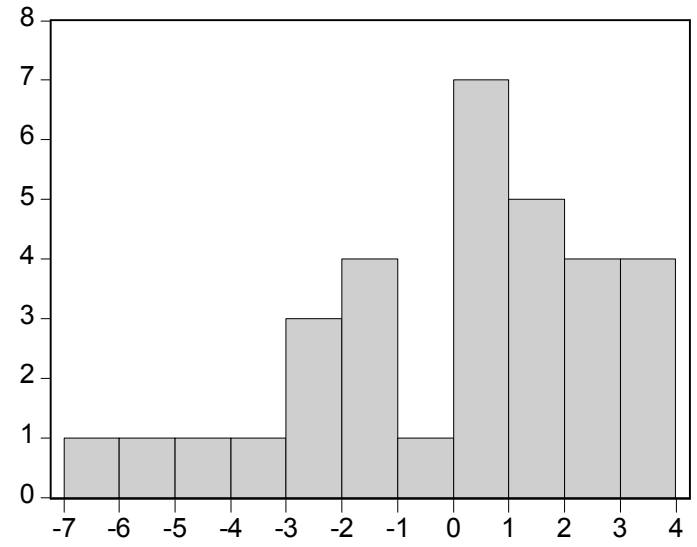
Series: FCMBRESIDUALS	
Sample 1 32	
Observations 32	
Mean	0.000000
Median	-0.450850
Maximum	4.275900
Minimum	-6.077000
Std. Dev.	3.113620
Skewness	-0.273907
Kurtosis	2.153650
Jarque-Bera	1.355212
Probability	0.507831



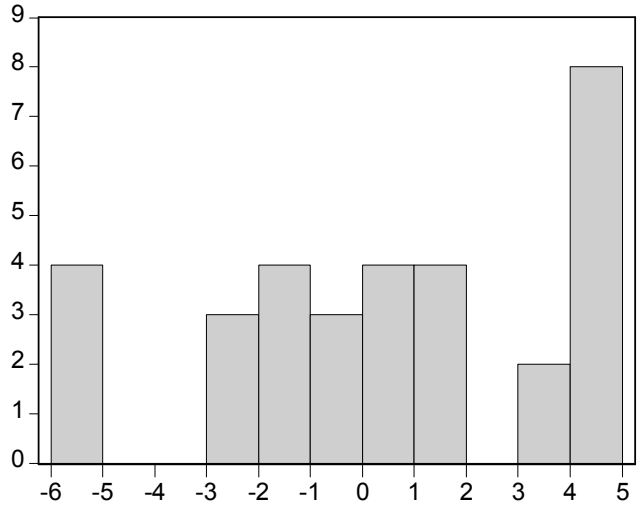
Series: FIDELITYRESIDUALS	
Sample 1 32	
Observations 32	
Mean	3.12E-06
Median	-0.130150
Maximum	7.431500
Minimum	-6.138500
Std. Dev.	3.395417
Skewness	0.386237
Kurtosis	2.637065
Jarque-Bera	0.971249
Probability	0.615313



Series: FINRESIDUALS	
Sample 1 32	
Observations 32	
Mean	-6.25E-06
Median	-0.062450
Maximum	6.059200
Minimum	-9.489400
Std. Dev.	3.453322
Skewness	-0.460876
Kurtosis	3.410379
Jarque-Bera	1.357382
Probability	0.507281

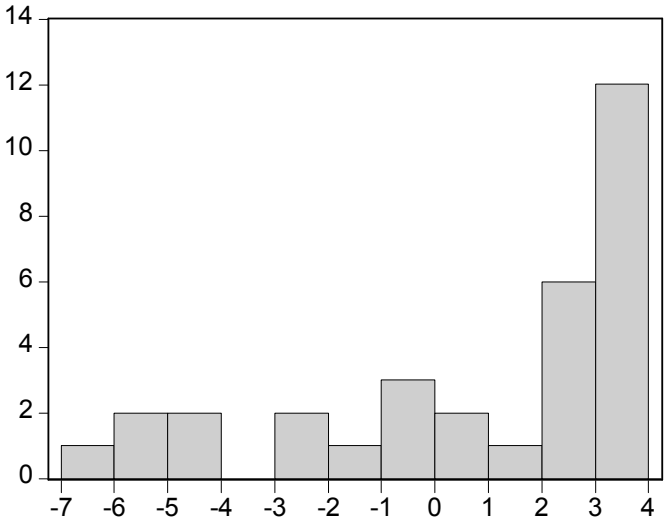


Series: FIRSTRESIDUALS	
Sample 1 32	
Observations 32	
Mean	-1.39E-16
Median	0.328100
Maximum	3.321100
Minimum	-6.126600
Std. Dev.	2.578154
Skewness	-0.612164
Kurtosis	2.562885
Jarque-Bera	2.253395
Probability	0.324102



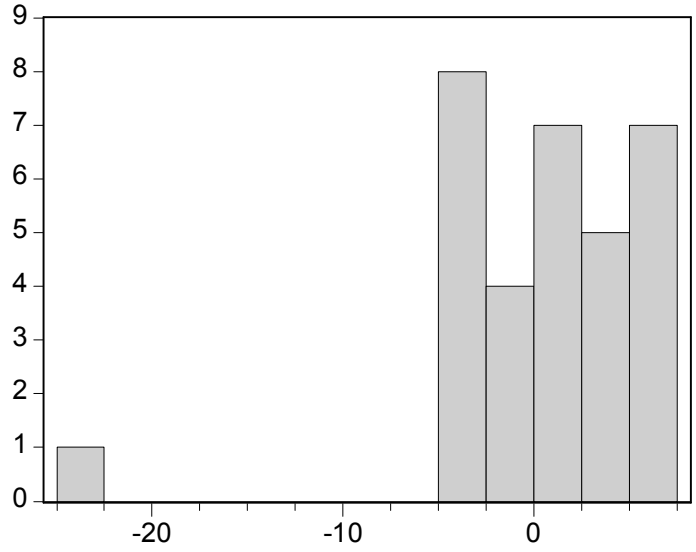
Series: INTERCONTRESIDUALS
Sample 1 32
Observations 32

Mean	0.565872
Median	0.419450
Maximum	4.862900
Minimum	-5.181400
Std. Dev.	3.237269
Skewness	-0.248397
Kurtosis	2.056378
Jarque-Bera	1.516302
Probability	0.468532

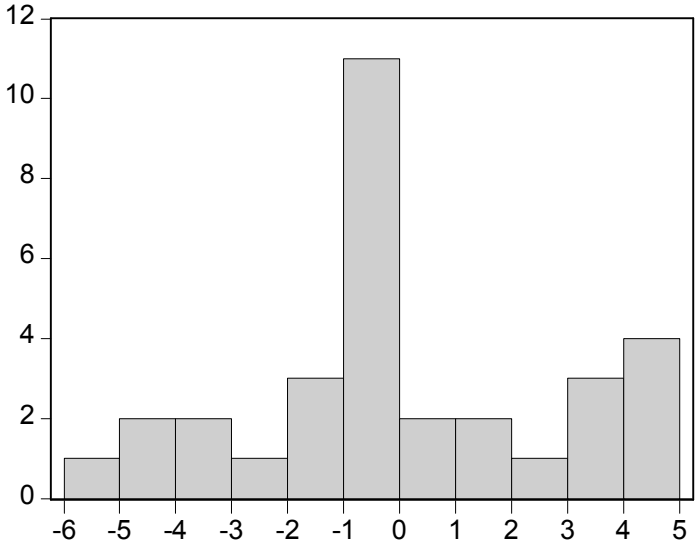


Series: OCEANICRESIDUALS
Sample 1 32
Observations 32

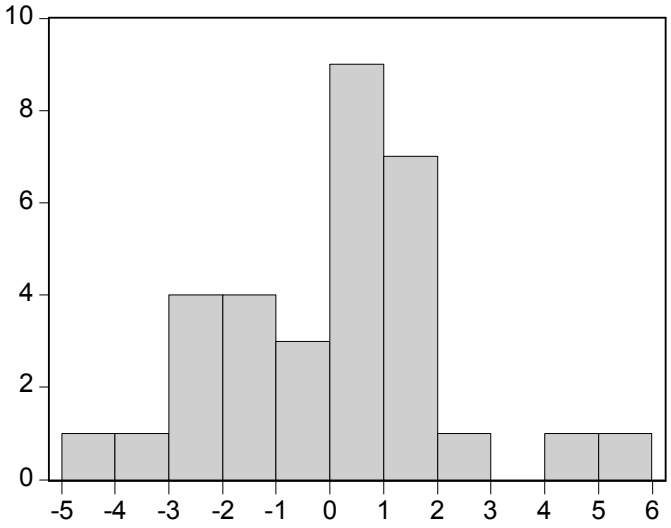
Mean	0.741597
Median	2.789850
Maximum	3.718400
Minimum	-6.941100
Std. Dev.	3.200213
Skewness	-1.049009
Kurtosis	2.714601
Jarque-Bera	5.977506
Probability	0.050350



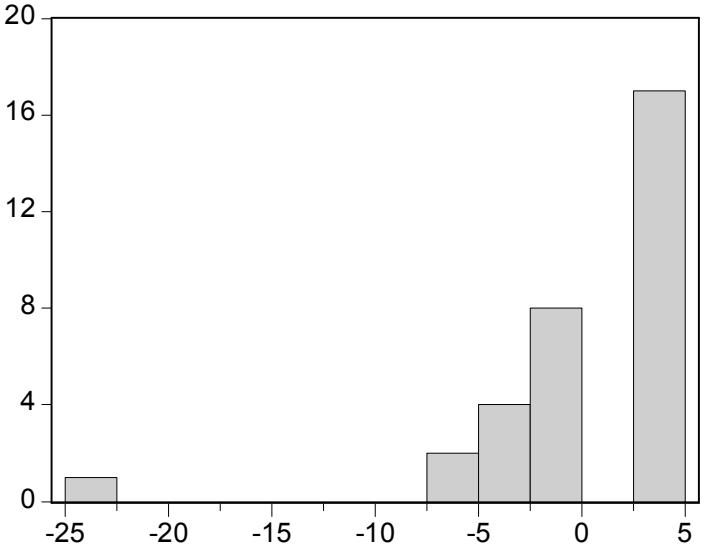
Series: PHBRESIDUALS	
Sample 1 32	
Observations 32	
Mean	3.12E-06
Median	0.475700
Maximum	5.795500
Minimum	-24.05120
Std. Dev.	5.743259
Skewness	-2.255774
Kurtosis	10.55288
Jarque-Bera	103.2002
Probability	0.000000



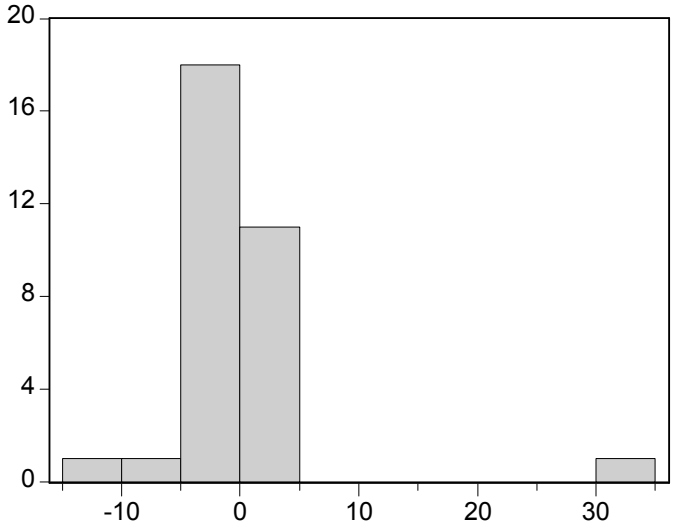
Series: SKYERESIDUALS	
Sample 1 32	
Observations 32	
Mean	6.25E-06
Median	-0.535000
Maximum	4.337400
Minimum	-5.927400
Std. Dev.	2.708406
Skewness	0.039086
Kurtosis	2.381054
Jarque-Bera	0.518941
Probability	0.771460



Series: STANBICRESIDUALS	
Sample 1 32	
Observations 32	
Mean	3.12E-06
Median	0.587300
Maximum	5.706800
Minimum	-4.919200
Std. Dev.	2.164839
Skewness	0.147865
Kurtosis	3.536825
Jarque-Bera	0.500850
Probability	0.778470

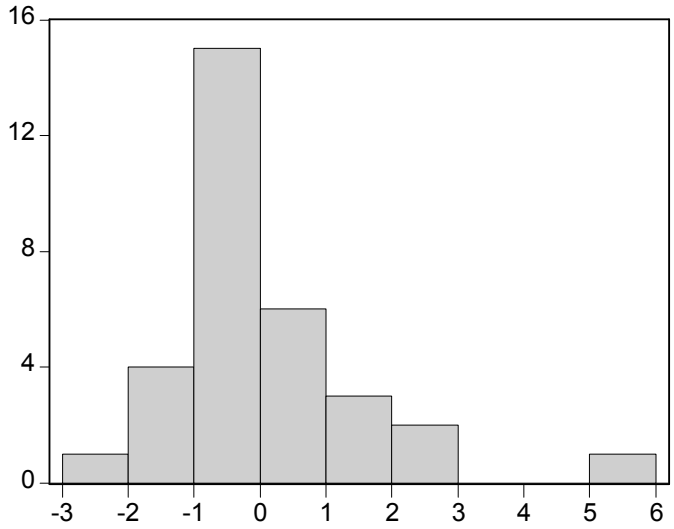


Series: UBARESIDUALS	
Sample 1 32	
Observations 32	
Mean	-3.13E-06
Median	2.925500
Maximum	3.759700
Minimum	-22.84930
Std. Dev.	5.274644
Skewness	-2.679060
Kurtosis	11.98984
Jarque-Bera	146.0356
Probability	0.000000



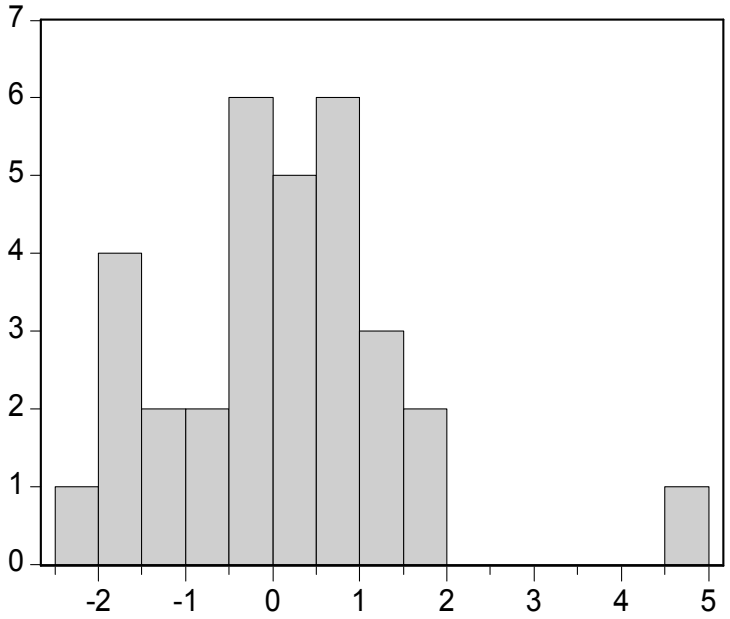
Series: ZENITH1RESIDUALS
Sample 1 32
Observations 32

Mean	-9.38E-06
Median	-0.640200
Maximum	34.42180
Minimum	-13.65700
Std. Dev.	7.153421
Skewness	3.341356
Kurtosis	18.41223
Jarque-Bera	376.2606
Probability	0.000000

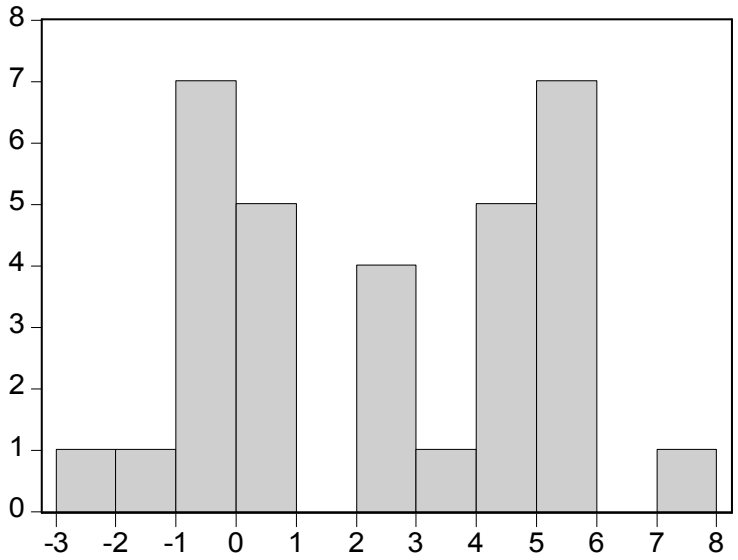


Series: ZENITH2RESIDUALS
Sample 1 32
Observations 32

Mean	6.25E-06
Median	-0.324300
Maximum	5.014200
Minimum	-2.834400
Std. Dev.	1.462621
Skewness	1.344773
Kurtosis	5.962450
Jarque-Bera	21.34636
Probability	0.000023



Series: AAR	
Sample 1 32	
Observations 32	
Mean	0.093384
Median	0.089500
Maximum	4.621600
Minimum	-2.355600
Std. Dev.	1.353148
Skewness	0.879221
Kurtosis	5.234405
Jarque-Bera	10.77958
Probability	0.004563



Series: CAR	
Sample 1 32	
Observations 32	
Mean	2.437506
Median	2.669000
Maximum	7.399000
Minimum	-2.136200
Std. Dev.	2.731798
Skewness	0.008291
Kurtosis	1.593305
Jarque-Bera	2.638755
Probability	0.267302

Appendix XIII: Event Window Sample Banks' Abnormal Return

Table 5 Event Window Sample Banks' Abnormal Return

Day	Access	Diamond	FCMB	Fidelity	Fin	First	Intercont	Oceanic	PHB	Skye	Stanbic	UBA	Zenith1	Zenith2
-16	-1.0780	4.2749	-2.8405	3.0172	6.0592	-1.9962	-1.7364	2.8657	4.8647	-0.1278	-3.1256	-5.7262	1.6268	2.1543
-15	-0.9687	1.7877	0.9808	2.5431	-0.7133	-1.4320	-2.2232	-0.3367	-4.6462	-0.7837	5.7068	-0.0181	1.1058	-0.9370
-14	-0.7456	-1.7924	-0.8763	2.4885	-4.0031	3.0186	4.6198	0.1456	-4.7484	-2.2974	-1.5197	3.5939	-0.4815	-0.7011
-13	-1.5233	-2.9424	-1.0116	-5.4608	-1.2752	0.3894	4.3347	-4.7727	-1.6810	0.9868	-4.9192	3.4744	-2.2210	-0.2578
-12	-0.5506	-1.7153	3.3968	-3.8740	1.8398	0.3303	0.8005	-5.1252	5.7955	-0.9908	-2.6356	3.4776	-0.5861	2.8982
-11	-3.3107	4.5365	-3.1349	6.8229	-0.4688	-4.4131	-2.4333	3.0060	5.2834	-3.1837	-0.7850	3.3860	1.3765	-1.4722
-10	1.5728	0.4736	-2.8725	-6.1385	1.6761	1.7030	3.2567	3.1132	3.2056	-0.4368	-2.7475	3.2532	-0.5136	1.1377
-9	-2.3304	1.4550	-0.8818	-3.5624	-0.4538	-5.0334	0.7937	3.0459	-3.7639	-0.6922	0.1787	-22.8493	-0.1863	1.3012
-8	8.5095	1.1281	0.1709	-3.1233	4.5278	1.2807	3.9015	2.8558	5.6810	-1.9149	4.1115	-0.7096	-1.1767	-2.8344
-7	1.1307	1.2272	-2.0547	-1.0914	2.2906	-2.5754	1.4291	2.4667	4.8668	0.4868	-1.3575	-4.5690	0.8371	-0.6462
-6	-0.5284	-0.8161	-0.6749	5.3434	0.5600	0.2564	1.5427	-1.4124	-0.5173	4.2458	0.8212	3.7597	2.4061	0.8624
-5	-4.8573	-9.0746	-2.2008	-2.7831	-0.4971	0.0353	-2.1045	-4.4778	-2.6410	3.2859	-2.8311	3.4041	0.1056	0.0652
-4	3.3610	-2.9895	-0.2748	-1.7425	-4.8627	-1.1956	4.2824	-2.6410	1.8284	1.3666	-2.4745	3.5438	-1.1784	-0.8678
-3	4.0143	0.8747	2.1348	0.8552	-0.6870	1.9328	1.7796	0.4480	-4.0699	1.1015	-1.9320	3.4114	4.2461	-0.1440
-2	4.3222	2.6179	3.8283	7.4315	0.2962	-2.2896	4.7963	3.7184	3.1357	-4.1241	2.6404	3.2486	34.4218	0.6594
-1	-1.6004	8.1237	3.3975	1.2368	-5.3400	1.1877	4.8184	3.1378	-24.0512	-1.0246	-1.6136	2.7893	-13.6570	0.3700
0	4.1158	-5.7669	-2.6368	-1.1458	-2.9771	2.7512	4.7790	3.2409	-4.0195	-0.8811	0.7904	3.2574	-9.4249	5.0142
1	0.7206	2.3452	-2.3875	0.1781	1.0156	-0.5635	-5.1814	-0.0428	0.5413	-0.4423	-0.5903	-0.2781	1.3519	0.6557
2	4.5436	3.2663	1.7991	0.0214	-0.1527	0.1479	4.8629	2.9004	5.1508	4.3374	0.9066	3.2737	-4.0723	0.2761
3	4.1190	0.3801	-0.6135	1.1653	0.0278	0.3259	-5.1031	2.9144	5.1766	3.6587	-0.2054	3.2893	-2.2138	-0.4230
4	2.6942	0.5039	-6.0770	-0.7791	4.0488	3.3211	-5.1289	3.1313	5.2498	-1.8250	1.0788	3.5395	-1.7765	-0.4888
5	-3.2490	-0.3460	-6.0463	5.5180	3.1968	3.2228	-5.0784	2.7239	0.0121	-5.9274	0.7064	3.0617	-2.5003	-1.8509
6	-3.4474	-4.2069	3.8268	2.5671	5.5836	2.9744	4.1802	3.1544	-4.3780	-4.0816	1.0898	3.5526	-0.9675	-0.7272
7	-3.6166	8.5311	3.9196	2.4874	2.2415	2.6979	-1.1432	3.1214	0.7827	4.0190	1.2316	-6.4741	3.5246	-0.7895
8	-4.4495	-1.3187	-0.3903	-0.0852	-9.4894	-3.6295	-0.0091	3.2784	0.3717	-3.0352	0.7182	-1.8811	-0.6943	-0.7936
9	3.1280	-0.9765	4.2759	-3.2744	0.4301	-2.1024	0.0452	-2.6547	-4.4885	-0.4687	1.1528	-3.5127	-3.7393	1.2836
10	-1.1156	0.2279	2.3436	-4.1544	-1.6790	-1.9435	-1.7710	-5.3464	5.0859	-0.7127	0.8895	-1.3231	-3.4824	-1.0717
11	-1.6855	0.3980	3.9828	-1.5472	1.6977	3.2060	1.4118	-0.0509	0.9420	2.9128	1.2394	-4.1059	1.4785	-0.2193
12	-1.9846	0.4383	3.8673	-1.6381	-2.0031	0.8904	-1.4218	3.1386	-2.2056	-0.7261	0.3385	-1.7176	1.4547	-1.0662
13	0.5975	0.3857	-0.5114	1.1635	5.3813	2.3881	-0.0179	3.1418	0.4101	4.1430	1.0551	-0.2524	-2.6552	-0.8422
14	-1.7589	-4.9525	-5.7576	-2.2640	-5.1186	-6.1266	0.0006	1.9842	-1.8563	3.7333	1.6132	-3.5421	-1.6007	-0.3908
15	-4.0284	-6.0779	3.3190	-0.1751	-1.1522	1.2409	-0.1750	-6.9411	4.6828	-0.6013	0.4682	-0.3570	-0.8080	-0.1541

Source: Eviews Output, 2012

Appendix XIV: Descriptive Statistics of Sample Banks' Event Window Abnormal Return

Table 6 Descriptive Statistics of Sample Banks' Event Window Abnormal Return

	Mean	Median	Maximum	Minimum	Standard Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Obs.
Access	9.38E-06	-0.8572	8.5095	-4.8573	3.2403	0.5968	2.7099	2.0117	0.3657	32
Diamond	3.13E-06	0.3919	8.5311	-9.0746	3.7360	-0.0119	3.5836	0.4547	0.7966	32
FCMB	0.0000	-0.4509	4.2759	-6.0770	3.1136	-0.2739	2.1537	1.3552	0.5078	32
Fidelity	3.12E-06	-0.1302	7.4315	-6.1385	3.3954	0.3862	2.6371	0.9712	0.6153	32
Fin	-6.25E-06	-0.0625	6.0592	-9.4894	3.4533	-0.4609	3.4104	1.3574	0.5073	32
First	-1.39E-16	0.3281	3.3211	-6.1266	2.5782	-0.6122	2.5629	2.2534	0.3241	32
Intercont	0.5659	0.4195	4.8629	-5.1814	3.2373	-0.2484	2.0564	1.5163	0.4685	32
Oceanic	0.7416	2.7899	3.7184	-6.9411	3.2002	-1.0490	2.7146	5.9775	0.0504	32
PHB	3.12E-06	0.4757	5.7955	-24.0512	5.7433	-2.2558	10.5529	103.2002	0.0000	32
Skye	6.25E-06	-0.5350	4.3374	-5.9274	2.7084	0.0391	2.3811	0.5189	0.7715	32
Stanbic	3.12E-06	0.5873	5.7068	-4.9192	2.1648	0.1479	3.5368	0.5009	0.7785	32
UBA	-3.13E-06	2.9255	3.7597	-22.8493	5.2746	-2.6791	11.9898	146.0356	0.0000	32
Zenith1	-9.38E-06	-0.6402	34.4218	-13.6570	7.1534	3.3414	18.4122	376.2606	0.0000	32
Zenith2	6.25E-06	-0.3243	5.0142	-2.8344	1.4626	1.3448	5.9625	21.3464	0.0000	32

Source: Eviews 4.0 Output, 2012

Appendix XV: The Student's t-Distribution Table

Table 7 Critical values of Student's *t*-distribution for different probability levels and degrees of freedom

α	0.4	0.25	0.15	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
v										
1	0.3249	1.0000	1.9626	3.0777	6.3138	12.7062	31.8205	63.6567	318.3087	636.6189
2	0.2887	0.8165	1.3862	1.8856	2.9200	4.3027	6.9646	9.9248	22.3271	31.5991
3	0.2767	0.7649	1.2498	1.6377	2.3534	3.1824	4.5407	5.8409	10.2145	12.9240
4	0.2707	0.7407	1.1896	1.5332	2.1318	2.7764	3.7469	4.6041	7.1732	8.6103
5	0.2672	0.7267	1.1558	1.4759	2.0150	2.5706	3.3649	4.0321	5.8934	6.8688
6	0.2648	0.7176	1.1342	1.4398	1.9432	2.4469	3.1427	3.7074	5.2076	5.9588
7	0.2632	0.7111	1.1192	1.4149	1.8946	2.3646	2.9980	3.4995	4.7853	5.4079
8	0.2619	0.7064	1.1081	1.3968	1.8595	2.3060	2.8965	3.3554	4.5008	5.0413
9	0.2610	0.7027	1.0997	1.3830	1.8331	2.2622	2.8214	3.2498	4.2968	4.7809
10	0.2602	0.6998	1.0931	1.3722	1.8125	2.2281	2.7638	3.1693	4.1437	4.5869
11	0.2596	0.6974	1.0877	1.3634	1.7959	2.2010	2.7181	3.1058	4.0247	4.4370
12	0.2590	0.6955	1.0832	1.3562	1.7823	2.1788	2.6810	3.0545	3.9296	4.3178
13	0.2586	0.6938	1.0795	1.3502	1.7709	2.1604	2.6503	3.0123	3.8520	4.2208
14	0.2582	0.6924	1.0763	1.3450	1.7613	2.1448	2.6245	2.9768	3.7874	4.1405
15	0.2579	0.6912	1.0735	1.3406	1.7531	2.1314	2.6025	2.9467	3.7328	4.0728
16	0.2576	0.6901	1.0711	1.3368	1.7459	2.1199	2.5835	2.9208	3.6862	4.0150
17	0.2573	0.6892	1.0690	1.3334	1.7396	2.1098	2.5669	2.8982	3.6458	3.9651
18	0.2571	0.6884	1.0672	1.3304	1.7341	2.1009	2.5524	2.8784	3.6105	3.9216
19	0.2569	0.6876	1.0655	1.3277	1.7291	2.0930	2.5395	2.8609	3.5794	3.8834
20	0.2567	0.6870	1.0640	1.3253	1.7247	2.0860	2.5280	2.8453	3.5518	3.8495
21	0.2566	0.6864	1.0627	1.3232	1.7207	2.0796	2.5176	2.8314	3.5272	3.8193
22	0.2564	0.6858	1.0614	1.3212	1.7171	2.0739	2.5083	2.8188	3.5050	3.7921
23	0.2563	0.6853	1.0603	1.3195	1.7139	2.0687	2.4999	2.8073	3.4850	3.7676
24	0.2562	0.6848	1.0593	1.3178	1.7109	2.0639	2.4922	2.7969	3.4668	3.7454
25	0.2561	0.6844	1.0584	1.3163	1.7081	2.0595	2.4851	2.7874	3.4502	3.7251
26	0.2560	0.6840	1.0575	1.3150	1.7056	2.0555	2.4786	2.7787	3.4350	3.7066
27	0.2559	0.6837	1.0567	1.3137	1.7033	2.0518	2.4727	2.7707	3.4210	3.6896
28	0.2558	0.6834	1.0560	1.3125	1.7011	2.0484	2.4671	2.7633	3.4082	3.6739
29	0.2557	0.6830	1.0553	1.3114	1.6991	2.0452	2.4620	2.7564	3.3962	3.6594
30	0.2556	0.6828	1.0547	1.3104	1.6973	2.0423	2.4573	2.7500	3.3852	3.6460
35	0.2553	0.6816	1.0520	1.3062	1.6896	2.0301	2.4377	2.7238	3.3400	3.5911
40	0.2550	0.6807	1.0500	1.3031	1.6839	2.0211	2.4233	2.7045	3.3069	3.5510
45	0.2549	0.6800	1.0485	1.3006	1.6794	2.0141	2.4121	2.6896	3.2815	3.5203
50	0.2547	0.6794	1.0473	1.2987	1.6759	2.0086	2.4033	2.6778	3.2614	3.4960
60	0.2545	0.6786	1.0455	1.2958	1.6706	2.0003	2.3901	2.6603	3.2317	3.4602
70	0.2543	0.6780	1.0442	1.2938	1.6669	1.9944	2.3808	2.6479	3.2108	3.4350
80	0.2542	0.6776	1.0432	1.2922	1.6641	1.9901	2.3739	2.6387	3.1953	3.4163
90	0.2541	0.6772	1.0424	1.2910	1.6620	1.9867	2.3685	2.6316	3.1833	3.4019
100	0.2540	0.6770	1.0418	1.2901	1.6602	1.9840	2.3642	2.6259	3.1737	3.3905
120	0.2539	0.6765	1.0409	1.2886	1.6577	1.9799	2.3578	2.6174	3.1595	3.3735
150	0.2538	0.6761	1.0400	1.2872	1.6551	1.9759	2.3515	2.6090	3.1455	3.3566
200	0.2537	0.6757	1.0391	1.2858	1.6525	1.9719	2.3451	2.6006	3.1315	3.3398
300	0.2536	0.6753	1.0382	1.2844	1.6499	1.9679	2.3388	2.5923	3.1176	3.3233
∞	0.2533	0.6745	1.0364	1.2816	1.6449	1.9600	2.3263	2.5758	3.0902	3.2905

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