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An Empirical Analysis of the Relationship between New Investors and the Telecommunications Stocks 'Bubble Post the Egyptian Revolution

Marwan Mohamed Abdeldayem
Faculty of Commerce-Business & Finance Department -Cairo University-Egypt
And Applied Science University (ASU)-Kingdom of Bahrain-P.O Box 5055 Email:Marawan2000@hotmail.com

ABSTRACT
The Egyptian Exchange (EGX) declined 6.25% following the beginning of the Egyptian Revolution of 2011 on the 25th January. The EGX was closed after the revolution for a period of 55 days, till it was reopened on Wednesday 23rd March and the market fell by a further 8.9% on reopening. Subsequently, all the market indices soared during the period from the 23rd of March till the end of May 2011. Therefore, this study shares with some existing works the objective of getting a better understanding of investor behavior during financial bubbles and aims to analyze empirically the relationship between new investors (NI) and the telecommunications stocks' bubble that occurs after the Egyptian revolution. A similar methodology is employed as that used in previous studies in particular, the study of Gong, Pan and Shi (2015). The empirical findings of this research effort reveal that (1) the new investors initiated the telecommunications stocks' bubble; (2) the continuous entrance of new investors in the EGX sustained this bubble; and (3) the slow decline of the average price of telecommunications stocks over time is due to the new investors. Compared with other factors, the continuous stream of new investors was the most robust driving force of the bubble over the whole trading period.
Key Words: Telecommunications Stocks- Financial Bubble- New Investors (NI)-Behavioral Finance- Egyptian Exchange (EGX) -Egyptian Revolution- EGX 30 Index- Black-Scholes value- Volatility- Market Return

1. INTRODUCTION

In the 1990s, a lot of the focus of academic research shifted away from these econometric analyses of time series of prices, earnings and dividends toward developing models of human psychology in its relation to financial markets (Shiller, 2003). Hence, the field of behavioral finance developed and researchers, around the world, had seen too many anomalies, too little inspiration that the theoretical models captured important fluctuations.
Abdeldayem and Reda (2013) argue that behavioral finance means finance from a broader social science perspective including psychology and sociology. Behavioral finance is considered nowadays as one of the most vital research programs, and the current study, which analyzes the behavior of new investors and the financial bubble after the Egyptian revolution, is among this category.
Financial Bubbles occur when prices for a particular item rise far above the item's real value. Examples include houses, stocks, and gold or baseball cards. Sooner or later, the high prices become unsustainable and they fall dramatically until the item is valued at or even below its true worth. While most people agree that asset bubbles are a real phenomenon, they don't always agree on whether a specified asset bubble exists at a given time. There is no definitive, universally accepted explanation of how bubbles form. Each school of economics has its own view (See for example: King et al (1993); Lahrat (2008); Shiller (2012); Robert et al (2010) Levine et al (2007) and Krugman (2013)).
Shiller (2003) and Garber (1990) also argue that many individual grew suddenly rich. A golden bait hung temptingly out before the people, and one after another, they rushed to the stock markets like flies around the honey-pot. Eventually, however, the more prudent start to see that this folly could not last forever. Rich people no longer bought the flowers to keep them in their garden, but to sell them again at penny by penny profit. It seems that somebody must lose fearfully in the end. As this conviction spread, prices fell and never rose again.
Furthermore, Frehen, Goetzmann and Rouwenhorst (2011) argue that asset bubbles are important puzzles in financial economics, important because of their extraordinarily potential for disruption; puzzles because they defy standard notions of rationality. Recent research has highlighted the role of technological innovation in asset bubbles. This approach makes some cross-sectional empirical estimation about security prices during periods of technological change. Nicholas (2008) for example, utilizes *ex post* patent citations to prove that the U.S. stock market boom in the late 1920"s was driven by expected returns to companies invested in technological innovation. Further, Macleod (1986) highlights the association between stock market investing and the growth in patent filings in the late 17th century in Britain. In addition, Pastor and Veronesi (2006) introduce a model that reveals how imputed growth rates in innovative industries can appear irrationally high *ex post* and that industries in which bubbles occur will be characterized by high return volatility, high uncertainty and rapid adoption of the new technology. They test these predictions on

19th century railroad securities listed on the New York Stock Exchange (NYSE).

In the Egyptian context, following the 25th of January 2011 revolution, Egypt has embarked on a political and economic transition. The period has also witnessed deterioration in the macroeconomic framework, and economic growth has slowed substantially following the events post revolution. The uncertainty surrounding policies of the new administration have a major effect not only on the Telecommunications sector, but more important on the future of Egyptian economic and financial sector development.

The Egyptian Exchange (EGX) witnessed a severe decline in the value traded during 2011 to record LE 148 billion, as opposed to LE 321 billion in 2010 (worth mentioning that the EGX was closed after the revolution for a period of 55 days in 2011).Moreover, the volume traded recorded 18.5 billion securities in 2011 compared to 33 billion securities in 2010. Likewise, the number of transactions recorded 5.6 million transactions versus 10 million in 2010.

But then, Over the Counter market (OTC) has witnessed a remarkable decline in the trading activity in 2011, registering a trading value of LE 17.5 billion as opposed to LE 48 billion in 2010. This decline is mainly attributed to the OTC (Orders market) which recorded a trading value of LE 463 million down from LE 5 billion in 2010. Additionally, the Deals market has registered a trading value amounted to LE 17 billion in 2011 as opposed to LE 43 billion in 2010.

The trading suspension continued till the banks re-open, meanwhile, EGX and EFSA undertook several precautionary measures to assure the highest level of protection of investors' rights. Trading was resumed on the 23rd of March and the market witnessed a sharp decline during the first two sessions following the trading resumption. However, the market then showed a stable performance amid the parliamentary elections and the prevalence of a relative political stability which restored the investors' confidence and appetite.

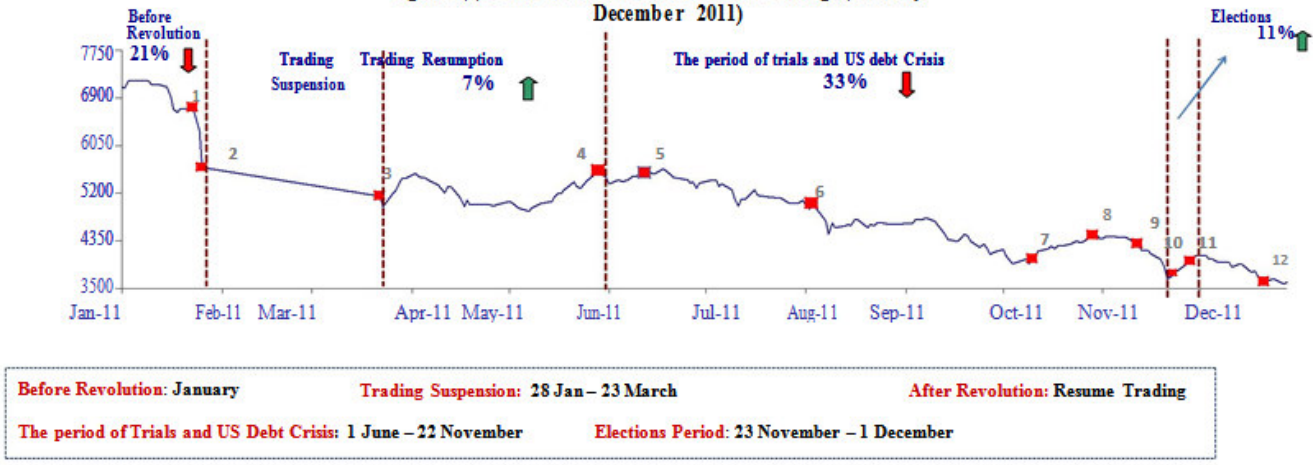
Consequently, all the market indices soared during the period from the 23rd of March till the end of May 2011 whereas EGX 30 rose by 7 %, while EGX 70 and EGX 100 surged by 32 % and 25 %, respectively. Therefore, attention was given to explore and analyze a potential financial bubble that may exist in the EGX after the Egyptian revolution (refer to table (1) that summarizes the Egyptian indices performance in 2011 and Figure (1) which illustrates the EGX 30 Index during January to December 2011).

Table (1) Indices Performance in 2011

Index	Open	High	Low	Close
EGX 30 Index (in Local Currency Terms)	7142	7210	3587	3622
EGX 30 Index (in US$ Terms)	4176	4223	2018	2038
EGX 70 Index	722	788	393	416
EGX 100 Index	1166	1245	629	643
DJ EGX Egypt Titans 20 Index	1533	1545	809	817
S&P/EGX ESG Index	1113	1178	576	598
EGX 20 Capped Index	8024	8172	3871	3925

Source: The Egyptian Exchange Annual Report (2011)

Figure (1) EGX 30 Index Performance During (January - December 2011)



10 **25 January** ….. The Egyptian Revolution Started

11 **28 January**..... Trading Suspension

12 **23 March** ….. Trading Resumption

13 **30 May**…….. Capital gains tax rumor spread

14 **12 June**……. S&P downgraded Egypt's Credit Rating

15 **August**……. US and Europe debt crisis heightening

16 **October**……. EGX 20 Capped Index launch

17 **30 October**…… Moody's downgrades the Egyptian government bonds' rating from Ba3 to B1 with a negative outlook

18 **13 November**…… launching NILEX new trading system

19 **24 November**……. Overnight Deposit Rate was raised by 100 bps to reach 9.25% and overnight lending rate was raised by 50 bps to reach 10.25%. The discount rate was also raised by 100 bps to 9.5%.

20 **28 – 29 November**..... The parliamentary elections

21 **22 December** …. Moody's downgrades the Egyptian government bonds credit rating for the fourth time from B1 to B2

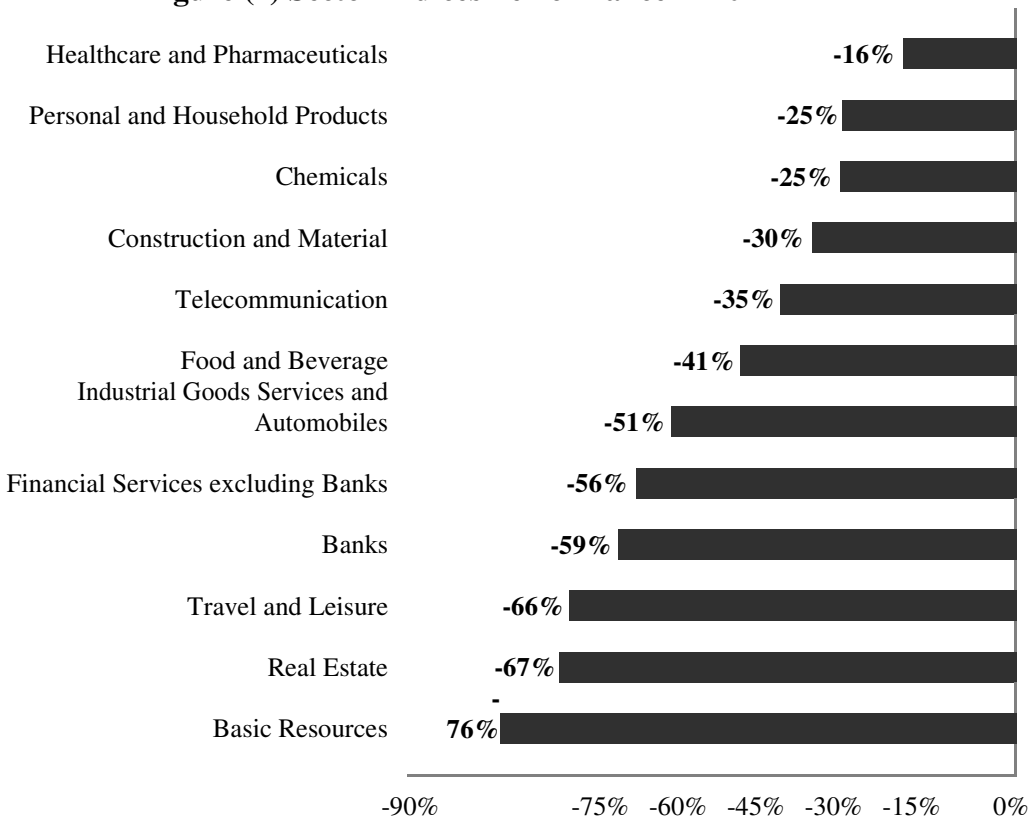
Source: Research & Markets Development Department-EGX

It should also be noted that the parliamentary elections of 2011 influenced the market positively, as all the indices surged at good rates. During the elections week, EGX 30 increased by 11 %, EGX 70 and EGX 100 rose by 19 % and 15 %, respectively. However, the political unrest hindered the market rise amid a sharp decline in the trading aggregates, and EGX 30 concluded the year with a decline of 49 %, EGX 70 declined by 42 % and EGX 100 decreased by 45 %. In addition, the market capitalization concluded the year 2011 at LE 294 billion as opposed to LE 488 billion at the end of 2010, with a decline of 40 %and representing 21 %of GDP.

Sector Indices Performance in the Egyptian Exchange (EGX)

All the traded sectors in the Egyptian Market witnessed a significant falling during 2011. It can be seen from Figure (2) and Table (2) that the lowest of which was recorded by the Healthcare and Pharmaceuticals sector of around 16 %.,followed by the Personal and Household Products sector in the second place retreating by 25 %. The third and fourth places were captured by the Chemicals sector and Construction and Materials sector recording a 25 % and 30 % decline, respectively. Worth mentioning, the Construction and Materials sector came forth in terms of volume traded recording 1.5 billion securities worth LE 13.6 billion. Recording a 35 % decline, the Telecommunications sector occupied the fifth place in terms of volume traded recording around 1.5 billion securities worth LE 9.7 billion.

Figure (2) Sector Indices Performance in 2011



Source: The Egyptian Exchange (2011)

Table (2) Sector Indices: 5 Most Active Sectors in terms of Volume Traded

Sector	Trading Volume (million shares)	Trading Value (LE million)	Average P/E Ratio 29/12/2010	Average DY (%) 29/12/2011
Financial Services (excluding Banks)	4,519	15,678	11.9	9.3
Real Estate	2,854	13,903	14.7	9.1
Industrial Goods, Services and Automobiles	1,627	6,242	8.2	9.6
Construction and Materials	1,498	13,613	10.4	11.1
Telecommunication	1,462	9,699	8.9	6.9

Source: The Egyptian Exchange Annual Report (2011)

Furthermore, it should be noticed that the Telecommunications sector in Egypt includes four companies as follows:

1-**Telecom Egypt (ETEL)** Telecom Egypt is a public company, listed on the Egyptian Exchange (EGX) since December 1999. It operates within the telecommunication services sector focusing on integrated telecommunication services. It has 14 subsidiaries operating across Northern Africa, Middle East, British Islands and Western Europe. Telecom Egypt is based in Giza, Egypt and was established in January 1854.

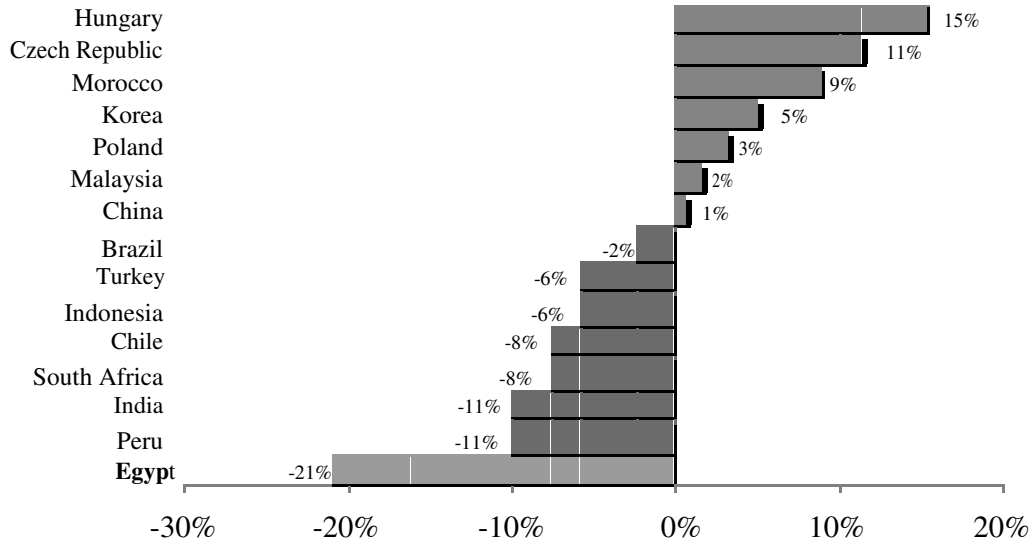
2-Global Telecom Holding (GTHE) Global Telecom Holding is a public company, listed on the Egyptian Exchange since January 1999. It operates within the telecommunication services sector focusing on integrated telecommunication services. It has 74 subsidiaries operating across Northern Africa, North America, British Islands, Eastern Asia, Southern Europe, Southern and Central Asia, Middle East, Western Europe, Eastern Africa and Central Africa. Global Telecom Holding is based in Cairo, Egypt and was established in July 1998.

3-Orascom Telecom Media and Technology Holding (OTMT) Orascom Telecom Media and Technology Holding (known as: Orascom Telecom Media & Technology) is a public company, listed on the Egyptian Exchange since January 2011. Orascom Telecom Media & Technology operates within the telecommunication

services sector focusing on integrated telecommunication services. It has 35 subsidiaries operating across Northern Africa, British Islands, Eastern Asia, Southern and Central Asia, Middle East, Southern Europe, North America and the Carribian. Orascom Telecom Media & Technology is based in Cairo, Egypt and was established in November 2010.

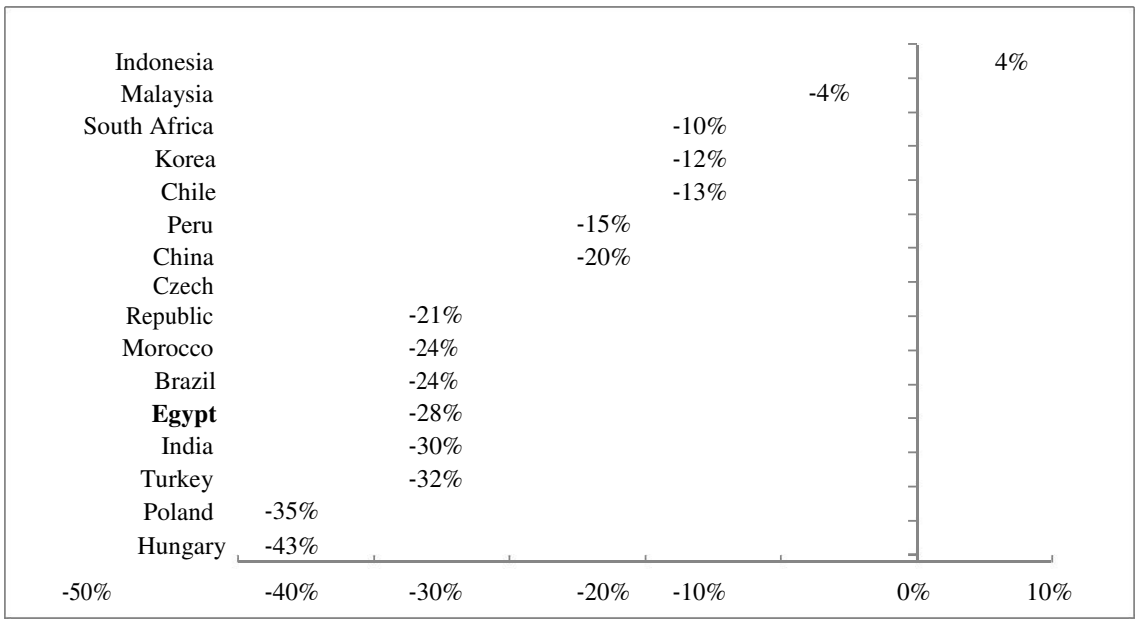
4-Egyptian Company for Mobile Services (MOBINIL) Egyptian Company for Mobile Services (known as: Mobinil) is a public company, listed on the Egyptian Exchange since May 1998. Mobinil operates within the telecommunication services sector focusing on wireless telecommunication services. It has 6 subsidiaries operating across Egypt. Mobinil is based in Cairo, Egypt and was established in March 1998. Accordingly, due to the political situation in Egypt, it can be seen from figures (3) and (4) that the EGX recorded the lowest performance vs. all global markets before the 28th of January, 2011 recording 21 % losses before the revolution. This was mainly driven by the losses that took place during the two sessions prior to the 28th of January according to MSCI Price Index.

Figure (3) Percentage Change in MSCI Egypt vs. Other Emerging Markets in 2011 (Before Revolution: 1-27 January)



Source: Morgan Stanley Website

Figure (4) Percentage Change in MSCI Egypt vs. Other Emerging Markets in 2011 (After Revolution: 23 March - End of Year)



Source: Morgan Stanley Website

This paper is organized as follows: section (1) is an introduction to the study. Section (2) includes the literature review of new investors and financial bubbles and gives background to the Egyptian Exchange (EGX). The research methodology and analysis are in section (3) and (4) respectively. Section (5) presents the empirical findings of the study, while section (6) concludes.

2- LITERATURE REVIEW

Greenwood and Nagel (2009) argue that stock market folklore is rich in anecdotes about new investors drawn into the market during financial market bubbles. In his classic history of financial speculation, Kindleberger (1979) argues that bubbles bring in "segments of the population that are normally a loaf from such ventures." In addition, both Garber (1990) and Froot et al (1991) suggest that it has been variously suggested that bubbles may be rational, intrinsic and contagious (Topol, 1991).To date, there is no widely accepted theory to explain their occurrence. Recent computer-generated agency models suggest excessive leverage could be a key factor in causing financial bubbles (Bunchanan, 2008)

One possible cause of bubbles is excessive monetary liquidity in the financial system, inducing lax or inappropriate lending standards by the banks, which makes markets vulnerable to volatile asset price inflation caused by short-term, leveraged speculation. For example, Axel A. Weber, the former president of the Deutsche Bundesbank, has argued that "The past has shown that an overly generous provision of liquidity in global financial markets in connection with a very low level of interest rates promotes the formation of asset-price bubbles (Caginalp and Balenovich, 1999)

Moreover, herding is a very interesting and important phenomenon in the financial sphere as it is a common notion that herding is associated with volatility in stock prices and stock returns as well as the destabilization of financial markets (Bikhchandani and Sharma (2000); and Dasgupta et al. (2011)). Moreover, herding is also known to account for the momentum in as well as the reversal of stock prices (Nofsinger and Sias 1999)

Herding has also been believed to be a main driver of asset price bubbles. Rannou (2010) postulate a model to explain the presence of speculative bubbles and they assume that the increase in the intensity of herding increases the size of the bubble. This is because as investors follow each other, they push the prices up even more. Similarly, DeMarzo et al. (2008) explain that herding is a primary component for the birth and sustainability of a financial bubble which leads to the conclusion that asset bubbles are a social phenomenon. Also, Caparelli et al. (2004) claim that herding is an indicator of inefficient markets that often have speculative bubbles.

Frehen, Goetzmann and Rouwenhorst (2011) revisit the first global financial bubbles which occurred in 1720 in France, Great-Britain and the Netherlands. They argue that the explanations for these linked bubbles mainly focus on the irrationality of investor speculation and the corresponding stock price behavior of two large companies: the South Sea Company in Great Britain and the Mississippi Company in France. In this paper they collect and examine a broad cross-section of security price data to evaluate the causes of the bubbles. Using newly available stock prices for British and Dutch firms in 1720, they find evidence against indiscriminate irrational exuberance and evidence in favor of speculation about fundamental financial and economic innovations in the European economy. These factors include the emergent Atlantic trade, new institutional forms of risk sharing and the innovative potential of the joint-stock company form itself. These factors ultimately had long-lasting transformative economic effects which may have been anticipated by the markets at the time. They use the cross-sectional data to test the hypothesis that the bubble in 1720 was driven by innovation by dividing the London share market into “old” and “new” economy stocks. Further, they find that companies associated with the Atlantic trade and with the new joint-stock insurance form had the highest price increases and had return dynamics consistent with current models of "New Economy" stocks. Moreover, the availability of new, high frequency data allow them to pinpoint the date of the 1720 crash and track its international propagation.

Greenwood and Nagel (2009) argue that asset market experiments suggest that inexperienced investors play a vital role in the formation of asset price bubbles. Without first-hand experience of a downturn, these investors are more optimistic and likely to exhibit trend chasing in their portfolio decisions. They examine this hypothesis with mutual fund manager data from the technology bubble. Using age as a proxy for managers' investment experience, they find that around the peak of the bubble, mutual funds run by younger managers are more heavily invested in technology stocks, relative to their style benchmarks, than their older colleagues. Consistent with the experimental evidence, they find that young managers, but not old managers, exhibit trend-chasing behavior in their technology stock investments. As a result, young managers increase their technology holdings during the run-up, and decrease them during the downturn. The economic significance of young managers' actions is amplified by large inflows into their funds prior to the peak in technology stock prices. Their results are unlikely to be explained by standard career concerns models or by differences in the ability to pick technology stocks between young and old managers.

Furthermore, Gong, Pan and Shi, (2015) argue that the crucial role of new investors in financial bubbles and their dynamics were explained by Anderson (1787) more than two centuries ago. Anderson argues that good potential gains lead to increasing investment, resulting in price appreciation that attracts new investors. The novel sources of funds lead to further price appreciation that continues to attract new investors. Despite the same mechanism underlying bubbles is widely believed to repeat itself over the centuries and across countries, few empirical and experimental research have concluded that there is a direct link between new investors and financial bubbles

Furthermore, the theoretical literature on bubbles has mainly investigated the macro and micro conditions under which a bubble exists, but has not examined the role of new investors in either initiating, aggravating or sustaining a bubble. This is mainly because of the lack of account level data, empirical research using naturally occurring data has not conducted much to highlight this issue, either. Greenwood and Nagel (2009) find that around the peak of the technology bubble, mutual funds run by younger managers invested in technology stocks more heavily than those run by older ones. Younger managers, however, are not equivalent to new investors.

Since Smith, Suchanek, and Williams (1988) introduced their pioneer methodology and concluded that market prices strongly deviate from fundamental value, so many replications and modifications to its experimental settings have followed, in order to test how factors such as experience, information, short sale constraints, cash to asset ratio, constant or changing fundamental value, futures markets and excess money, affect bubble formation. However, all existing experimental research merely emphasizes a certain set of subjects for example: Noussair, Robin, and Ruffieux (2001) and Huber, Kirchler, and Stockl (2010) find that increasing cash to asset ratio has a positive effect on bubble formation. However, they only look at the effect of new money held by old investors, not new investors entering the market.

The only study that empirically examined the effect of new investors in the bubble of the Baosteel call warrant in China is the study of Gong, Pan and Shi, (2015). In their comprehensive study, they provide an empirical analysis of the trading behavior and the impact of new investors on the bubble surrounding the Baosteel call warrant, the first derivative traded in China after a nine-year suspension. They find that First, the new investors initiated the bubble. Second, echoing common wisdom, further, they empirically show that the continuous entries of new investors sustained the bubble. Third, they attribute the slow drop of the warrant price at the approach of maturity to new investors. Finally, they concluded that compared with other factors, the continuous inflow of new investors was the most powerful driving force of the bubble over the whole trading period. Therefore, this research effort is adopting the same methodology and following the same procedures of this pioneer study. Hence, the aim of this study is to analyze the Telecommunications stocks bubble in the Egyptian Exchange (EGX) that occurs after the Egyptian revolution on the 25thof January, 2011. The period followed that revolution attracted frenzied speculation and generated a large bubble. After the Egyptian revolution, the average price of telecommunications stocks was on average three times higher than the fundamental value estimated with the Black-Scholes equation. The empirical analysis of the effect of new investors is made possible in this study by the available data, in which orders and transactions of every investor can be identified.

Background of the Egyptian Exchange (EGX):

Egypt's Stock Exchange is among the oldest stock exchanges in the world. The Egyptian Exchange (EGX), comprises two exchanges, Cairo and Alexandria, both governed by the same board of directors and sharing the same trading, clearing and settlement systems (Abdeldayem and Assran, 2013).

The Alexandria Stock Exchange was officially established in 1883, with Cairo following in 1903. Both exchanges were very active in the 1940s, and the combined Egyptian Stock Exchange ranked fifth in the world. The central planning and socialist policies adopted in the mid-1950s led to the exchange becoming dormant between 1961 and 1992.

In the 1990s, the Egyptian government's restructuring and economic reform program resulted in the revival of the Egyptian stock market, and a major change in the organization of the Cairo and Alexandria stock exchanges took place in January 1997 with the election of a new board of directors and the establishment of a number of board committees.

EGX 30 Index

The Egyptian Exchange has launched its main index EGX30 on February 1, 2003 The index includes top 30 companies in terms of liquidity and activity. The Index is weighted by market capitalization and adjusted by free float. EGX30 avoids concentration on one industry and therefore has a good representation of various industries/sectors in the economy. The Egyptian Exchange started publishing EGX30 Index, the previously named CASE30 on 2 February 2003, which has a base date of 1/1/1998 and a base value of 1000 points. As of 1 March 2009, the Egyptian exchange started publishing EGX30 in US$ terms, and renamed CASE30 to EGX30 reflecting the replacement of Cairo and Alexandria Stock Exchanges by the Egyptian Exchange (EGX), as per the amendments in the Capital Market Law No. 95/1992. EGX Index Committee is an independent committee consists of 4 members and chaired by EGX Chairman. The members are market participants from member firms, fund managers and banks.

Eligibility Criteria:

1- **Liquidity**: is the most important criteria for selecting the constituents that comprise EGX30. All traded companies are ranked according to total value traded for the period prior to the next rebalance, after excluding "OPR" deals.
2- **Number of trading days**: Eligible companies that met the liquidity criteria must be traded at least 50% of the trading days during this period. For example, if the total number of traded days during the last six month period is 120 (5 x 4 x 6), the company must be traded at least 60 days during this period to join the index.
3- **Free float**: EGX has amended the required free float of any company included 3 in the index to be at least 15%. The free float is the freely floated shares that are traded and held by the public (tradable shares).

Worth mentioning that the Index Rebalance EGX30 constituents are reviewed on semi-annual base (1 February and 1 August) by EGX Index Committee, whereby constituents are changed (added or deleted), if necessary, based on the above-mentioned criteria.

3. RESEARCH METHODOLOGY

In order to analyze the relationship between new investors and the telecommunications stocks' bubble after the Egyptian revolution, as mentioned earlier, a similar methodology is employed as that used in previous studies in particular, the study of Gong, Pan, and Shi (2015).

Data

The starting point of data collection in this study is the daily opening and closing prices of the 30 most traded stocks in the Egyptian Exchange (EGX), which is called the EGX 30 for a period of 3 years (i.e. from 1st January 2011 till 2nd January 2014). The data was gathered from the website of Arab Capital Markets Resource Center (http://www.btflive.net) and the website of the Egyptian Exchange (http://www.egyptse.com).The study follows the notion of Blasco and Ferrerulela (2008) who assumed that analyzing highly traded stocks which proxy for familiar stocks, would increase the chance that if bubble is indeed found, then it is intentional not spurious. Moreover, the ranking of the stocks was obtained from Mubasher website (http://www.mubasher.info).

It is important to note that some of the stocks in the ranking list were not considered because they were launched in the Egyptian Exchange during the period of the study. Therefore, the data collected was for the 30 most actively traded stocks which had complete data during the period of the study. Furthermore, the four stocks of the telecommunications sector in the EGX 30 (I.e. the stocks of Telecom Egypt, Global Telecom Holding, Orascom Telecom Media and Technology; and MOBINIL) during the above mentioned period had extremely high price/sales ratios compared to the other stocks included in this index Therefore, the study examines only the prices of the telecommunications stocks over a period of 3 years. Specifically the starting date of data gathering is on January 1st 2011 and the end date is on January 2nd 2014.

Consequently, the researcher requires data on the performance and types of investors of all the telecommunications stocks in the EGX30 at the beginning of 2011. The end of 2010 was chosen as the pre-bubble cutoff because the following year is the first time when telecommunications stocks meaningfully outperform the market after the Egyptian revolution on the 25thof January 2011.

Defining the Bubble Segment

This study starts by defining the segment of the EGX that comprised the financial bubble of the late 2011.As described in Ofek and Richardson (2003), the stocks affected by the bubble tended to be in the internet and technology sectors. Lewellen (2003) reports that almost all internet stocks in March 2000 had extremely high prices/sales ratios, compared with other stocks. The researcher follows Brunnermeier and Nagel (2004) and Greenwood and Nagel (2009) and uses the price/sales ratio to identify the segment of the market most affected by the financial bubble. Figure (5) illustrates that the telecommunications sector in the EGX is the most segment in the Egyptian market that has been affected by the bubble after the Egyptian revolution. This conclusion was made by plotting the buy-and-hold returns of a value-weighted portfolio of NASDAQ stocks in the highest price/sales quintile (rebalanced monthly) from January2011to January2012 (thick line) against the buy-and-hold return on the CRSP (the center for research in security prices) value-weighted index. Prices of high price/sales NASDAQ stocks almost quadrupled over a one-year period, only to lose all of these gains in the subsequent two years.

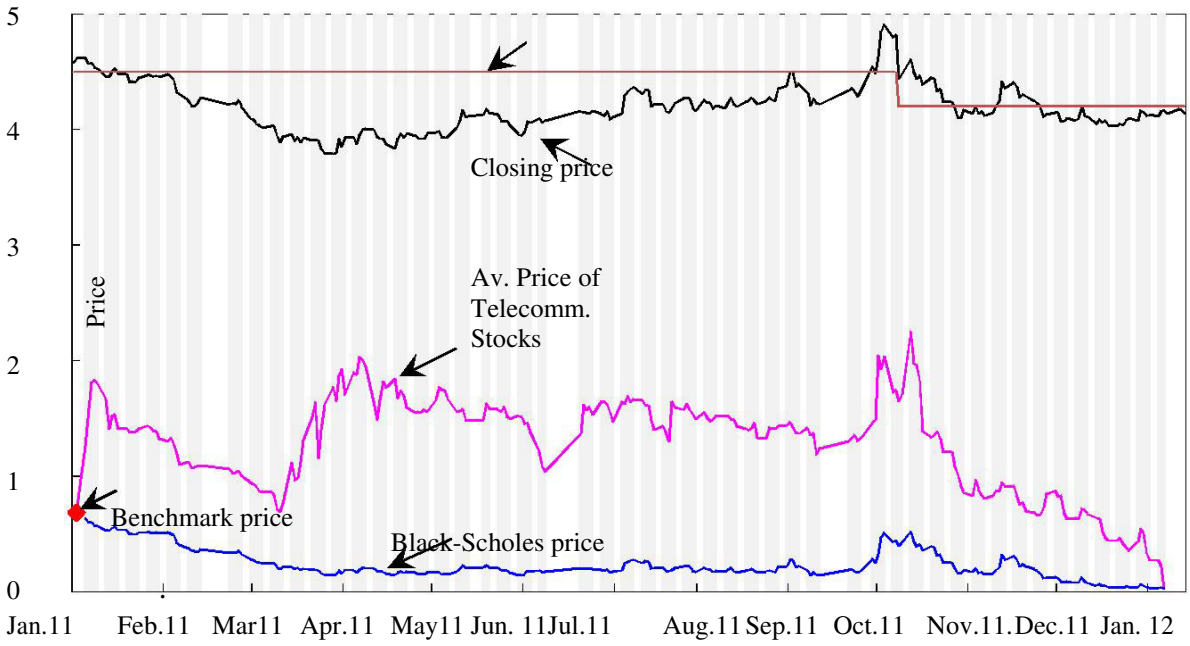
4. ANALYSIS

One of the oldest theories about financial markets is "a price to price feedback theory" (Shiller, 2003). Based on this theory, when speculative prices go up, providing successes for some investors, this may attract public

attention; promote word of mouth enthusiasm, and increasing expectations for further price increases. This process in turn increases investors demand and therefore, generates another round of price increases. If the feedback is not interpreted and justified, it may produce after several rounds a speculative bubble, in which high expectations for further price increases support the very high current prices. Eventually, the high prices are not sustainable, because they are high only due to the expectations of further price increases and thus the bubble ultimately bursts, and price come falling down. The feedback that led the bubble carries the seeds of its own destruction and hence, the end of the bubble perhaps unrelated to new stories about fundamentals. The same feedback may also generate a negative bubble, downward price movements propelling further downward price movements, promoting word of mouth pessimism, until the market reaches unsustainably low level.

In any empirical study, it is not easy to determine the fundamental value of an asset, since fundamentals are in general unobservable. An exception is the fundamental value of telecommunications stocks that are determined by the average price and volatility of the underlying stock (Gong, Pan and Shi, 2015). The celebrated Black-Scholes model provides a reliable tool for estimating the stocks fundamental value. The daily closing price and previous one-year rolling daily return volatility of the telecommunications stocks leads to the Black-Scholes value. Moreover, under alternative assumptions about volatility such as GARCH (1, 1) and Garman and Klass (1980), the Black-Scholes value will change a little, but the gap between the average price of telecommunications stocks and Black-Scholes value is still large and significant. Table (3) presents summary statistics of the daily data. A couple of points are noteworthy when we compare the average price of stocks and the fundamental value. First, it is a large bubble. The average telecommunications stocks price amounts to 2.34LE, more than seven times higher than the average fundamental value of 0.32 LE. Second, this is a textbook bubble in the sense that the average price declined during the last several days, and hit the fundamental value in the last minute.

Figure (5) daily average prices of the Telecommunications Stocks along with the closing prices and the Black-Scholes value,



Furthermore, Table (3) shows the mean, standard deviation, minimum and maximum of time-series of the underlying stocks and the telecommunications stocks, which includes the average daily closing price, turnover rate, trading volume (in million stocks and Egyptian Pound), and bid-ask spread (in 0.1 piaster and percent), the Black-Scholes value calculated with the previous one year daily return volatility, and the bubble value calculated as average price minus Black-Scholes value

The first concern of any empirical study on a possible bubble is whether it is indeed a bubble. Even for historically famous bubbles, such as the South Sea bubble of 1720, there is an open debate, as in Garber (2000); Frehen, Goetzmann and Rouwenhorst (2011) or Pastor and Veronesi (2006). However, the bubble of the Telecommunications Stocks seems indubitable for the following reasons:

First, the over valuation in the average price of telecommunications stocks is not due to lack of liquidity. Low liquidity in less developed financial markets, like the case of EGX, from time to time

leads to temporary but rather persistent deviations from fundamentals. These deviations should not be considered bubbles. However, even though the Egyptian Exchange (EGX) is far from fully developed, temporary shocks hardly affect the average price of telecommunications stocks because the liquidity is really good (as seen in the bid-ask spread in Table (3)

Second, there is no evidence of price manipulation. Investors held the telecommunications stocks evenly, with a minimum of 12.30. Furthermore, the Market Surveillance Department (MSD) of the EGX paid extra attention and deterred any suspicious trading immediately. In addition, the EGX members tried their best to make relevant information transparent so that misunderstandings and rumors were clarified imminently.

Third, investors can judge the bubble through comparing the profitability and safety of the telecommunications stocks and the underlying stock. Although the Black-Scholes model does not generate a precise estimation of fundamental value for the stock because it builds on an arbitrage mechanism that is not applicable for preventing short selling in Egypt, the much worse profitability and safety of the telecommunications stocks compared to the underlying stock clearly reveal that the telecommunications stocks are substantially overpriced. Almost every investor would agree that the probability of the underlying stock price increasing more than 86% is very low, so it is obvious that investors buying the telecommunications stocks do not think the price is reasonable but want only to sell the stocks to another investor at a higher price.

Table (3) Descriptive Statistics of Daily Data

		Mean	St. Dev.	Min	Max
Average Closing price (LE)	Underlying	6.120	0.304	5.706	6.822
	Tele. Stocks	2.345	0.445	1.055	3.560
Turnover rate (%)	Underlying	0.35	0.22	0.08	2.23
	Tele. Stocks	156.11	169.75	42.13	2,177.50
Share volume (million)	Underlying	52	43	16	330
	Tele. Stocks	601	710	112	5478
LE volume (million)	Underlying	288	210	64	914
	Tele. Stocks	808	890	92	5.324
Bid-ask spread (0.1 piaster)	Underlying	12.6	0.225	12	13.67
	Tele. Stocks	2.334	0.819	2.044	6.321
Bid-ask spread (%)	Underlying	0.344	0.036	0.310	0.499
	Tele. Stocks	0.225	0.095	0.082	0.995
Black-Scholes value	Tele. Stocks	0.320	0.215	0.033	0.719
Bubble value	Tele. Stocks	**2.025**	**0.230**	**1.022**	**2,841**

Furthermore**,** the following analysis presents the new investors effects during three phases of the bubble: (1)

beginning of the bubble, (2) sustaining the bubble and (3) the bubble bursts.

(1) Beginning of the bubble

On the first trading day, after 8 weeks of trading suspension in the EGX, starting at its opening price, the average price of the telecommunications stocks reached the upper price limit (2.345 LE) and generated a significant bubble (86% higher than the fundamental value). This situation on the first trading day provides a unique opportunity to give original beliefs, without a shadow of drought that such a bubble is due to investor interaction Moreover, Table (4) presents the composition of investor number, order number, and order volume on the buy and sells sides. This table also reports summary statistics of new and old investors on the buy side. New investor refers to those who had never held the telecommunications stocks before and who placed a buy order; old investor refers to initial stocks holders who placed an order to buy more.

Table (4) Summary statistics of the First Trading Day

		Investor number	Order volume (million)	Prices of orders (LE.)			
				Mean	Difference (*p*-value)	St. Dev.	Difference (*p*-value)
	Institutions	207	56.1	0.811		0.209	
	New	170	33.2	0.766	0.045 *(0.000)*	0.197	0.042 *(0.000)*
	Old	37	22.9	0.625		0.155	
	Individuals	9516	414	0.733		0.211	
Buy	New	8116	351.5	0.625	0.024 *(0.000)*	0.209	0.023 *(0.000)*
	Old	1400	62.5	0.601		0.186	
	Both	9723	470.1	0.610		0.208	
	New	8286	384.2	0.755	0.145 *(0.000)*	0.218	0.003 *(0.000)*
	Old	1437	85.9	0.610		0.188	
	Institutions	23	0.545	0.705		0.111	
Sell	Individuals	319	1.340	0.715		0.133	
	Both	324	1.885	0.710		0.130	

From Table (4), three main points should be highlighted: (1) the average bid and ask prices were not far from the fundamental value, (2) the large standard deviation reveals huge diversity in investor belief; and (3) there is an extreme imbalance between buying and selling. The number of investors on the buy side is about 30 times more than that on the sell side (9723/324), while the ratio is about 249 when it comes to order volume (470.1/1.885).

The three points mentioned above provide support for a suggestion by Miller (1977) and Gong, Pan, and Shi (2015). In a static setting, where short selling is prohibited and investors hold different beliefs about the fundamental value, Both Miller, and Gong, Pan and Shi suggest that the asset price is biased toward the beliefs of optimists, because pessimists cannot sell short.

Table (4) also shows that the overwhelming majority of the buy orders came from new investors. On the buy side, new investors account for 88% of the total investor number, 94% of the order number, and 74% of order volume. On average, new investors buy significantly higher prices than old investors did. If we take standard deviation of order price as an indicator of heterogeneity, it is obvious that new investors' opinions seem to be

more diverse than old investors are. Moreover, all the buy orders at the upper limit price (47.65LE) come from new investors rather than old ones. As far as the order volume is concerned, it exceeds the total volume at all prices on the sell side.

(2) Sustaining the bubble

As mentioned earlier, the EGX was closed after the Egyptian revolution for a period of 55 days. From the opening of the EGX (I.e. 23rd March, 2011) on the first trading day to the last minute on the last trading day, the average price of telecommunications stocks hit fundamental value, the bubble of the telecommunications was sustained for the entire trading period (Figure 5).

The term new investors here refers to those who held the telecommunications stocks for the first time. A logical measure of new investors (NI) is the number of shares they purchased on the market, but this variable is highly correlated with trading volume. To distinguish the impacts of new investors and trading volume, percentage of shares purchased by new investors was utilized as the measure of new investors instead, that is:

$$NI = \frac{\text{Net shares purchased by new investors}}{\text{Net shares purchased by new and old investors}} \quad (1)$$

Table (5) presents summary statistics at different frequency levels. It can be seen that new Investors (NI) is sizable, with a mean of 77% from daily data, which means that new investors purchased more than three-fourths of the stocks traded in an average trading day. Table (5) also reveals bubble growth (**ΔB**) that stands for the first-order difference (In 0.1 piaster, the minimum tick size) of the bubble size, which is calculated as the average price of telecommunications stocks minus the fundamental value according to the Black-Scholes equation. To eliminate the impact of the overnight events, we followed Gong, Pan and Shi (2015) and use the closing price minus opening price in one trading day, instead of closing price minus the last day's closing price to calculate **ΔB**. Table (5) also shows that the turnover rate is very high, at 128% daily, which means that each share is on average only held for around 118 minutes.

Table (5). Summary Statistics of Bubble growth, New Investors and Control Variables

Daily data	Mean	St.Dev.	Min	Max
(NI) New investors (%)	77.1	7.15	48.65	82.10
(**ΔB**) Bubble growth (0.1 p.)	-17.55	98.66	-320	611
Market return (%)	0.18	1.15	-5.11	4.15
New accounts # (thousand)	7.48	8.12	2.50	68.90
Turnover rate (%)	128	141	36	998
Volatility (%)	100	79.1	4.90	911

In addition, the following regression was run to test whether inflows of new investors can amplify the bubble:

$$\Delta Bt = \alpha 1 + \sum t=1;q\beta\, t \quad \Delta Bt\text{-}i + YtNIt\ R, + \epsilon t \quad (2)$$

Where: ϵ is referring to a generic term capturing sampling noise. Augmented Dickey-Fuller (ADF) tests for unit roots reject the existence of unit roots for NI and ΔB at the 1% level. Two lags are included for the daily data. The main results are rigorous to the number of lags. Table (6) shows the regression results of bubble growth (in 0.1 piaster, the minimum tick size) on new investors (in percentage), market return, new accounts number, turnover rate, and volatility. Panel analysis shows results of daily data. *t*-statistics are in brackets.

It should be noticed that column (1) in Table (6) shows the estimated results using daily data. Further, the key coefficient Y1 on new investors is positive and highly significant, showing a strong correlation between new investors and the bubble's growth. The effect of new investors is sizable. Using daily data, the regression results show that a 1% point increase in NI leads to an existing increase of **ΔB** by 0.00518 LE.

The estimation also shows that NI with a standard deviation of 7.15 accounts for about 41% of the volatility of ΔB. It can also be seen that **α**1 is significantly negative in all specifications, REVEALING that the size of the bubble tends to diminish over time. In an average trading day, NI, with its 77.1% mean, can increase the bubble growth by 0.375 LE.

Table (6) Regressions of Bubble Growth

Panel analysis of daily data, AR. (2)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant,**α**	-485.77	-31.22	-30.75	-40.67	-22.50	-443.80
(*t*-stat)	*(-6.43)*	*(-2.95)*	*(-3.36)*	*(-4.11)*	*(-2.09)*	*(-5.60)*
New investors, **Y1**	6.70					5.55
(*t*-stat)	*(7.88)*					*(5.32)*
Market return, **Y2**		11.95				10.80
(*t*-stat)		*(3.86)*				*(2.59)*
New acc. no., **Y3**			0.08			
(*t*-stat)			*(0.11)*			
Turnover rate, **Y4**				0.13		0.610
(*t*-stat)				*(2.10)*		*(1.18)*
Volatility, **Y5**					-0.0218	
(*t*-stat)					*(-0.15)*	
Adj. **R**2	0.1175	0.0185	-0.0374	0.0412	0.0071	0.0445

Furthermore, new investors are not the only factor affecting the bubble. Hence, other factors were included in the regression such as: volatility, turnover rate, market return, and the number of new accounts on the Egyptian Exchange (EGX). We started by regressing the bubble growth on each of these variables alone, as follows:

$$\Delta \mathbf{B}t=\alpha 2+\sum t=1;q\boldsymbol{\beta}\ t\ \Delta \mathbf{B}t\text{-}i+Y\mathbf{X}t+\epsilon t \qquad \textbf{(3)}$$

Where X, refers to one of the above variables. Here, volatility refers to the return volatility built from one-minute intraday return. Market return is measured by the return of the EGX30 Index, the most popular index in Egypt. As for **ΔB,** the closing index minus the opening index for one trading day, was used to calculate market return.
The regression results in Columns (2) to (5) of table (6) show the estimated results of the above mentioned factors. It can be seen that turnover rate has a significant positive effect on bubble growth at a daily frequency. This finding is consistent with the findings of Gong, Pan, and Shi (2015); and Xiong and Yu (2011) However, it should also be noticed that, compared with new investors, the contribution of turnover rate is small. During each trading day, turnover rate, with its 128% mean, can increase the bubble growth only by 0.017 LE. Volatility shows no significance using daily data. A positive correlation between the bubble growth and market return is confirmed. However, the effect is economically trivial, at an average of only 0.003 LE in an average trading day.
Eventually, new investors, market return and turnover rate are combined in a single regression. Column (6) in Table (6) shows the estimated results. The impact of each variable solely on the bubble's growth is quite similar to that resulted from the individual regressions. The aggregate regression results in Table (6) reveal that new investors are the main power sustaining the bubble.

(3) The bubble bursts

The telecommunications stocks have a predetermined last trading day. During the last 42 trading days, the average price of telecommunication stocks declined from above 47 LE to 12.30 LE. While there was a clear downward trend, the price drop was slow in that there was no dramatic crash. This pattern of gradual price drop over time has also occurred in the bubbles of other securities such as the warrant in China in the study of Gong, Binglin, Deng Pan, and Donghui Shi (2015).

For the sake of further check, we examine the new investor (NI) effect from the perspective of conditional quantiles. This method allows estimation of the new investor effect in different quantile ranges, and identification of the quantile range for which new investors are relevant. Particularly, we run this regression:

$$\Delta \mathbf{B}t=\alpha(r) + \sum t=1;q\boldsymbol{\beta}\mathbf{I}\ (r)\Delta \mathbf{B}t\text{-}i+Y\mathbf{(r)}\ \mathbf{NI}t+ \epsilon t \qquad \mathbf{(4)}$$

Where; r ϵ (0, 1) refers to the r-th quantile. Figure (6) illustrates the estimated Y (r) from the regressions and their 95% confidence interval against r.

Figure (6) Quantile Regression.

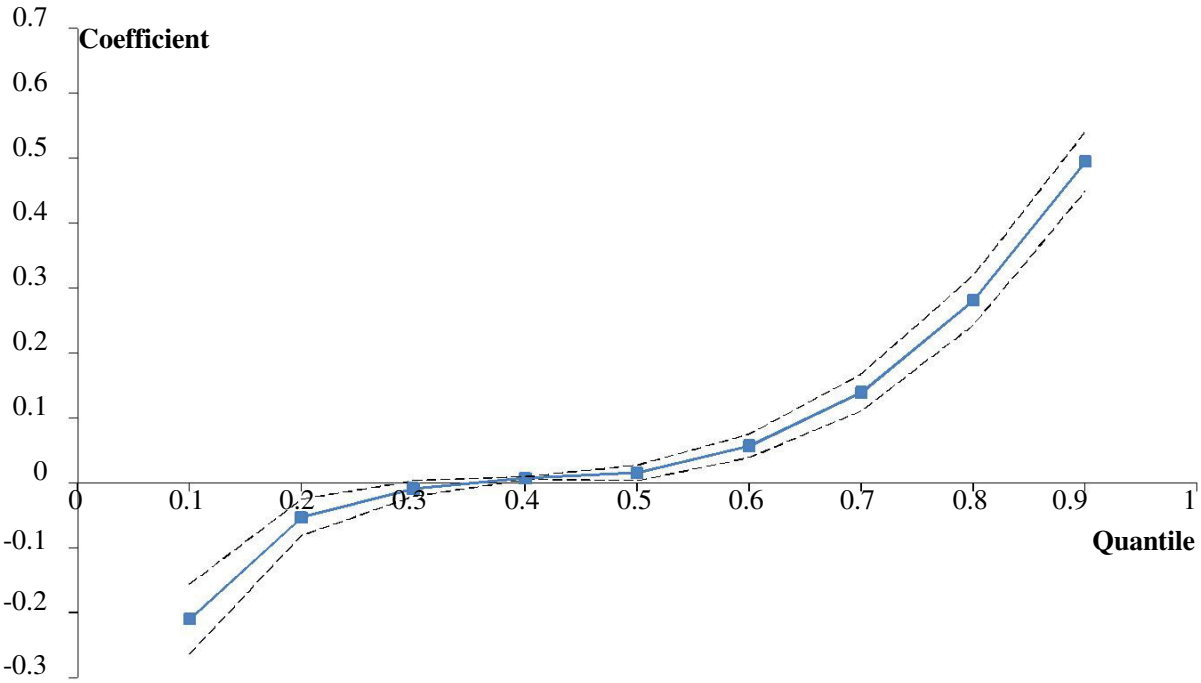


Figure (6) shows that the effect of new investors on bubble growth is significantly positive for most quantiles, but turns significantly negative for the lowest quantiles(<20%). Moreover, the volume of these estimates increases when r moves toward zero or one. Hence, new money spends opposite and diverse impacts on both sides of the distribution of **ΔB**, and such effects become stronger at more extreme quantiles. Furthermore, the entry of new investors enjects the bubble and restrains the decline of the average price of telecommunications stocks. Incapable to short sell when the price is going up, it is natural for a smart or overconfident investor to speculate on selling an overvalued stock at an even higher price to another investor in the future. When the price is declining, especially when it is dropping quickly, the low price is perceived by some investors as cheap and attracts more speculative trading. While the nominal price level does not contain any specific economic meaning, Both Gong, Pan, and Shi (2015) and Benartzi et al. (2007) report that it can affect investor demand for financial assets through the pressure of social norms.

5. EMPIRICAL FINDINGS

Overall, the empirical findings of this study are in line with the main results of previous studies such as: Gong, Pan and Shi (2015); Greenwood and Nagel (2009); and Gong, Lei and Pan (2011). Further, the findings are also consistent with evidence from experiments investor surveys. Smith, Suchanek, and Williams (1988) find that bubbles and crashes occur regularly in laboratory asset markets, but are less likely when subjects have experienced bubbles and crashes in prior trading sessions. Summarizing data from investor surveys, Huber

et al (2010) reported that new investors had the highest stock market return expectations in the late 1990s.
Defining new investors as those who had never owned the telecommunications stocks before, the main findings of this research effort are summarized as follows:

(1) New investors in the EGX initiated the bubble. On the first trading day, after the 55 days of EGX suspension followed the Egyptian revolution, (I.e. on the 23rd of March 2011),the average opening price of the telecommunications stocks reached their upper limit (average of 47.65 LE) and generated a significant bubble (86 %) higher than the estimated fundamental value). Because the opening price on the first trading day released no information during the process, it gives an infrequent opportunity to get original beliefs without having to account for investor interactions. The order prices reveals big diversity within investor opinion about the telecommunications stocks' prices. Under the restriction on short sale, the price is not determined by the majority of investors, but rather by the most optimistic ones. Moreover, the findings show that although diversity exists in both the original stocks holders and the new investors, the most aggressive buyers are mainly the new ones. New investors (NI) account for 79% of purchasing orders. Indeed, all the bids at the upper limit price come from new investors, and the order volume already exceeds the total volume at all prices on the sell side. Hence, there is no doubt that the new investors in the EGX created this financial bubble.

(2) New investors sustained the telecommunications stocks' bubble. From its opening on the first trading day until the last minute on the last trading day, when the average price of the stocks eventually hit the fundamental value, the bubble of the Telecommunications stocks was sustained for the whole trading period (126 trading days). Using daily data, and defining new investors as those who held the telecommunications stocks for the first time on that day, the regressions results reveal that the contribution of new investors to the bubble is huge. In an average trading day, new investors increased the bubble size by 0.375 LE and accounted for about 41% of the volatility of the bubble growth on average. Without the continuous inflow of new investors, the telecommunications stocks' bubble would have vanished in few trading days rather than sticking to throughout the whole trading period. Furthermore, new investors contributed to the bubble much more than other factors such as, volatility, market return and turnover rate.

(3) New investors in the Egyptian Exchange (EGX) explain the slow drop of the average price of telecommunications stocks over time. During the last 42 trading days, the average price of telecommunications stocks declined from above 47 LE to 12.30 LE. While there was a clear downward trend, the price drop was slow in that there was no dramatic crash. The quantile regressions show that entrance of new investors restrained the sharp decline of the telecommunications stocks prices.

In addition, the empirical findings highlight the importance of new investors in the lifecycle of a financial bubble. The impact of new investors is consistent with the standard assumption of heterogeneous investor belief made in theoretical works such as Scheinkman and Xiong (2003), and empirically confirmed in Gong, , Pan, and Shi (2015); Ofek and Richardson (2003); and Xiong and Yu (2011). Despite the empirical literature misses the mark to identify where the heterogeneity comes from, theoretical models in Scheinkman and Xiong (2003); and Allen, Morris, and Postlewaite (1993) explain it in terms of different learning schemes and asymmetric information, respectively. The findings also reveal that the continuous stream of new investors to the EGX is an important source of persistent heterogeneity.
Furthermore, in line with the study of Gong, Pan, and Shi (2015), the results also help to explain the puzzling phenomenon of more and more frequent financial bubbles in the recent two decades. Both empirical research and experimental research have concluded a strong learning impact once investors have experienced a bubble and subsequent crash, they are hesitant to participate the next time. Therefore, a bubble can exist only following the arrival of a new generation of investors willing to invest their capital to purchase overpriced stocks. Hommes et al (2005) even claim that a period of two decades is the normal time it takes for the recollection of one disaster to be vanished. However, the recent reoccurring bubbles seem to imply that experience alone may not be a sufficient condition to ensure the prevention of financial bubbles. As the market environment changes rapidly under the influences of factors such as emerging markets and globalization, new investors can flood in much more quickly than before and hence, it does not take as long to create a new bubble. This also suggests that experimental research may have ignored certain important factors occurring in the field of asset markets, such as

the constant entries of new investor.

6. CONCLUSIONS

The current study had some limitations. This study was primarily limited to its small time horizon (I.e. data covered only three years of opening and closing prices of the telecommunications stocks in the EGX from 2011 till 2014) which resulted in small sample size. A larger sample with a longer time period would have benefited our results and enhanced the generalizability of the study. Another possible improvement could have been interviewing some new investors (NI) from the EGX. Personal interviews could elicit greater information regarding new investors' behavior. This method could have added important qualitative data and greater insight into the new investors' thoughts and opinions, so that better understanding and interpretation of the telecommunications stocks' bubble would have achieved.

Many studies have followed the pioneering work of Smith, Suchanek and Williams (1988) in order to test the robustness of the price bubble phenomenon. To date, the only treatment variable that appears to consistently eliminate the existence of the price bubble is the experience of all or some of the market participants gained through participation in previous asset market sessions of the same kind (Van Boening, Williams and LaMaster(1993); Dufwenberg, Lindqvist and Moore, 2005)). More specifically, experience in these experimental studies means living through an experimental bubble and its subsequent crash.

The objective of this study is to get a better understanding of investor behavior during financial bubbles by analyzing empirically the relationship between new investors (NI) and the telecommunications stocks' bubble that occurs after the Egyptian revolution. The empirical findings of this research effort reveal that (1) the new investors initiated the telecommunications stocks' bubble; (2) the continuous entries of new investors in the EGX sustained this bubble; and (3) the slow decline of the average price of telecommunications stocks over time is due to the new investors. Compared with other factors, the continuous stream of new investors was the most robust driving force of the bubble over the whole trading period.

It should be noticed here that, as mentioned earlier, this study adopted the same methodology and followed the same procedures of the pioneer study of Gong, Pan, and Shi (2015). Furthermore, the main findings of this research effort coming almost consistent and in line with their results and findings.

In this research effort, it is obvious that, if new investors (NI) were just attracted by an existing bubble, their role would be much less important. However, regarding the Egyptian telecommunications' bubble, we believe that it is not the case, for the following reasons: (1) new investors initiated the bubble in the telecommunications stocks on the first day after the reopening of the EGX on 23rd of March, 2011, when no one could have known of the existence of the bubble. (2) To explore how the stream of new investors responds to the growth in bubble size, a bi-viariate structural vector autoregressive regression (SVAR) was conducted. The results are similar to those in Table (6). (3) During the last 42 trading days, when the bubble began to diminish, new investors continued to flood in.

Moreover, in this study, old investors as well as new ones should be considered inexperienced, since the telecommunications stocks were the first trading stocks in the EGX after a two-month suspension, and therefore neither new nor old investors had experienced a crash in the Egyptian Exchange (EGX). Hence, the new investor effect found in this study is not equivalent to the inexperienced investor impact of Greenwood and Nagel (2009). Historically, the bubbles usually happened long after the preceding ones, which is consistent with the experience effect. Nonetheless, more frequent occurrences of financial bubbles in the last two decades than before seem to reveal that experience alone may not be a sufficient condition to ensure the elimination of bubbles. The findings of this research effort might suggest that the experience effect was only invisible in the Egyptian telecommunications bubble, because too many new investors entered the EGX after the Egyptian revolution and washed the effect away. Finding the precise relationship between the new investor effect and the inexperienced investor effect awaits Future empirical investigation with richer data or well-designed experimental studies. Moreover, a comparative study measuring and analyzing the financial bubbles' effect in more than one country could be an interesting topic to some researchers around the globe.

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