



# Marketing and financial issues in Iran

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## ABSTRACT

**Objective:** When a financial crisis occurs, speculators typically get the blame whereas fundamentalists are presented as the safeguard against excessive volatility. **Methodology:** This paper consider two types: speculators and fundamentals who have the same information. **Results:** In this paper, excess volatility not only exists, but is actually fueled by fundamental trading. **Conclusion:** Consequently, efficient markets are more volatile with a few speculators than with many speculators and Existence of fundamentals ruins market's liquidity and this may pose problems for traders, who intend to undertake frequent transactions.

## 1. Introduction

Investment is one of key factors to reach a country-level economic growth. Investment market, as an eminent investment alternative, provides a proper position to attract capitals. Investors consider their own level of risk taking together with their expected outcomes to evaluate and choose an appropriate equity. Hence, investment markets must possess required efficiency to attract investors, obtain financial resources, and as a result be able to optimize turnovers by allocating the resources in the most proper way. To reach the efficiency, market volatilities are required to be logical and fundamental. Although short-run volatilities are inevitable and natural, long-run equity prices must be determined based on firms' logic factors and their disclosed information.

Financial philosophers and market activists persistently consider financial market crashes and their unexpected changes. There is no clear definition for a market crash, but it usually refers to a two-digit negative market index for multiple days and in a short period of time. Simply speaking, a financial market crash is a sudden drop in the equity index for a short time. Equity price volatilities and price bubbles may root in investors' purchasing activities and their short- or long-run investment vision.

Identifying investors and considering their investment visions can impede equity price bubbles and as a result, prevent financial crisis to take place. This study aims to explore the role of fundamental investors in creation of equity price volatilities for qualified companies in Tehran Stock Exchange market.

### 1.1 Problem Statement

The characteristics of stock exchange markets led the firms and investors to find capital markets a suitable place to attract financial resources and investments. Therefore, today stock exchange markets are recognized as an economic entity within developed societies and their operations represent socio-economic situations in such nations. On the other hand, any kind of insecurities in these markets can result in an enormous financial crisis. Equity market crises are important events in both scientific and practical perspectives, such that they are a constant source of anxiety and stress for investors and traders and by their emergence many lives could be ruined. So, one of the major reasons for a market crash is existence of bubbles and as they start to blown out several crises associated with long-lasting negative consequences may appear. In the traditional perspective after emergence of a crisis, speculators are blamed; this is while fundamental analysts can successfully identify bubbles and protect the market from exorbitance volatilities in the face of crises.

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Being bubble-free is considered as an assumption for an efficient market. In efficient markets people and investors have a homogeneous access to the information, while their expectations and investment visions may vary. Several studies evaluated exorbitance volatilities, all assuming a short-run vision for traders and speculators. But, the literature failed to account for traders with various investment visions.

The main issues in this research are considering people and traders with various expectations and investment visions, symmetric information, and rational traders. Having said these issues and using Martingle's behavior model, this study assesses the role of traders in creating bubbles or dropping equity prices in efficient markets.

### **1.2 Investment Methods in a Stock Exchange Market**

Investment and trading equity in an exchange market have a direct relationship with its investment method. In other words, investors always try to raise their own benefits, which is inter-related with an increased turnover. To this aim, there are three different methods of investment in a stock exchange market: i) fundamental analysis, ii) technical analysis, iii) buy and hold (B&H) method.

### **1.3 Fundamental Analysis**

Fundamental analysis assumes that each security has an intrinsic value that can be estimated by investors. The value of a security is a function of a series of fundamental variables and a combination of these variables determines the expected turnover associated with a specific risk level. In a fundamental analysis approximation of an intrinsic value of equity is obtained using the fundamental variables. In the next step, the estimated intrinsic value is compared with the market value of the equity. If the intrinsic value exceeds the market value, then it is the right time to buy the equity. Otherwise, the equity holder would have sufficient evidence to sell the equity.

Eventually, if the analyst will be convinced that it is the right time to invest (e.g. there are appropriate industries with high levels of turnovers in the economy), then he will analyze competing firms and evaluates equity prices. A general approach to analyze firms' equities consists of four major steps including: i) analysis of the economy and the market, ii) analysis of the industry, iii) analysis of the firm, and iv) analysis of the equity price.

### **1.4 The Role of Fundamental Analysts**

Contribution of analysts in codification of accounting standards approves their traditional role as appliers of the financial information. Analysts, as agents for financial information transmission, privilege their own covered companies. Based on a modern theory on information disclosure, companies with a larger number of analysts are more valuable. Existence of a higher number of analysts in such companies provides a higher level of investment opportunity awareness amongst investors. Empirical studies reveal that in companies, which are subjected to more financial analysis, commercial costs are lower. This is while for companies with lower level of financial analysis, utilization of proper information disclosure policies only reduces financial costs. Forecasting future revenues, the most frequent issue in financial analysts' reports, is an example of how analysts apply financial information. Analysts use the future revenues as a mean to recommend investment in certain companies and as an index to evaluate the companies' performances.

### **1.5 Equity Price Volatility**

In capital markets, profit information is one of the predominant information in decision making of investors, analysts, and other information user groups. If forecasted profit by firms suffers of inaccuracy, then investors will be anxious and confused and the market will lose its investment security in the capital market. Many investors have lost a large portion of their capital because of reliance on disclosed information in markets, where profits were highly volatile and were subjected to negative deviations and volatilities. Equity turnover volatility is one of the challenging financial issues that is been studied frequently in the emerging capital markets over the recent years (Leledakis et al., 2004). The main reason for this tendency is the relationship between the price volatility and turnover and their impacts on financial sector performance and nation-wide economy. On the other hand, equity turnover volatility could be considered as a measure to evaluate risks and therefore may aid policy makers to assess vulnerability of the equity market (Beine et al., 2009).

### **1.6 Price Bubble**

The concept of bubbles was introduced to the economics literature during the 17th century. However, there is no evidence of scientific studies on this issue till late 20th. After the first debates on this issue in the Persian literature in 2003, any type of rapid price growth have mistakenly considered a bubble, while bubbles are created if a speculations in a financial tool (e.g. equity) leads to a price growth associated with more speculations. In this situation prices irrationally grow to a high level. Bubbles generally end up with a sudden price drop, often called "market crash". Due to its similarity to the soap bubble, which appears and vanishes in a short period of time, the name "bubble" is devoted to this financial event. Bubbles often emerge following real productivity advancements and/or initial profitability of the firms or industries. Historical evidence show that investors in such situations over exaggerate the economic capability of their own invested company (Greenspan, 2002).

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## **2. Materials and methods**

### **2.1 Literature Review**

Available studies indicate that Tehran Stock Exchange Market suffers of low efficiency. Findings of these studies aid investors and other information applicants to differentiate more efficient companies easier and benefit from a more rational investment.

The paper "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?" by Shiller (1981) was one of the initial researches on the bubbles. Shiller in this study utilized the annual data for the period of 1871-1986 on the variance bound test or price over volatility. His findings revealed that current cash profit value changes does not explain price changes.

Larsen (1997) assessed price bubbles in Norwegian Stock Market and evaluated their impact on Norway's economy over 1982-1997. Using Shiller's (1981) ANOVA, he rejected the null hypothesis of market efficiency (e.g. non-existence of price bubbles) over the study period.

White (1990) studied the US Stock Market Crisis in 1929. Applying Shiller's method, he introduced structural modifications as the main reason for price and profit volatilities.

Amongst the Persian literature on the price bubbles in the Tehran Stock Exchange Market, it is worth to mention the study by LeRoy (2004) in the Imam Sadegh University. He applied correlation tests on periodical sequences of the equity prices. His findings indicated that price bubbles existed in the Tehran Stock Exchange Market over 2004-2006.

Acharya and Pedersen (2005) in his article, "Exploring Price Bubbles in the Tehran Stock Exchange Market, 2004-2005", defined bubbles as an intense and continuous increase in the price of an asset or a set of assets. Initial price growth was due to price rocket expectations resulted from attracting new investors. This growth often associated with reverse expectations and a steep drop in prices, which caused financial crises.

Soltani (2007) in his PhD dissertation evaluated price bubbles in the Tehran Stock Exchange Market for 70 active companies in the stock market over 1991-2005. To this aim he applied co-integration method. Using Johanson's co-integration test on each firm's real equity price and its real equity profit, he explored bubbles in the firms' equity prices. His findings indicated that with 95% confidence, there exist bubbles in the equity prices of 55% of the studied companies. In the next step, he applied Fisher's test to extract relationship between price bubbles, firms' sizes, price volatilities, and industries. The latter evaluation results shown a meaningful relationship between price bubbles, firms' sizes, and intense price volatilities; however, there were not sufficient evidence to approve a relationship between price bubbles and industries.

Vaez and Torki (2008) in his study, titled "Price Bubbles and Iran's Capital Market", used RALS technique and applied Monte Carlo's simulation method to evaluate existence of price bubbles in Iran's equity market. He discussed that equity prices diverged from their own long-run balance path (current value of expected future profits), and therefore Iranian capital market possesses bubbles.

In addition to the afore-mentioned studies, a research done by Shaw Wong et al. evaluated attributes and behaviors of investment managers in market forecasting and equity choosing in Hong Kong stock market. Chosen managers were asked to specify relative importance of each of the technique in forecasting the market and choosing equities. Results exhibited that Hongkonger analysts tend to use fundamental and technical analysis to forecast the market. In terms of choosing equities to invest, fundamental analysis followed by technical analysis and portfolio analysis were the most attributed techniques.

## 2.2 Research Hypothesis

**The main Hypothesis:** fundamental traders have a role in creating price bubbles in efficient markets.

## 3. Discussion and results

### 3.1 Definition of Research's Key (Words and Phrases):

Definition of key applied concepts and phrases in this research are summarized as follows:

**Securities:** Any paper or document that certifies transferrable financial rights for its owner or benefits of a holder.

**Capital Market:** An integrated official market, in which equities and other securities with more than one year maturity are purchased under certain rules and regulations.

**Equity Price:** A market or transaction price, which includes the value that seller and buyer agreed upon. The price of each equity that appears daily on the stock market board is the last transaction price for that specific equity.

**Equity Price Change:** Any change in the transaction value of equities that are purchased in the stock market.

**Fundamental Investors:** Traders, who evaluate and study all the factors that directly or indirectly contribute to a market's supply and demand.

**Price Bubble:** The difference between intrinsic and market value of an asset is called a price bubble.

**Market Crash:** A sudden drop in a market index that occurs following numerous factors.

This research is based on statistical analysis and statistical modeling. The statistical simulations are R program. First, express summary of what we will do and then represent the statistical program which we need for analyzing the data.

Consider a market where a single risky asset called stock. Assume that all traders have rational expectations, and share their investing horizon in the market. This happens in two ways:

1. All traders are fundamental and have long-term horizon.
2. All investors are speculators and have short-term horizon.

Each of these two types of pricing, and price equilibrium is obtained. Consider that all traders are rational, which means that same rational expectations based on the same data set. Our purpose is minimizing the mean of square (Rational Expectation)

RE is defined, as conditional expectation for t:

$$E[x_{t+1} | I_t] = \operatorname{argmin}_{\hat{x}_{t+1} \in I_t} E(\hat{x}_{t+1} - x_{t+1})^2 \quad (1)$$

Which  $I_t$  is information sets.

In this research, the expectations will cause the change equation 1. Long-term investors and short-term investors are different, but all of them decided rationally in their investing horizon.

1. All the fundamental and rational investors have long-term prospects:

All the long-term traders are fundamentals. Their strategies are buy and hold and assume price expectations in an infinite horizon. Price modeling is discounted cash flows and we assume no transaction opportunities:

$$p_t = \sum_{i=1}^{\infty} \frac{\hat{d}_{t+i}}{(1+r)^i} \quad \text{Expected a value in } t+i = dt+i \quad (2)$$

2. All the speculators and rational investors have short-term prospect:

Short term traders are called speculators in which buy and sell stocks at the moment. So, their expectations are between  $t, t+1$  periods. Stock's present price ( $P_t$ ) which calculate by discounting future expected price and future dividend. With these rational assumptions:

$$p_t = \sum_{i=1}^{\infty} \frac{E[d_{t+i} | I_t]}{(1+r)^i} \quad (3)$$

It's obvious that formule (1) is straight but formula (3) needs to have current price and future expected price together.

There are few econometric modeling which can solve equation (3), this model (4) is one of the accepted model for rational pricing:

$$p_t = \frac{1}{1+r} (E[p_{t+1} | I_t] + E[d_{t+1} | I_t]) \quad (4)$$

And we assume is predicted price for  $t+1$  due to current information ( $I_t$ ):  $F_t p$

$$p_t = p_t^F + (1+r)^t M_t \quad (5)$$

Notice that if  $M_t=0$ , equation is like equation (4).

This Model is look alike fundamental pricing. But long-term traders model is special case of short-term pricing.

$M_t$  is random process that obtain by filtering informations and rational expected is equivalent to present value:

$$p_t^F = \sum_{i=1}^{\infty} \frac{E[d_{t+i} | I_t]}{(1+r)^i} \quad (6)$$

That's why the second part of the Equation 5 is random. For this reason, the bubble will refer to components that often occurs in the market, especially when most of them are speculators. These components are defined as bubbles and illustrate with  $B$ :

$$B_t = (1+r)^t M_t \quad (7)$$

As a result, bubble prices can represent a dynamic vast market. This makes it difficult to make the model.

One way to release bubbles is the assumption  $M_t=0$  which illustrate it:

$$\lim_{i \rightarrow \infty} \frac{1}{(1+r)^i} E[d_{t+i} | I_t] = 0 \quad (8)$$

It means that bubble of short-term pricing model fall in long-term and returns to rational long-term prices.

Suppose that we have a set of traders that share fundamental share is and speculators share is. Then we use LT for fundamentals and ST for speculators. As fundamentals calculate price according to equation 3, speculators have no effect on the price. But speculators need to be inform the basic price comparison.

(9)

(10)

(11)

$$\hat{p}_{t+1}^{ST} = E(p_{t+1} | I_t)$$

$$\hat{p}_{t+1}^{LT} = \sum_{i=1}^{\infty} \frac{E[d_{t+1+i} | I_t]}{(1+r)^i}$$

$$p_t = \frac{1}{1+r} [(1-\mu)\hat{p}_{t+1}^{ST} + \mu\hat{p}_{t+1}^{LT} + \hat{d}_{t+1}]$$

Also they are aware of predicting next price (means price for speculators for t+1) and fundamental's price determine by equation 3 and equal to.

Fundamentals are indifferent to bubbles, but they are looking to see when the correct model can forecast future cash profits. As a result, long-term investor does not need to predict the price, but investigated and predicted are based on predicted cash dividends and no need of bubbles analyses and always have rational strategy.

Equation 11 can be generalized as Equation 4, but in Model 4, which represents the value of  $\mu$  as LT investors share is considered zero, which means all the investors are rational and Short-term. The equation as well as DeLong,  $r$  (the rate of return on investment) is equal to the cash dividends. so (for long-term). Therefore, fundamental price is equal to and all the long-term traders have the same horizon in which

$$\hat{p}_t^{LT} = \gamma$$

$$p_t = \frac{1}{1+r} [(1-\mu)E(p_{t+1} | I_t) + \mu\gamma + r]$$

(12)

Equation 12 is linear model and with martingale technics and hypothesis  $\mu \neq 0$  :

$$p_t = p_t^F + \left( \frac{1+r}{1-\mu} \right)^t M_t$$

(13)

The result can be state : fundamentals are essential for rational speculators in order to take advantage of short – term strategy. As a result, as the definition of fundamentals in which buy and hold stocks and trade less than speculators. Accurately, when fundamentals buy the stock in order to hold it forever and disappear it from market.

### 3.2 Martingales

In probability theory, Martingales are model of a fair game in which the passive information will not help in predict the future. In other words, martingale is a sequence of infinite random variables (in other words random process) in which expected future variable is equal to current one.

Famous example of Martingales are Brownian motion or Wiener process. An example of a model to express, first allow me to give more explanation about Martingales. Assume that no bubbles are at  $t=0$  and for  $t$ , we have:

$$B_t = \left( \frac{1+r}{1-\mu} \right)^t M_t$$

(14)

And assume  $\sigma$  with constant variance:

$$\hat{p}_{t+1}^{ST} = 1 + \left( \frac{1+r}{1-\mu} \right)^{t+1} M_t \quad (15)$$

Random variable can be isolated into components of the shock at time 0 to t and bubble factor is as follows:.

$$\hat{p}_{t+1}^{LT} = 1 \quad (16)$$

Thus, the variance of expected speculators' price as follows:

$$E[\varepsilon_t | I_{t-1}] = 0, V[\varepsilon_t | I_{t-1}] = \sigma^2 \quad (17)$$

(18)

(19)

$$M_t = \sum_{i=0}^t \varepsilon_i$$

$$B_t = \left( \frac{1+r}{1-\mu} \right)^t \sum_{i=0}^t \varepsilon_i$$

$$\sqrt{V[p_{t+1}^{ST} | I_t]} = \left( \frac{1+r}{1-\mu} \right)^t \sigma \quad (20)$$

Fluctuation depends on fundamentals role  $\mu$  in the market. Formula (20), as the time goes on, the effect of the parameter  $\mu$  parameter  $r$  will dominate. Fundamentals dramatic effect on the intensity of the bubble becomes apparent.

### 3.3 Simulation:

At this phase as we do the simulation, we analyzed and described results.

As shown in Equation 20 is the fundamental effect on the level of market volatility is exponential. If the fundamentals are not in the market, the bubble effect in the first period ( $t = 1$ ) is equal to the standard deviation. This will simulate the stages of logic is very clear. The simulation is performed in the R programming code.

When the fundamental percentage is 5% results are as follows:

For simulating, we simulate the bubbles. Here, we simulate 1000 bubbles at  $t = 1$   $Mt$  values are calculated, too. There are 1000  $M1$  and standard deviations are calculated. Volatility increases little, the value of 0.1 to 0.1149.

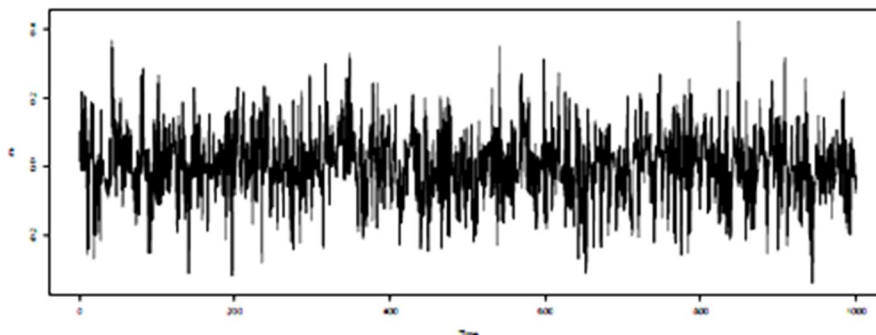


Fig 1: Volatility increases little, the value of 0.1 to 0.1149.

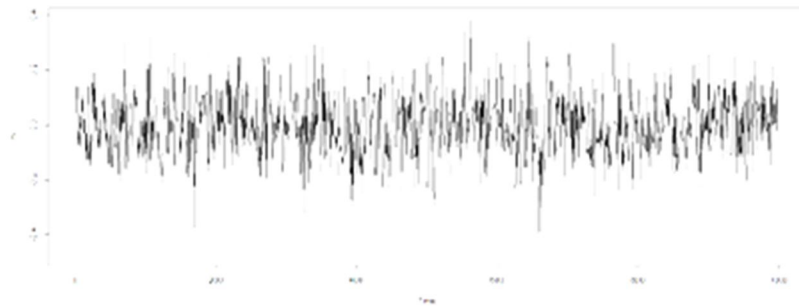


Fig 2: Again volatility increases and reaches a value of 0.1 to 0.1235 .

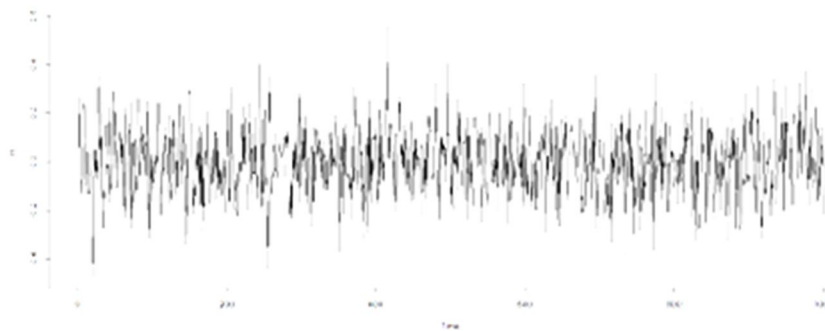


Fig 3: Levels of volatility increases and reaches the value 0.1505.

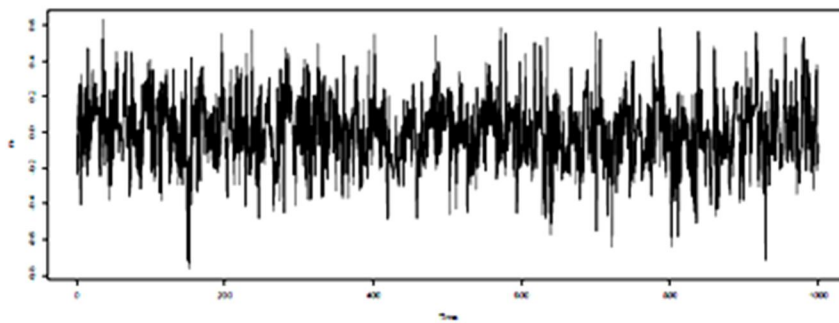


Fig 4 : When speculators and fundamentals are equal, volatility will be .%2234

As a result of fundamentals increase in market, standard deviation (volatility) also rises exponentially (meaning that a large number of speculator is better than small ones.)  
The following diagram illustrates that volatility increases exponentially.

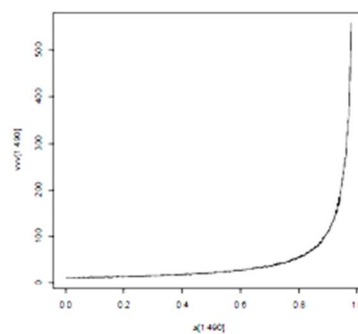


Fig 6: when fundamentals increase

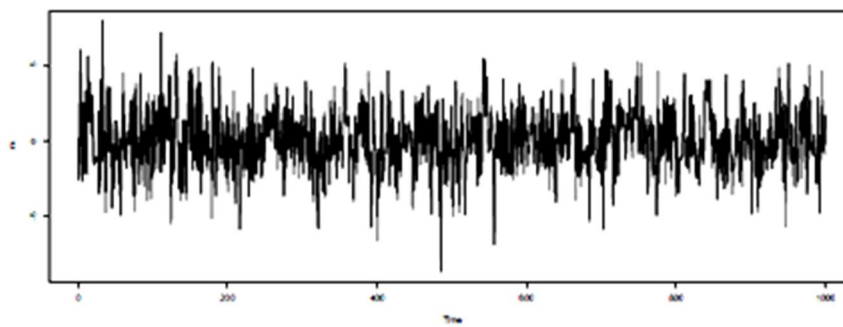


Fig 5: When  $\mu = 95\%$ , volatility becomes 234%.

When the market does not have any speculator, any shock in the market will not happen. Unfortunately, this situation is unrealistic, at least in the stock market are not allowed and it's impossible that the economic system omit speculators, but this paper showed that the elimination of speculators will have bad effect on market.

## 4. Conclusion

### 4.1 Summary of Findings

1. Fundamental traders have a role in creating bubbles or dropping equity prices in efficient markets.
2. In an efficient market without having speculators, equity prices are determined by fundamental traders. However, as the market opens up to the speculators, equity prices start to change and become volatile. As a result, more speculators enter the market. Policy makers must consider that having a fewer number of speculators is worse than having a larger number of them.
3. Existence of fundamentals ruins market's liquidity and this may pose problems for traders, who intend to undertake frequent transactions. In presence of speculators (few or more), fundamentals determine equity market volatilities.
4. As a result, as the number of fundamentals increase in the market, standard deviation (volatility) also grows exponentially. This means that the larger the number of speculators, the better.
5. Presence of fundamentals is mandatory for rational speculators to reach their short-run strategy. As a result, considering the definition of fundamentals, who buy and hold equities, they contribute to the transactions less than speculators. To be more specific, fundamentals purchase equity and hold it forever until it vanishes from the market.
6. As the bubble still exists, speculators' expectations increase the equity prices to a higher level and considering the share of long-run traders in the market, this effect will intensify. Consequently, this will magnify volatility and drop in equity prices.

### 4.2 Comparing the Findings with the Results of Similar Studies

In this section we aim to compare the findings with the available literature.

Findings of this study are in line with what Szafarz (2010) obtained in "Financial Crisis in Efficient Markets: How Fundamentals Fuel Volatility". Exorbitant volatilities exist in the markets, but fundamentals intensify them. Efficient markets in presence of few speculators are subjected to higher volatilities, however unlimited number of speculators ease this problem.

In another study, Abreu and Brunnermeier (2003) discussed a behavioral model, in which people with different levels of self-confidence had heterogeneous expectations and short sales were impossible. As a result, irrational bubbles appeared. They showed that as transaction costs (e.g. taxes) grow, speculative transactions fall. This way one can overcome price volatility.

In the behavioral finance, relevant models are heterogeneous for fundamentals and speculators. Fundamentals tend to stable markets, while speculators create more volatility.

In an efficient market, traders do not limit themselves to their own beliefs, but rational traders understand the right model and forecast based on it. One who does not follow the right model is deviated from the rationality assumption. In the behavioral finance, on the other hand, traders make efforts to find accurate prices; thus they may neglect the right model. To resolve this problem they discuss their own beliefs about future prices, which are rooted in their transactional strategy. To be more specific, behavioral finance fundamentals believe that future prices converge to the intrinsic values.

Considering short-run fluctuations (the difference between market prices and intrinsic values), traders tend to make transactions based on intrinsic values. Hence, they stabilize the market. It should be considered that people with rational, fundamental, and long-run vision, who do not respond to short-run volatilities, are too few to count.

Irrational speculators irregularly or mistakenly respond to all news, but rational speculators only take important and relevant news efficiently.

The only common factor among rational and irrational speculators is their short-run vision. Irrational speculators are able to raise or drop the equity prices, but they create instability. Although rational speculators implement fluctuation strategies in the short-run and diverge the prices from their intrinsic values (create bubbles), they are aware of the real prices. Their feedbacks do not create a significant change in the intrinsic values and long-run strategies.



The concepts of fundamentality and speculation are defined based on models. Considering the assumptions and rationality of the traders the definitions may vary. For instance, in behavioral finance models, speculators are introduced as people with irrational behaviors. In our model, considering the assumptions of an efficient market, traders all have rational expectations and fundamentals also can create instability.

Fear from behaviors of a few speculators may convince policy makers to impede opening up the market to more speculators. This will cause market instability and liquidity drop. This is while policy makers must stop fearing from a large number of speculators and accept the fact that taxes on transactions and/or profits can disappoint speculators from entering the market. As a result, volatilities will increase, extreme responds will take place, and the number of bubbles will boost up. These impacts are higher for superficial markets.

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