# Studing the relationship between unsystematic risk fluctuations and noise trading

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## Abstract:

*Classic finance believes that stock price changes are related to systematic changes in the company's intrinsic values. However, recent research shows that behavioral factors play a very important role in determining stock prices and returns of investors, one of these behavioral patterns is noise trading. The purpose of this study is to investigate the effect of unsystematic risk fluctuations on noise transactions.*

*For this study, we use the random variance of the capital asset pricing model-disrupted unit as a measure of unsystematic risk fluctuations and for measuring noise trading We used a comparison of company market value with industry companies the average market value. The research sample included 92 companies listed in the Tehran Stock Exchange during the period of 2011-2016.*

*The result of the test the hypothesis of the research showed that the relationship between unsystematic risk fluctuations and noise trading using is positive and significant and thus unsystematic risk fluctuations can be used as a criterion for detecting noise trading.*

**Keywords:**
Unsystematic risk, noise trading, behavioral finance, return, market fluctuations

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## Introduction

Investing is an essential and vital factor for the growth and development of each country. In order to provide the funds needed for this investment, there must be a number of sources for financing capital.

The best source for providing capital is the retention of the people of a society. The stock exchange is the best mechanism that allows the use of postpayments in the production sector. Thus, the stock market, on the one hand, pushes the waves back to development and production, and on the other hand satisfies the financial needs of companies (Shafizadeh, 1996).

Classic financial theory states that stock prices in financial markets represent the fundamental value of stocks and reflect the current value of future cash flows. Based on the market-efficient hypothesis, investors have rational behavior, which means that they process all available information and seek to maximize the expected utility (Talangi, 2004).

However, evidence suggests that investors do not use quantitative methods to determine stock values. Judgments are based on mental imaginings and unscientific information and psychological and emotional conditions in the stock exchange. Emotional variables formed based on cognitive constraints examine the psychological conditions of stock market participants. (Chen et al., 2010).

Behavioral Finance is one of the studies that have expanded rapidly in this regard, examining the process of investor decision making and their response to different financial market conditions. One of the founders of this area is Daniel Kahainman's famous financial psychologist (Shahr Abadi and Yousefy, 2007)

The behavioral financial perspective shows that some of the price changes in the securities have no fundamental reason, and the emotional tendency of the investor plays an important role in determining the prices. (Kim, 2010).

One of the most important issues in the field of behavioral finance is the noise traders, which creates major problems for the market efficiency hypothesis. Because noise traders mislead the intrinsic value of the stock (derived from the valuation equations) and their market value. However, it is necessary to note that the noise traders themselves prevent investors from benefiting from the ineffectiveness of the market (Black, 1986)

## Literature review Related to Unsystematic Risk Fluctuate

By referring to different scientific sources, several definitions of risk can be found. Risk is a term that is generally negative in the minds of the public and refers to conditions that should be avoided. For example, in Webster's dictionary, risk is defined as "exposure to danger or incident..

Weston and Brygham write in the definition of asset risk: "The risk of an asset is the probable change in the future returns on that asset"

Therefore, considering the total definitions above, the risk can be defined as follows:

Risk is the likelihood of a change in the benefits and benefits foreseen for a decision, an event, or a future state.

Over time and doing different researches, researchers found many of the movements and nuisances in financial markets that were not justified by efficient market theories. This led to the emergence of a behavioral revolution in financial discussions with the article "Kahneman" and "Tversky" in 1979. Theories and financial theories, according to this approach, have pointed out that investment decisions are not only influenced by economic indicators and rationality, but also other factors have a significant effect on their behavior and their decision types (Borji Dolatabadi, 2008).

In fact, behavioral finance is a branch of behavioral science that examines financial issues from a scientific, social and wider perspective, including attention to psychology, sociology, and the elimination of rational and logical fiscal frameworks of classical finance.

Noise traders are often referred to as irrational investors who have a false and irrational belief in future returns of risk assets and respond to noise information that has nothing to do with future cash flows (Abbasian and Farzanegan, 2011).

The existence of Noise traders can potentially affect many market forces, such as feedback trading (Kuraw, 2008), price bubbles (Diang et al., 1990), excessive volatility (Schiller, 1981).

For the first time Kyle (1985) introduced the term noise into the literature of finance and economics. Kyle states in the definition of the word noise means that the effect of a large number of small factors is much stronger than the effect of a few of the larger factors.

Kyle mentions noise traders as traders who trade without regard to stock fundamental information in a random fashion.

Kyle believes that not all demand changes seem rational, and some are responses to changes in expectations or feelings that are not fully justified by information. Such a change can be a response to a false signal that investors believe to provide information about the future period, while such information is not transmitted to a completely rational model. For such investors, Kyle has used the term noise traders.

Mork et al. (2000) have shown that stock prices in weak economies are shifted more consistently comparing to strong economies, due to the shortage of fundamental active analysts in weak economies as well as the widespread impact of political events Extensive and on all stocks of companies in the market.

Those‹ fluctuations in unsystematic risk, unrelated to fundamental stock changes, signaled the risk of noise traders. In addition, they believed that with any price changes in the stock of companies, the position of the arbitrage was created and the stock price returns to its fundamental value.

Levin and Zajek (2001) showed that noise traders, in contrast to arbiteragers, are grouped in accordance with a mutual actions, trends, or emotions. For example, some noise traders believe that they have more information than the rest of the traders, who call them “Naive traders", and they can buy precious-bubble stocks and to sell these trades at a higher price and get a profit from this place. Of course, this type of behavioral bias will lead to failure in the end, and eventually the market share price will return to its fundamental value.

Kaliva & Koskinen (2007) in their study of the causes and manner of identifying asset price bubbles in the financial markets showed that there was an acceptable explanation for the fact that stock prices deviated from its fundamental value and It is noise trading.

**Research hypotheses**

In order to identify the noise trading, the first hypothesis is expressed as follows:

-The relationship between unsystematic risk fluctuations and noise trading is positive and significant.

In this field, another discussion is that there is relationship between fluctuations in market returns and noise trading, in other words, market fluctuations may increase noise trading, and thus we must identify the relationship between fluctuations in market returns and noise trading. Therefore, the second hypothesis is considered as follows:

-The relationship between volatility of market returns and noise trading is positive and significant.

If the first hypothesis is confirmed, in the study of the relationship between unsystematic risk fluctuations and noise trading, the effects of fluctuations in market returns should be moderated and only the relationship between unsystematic risk fluctuations and noise trading should be studied. For this purpose, the third hypothesis is as follows:

-The relationship between unsystematic risk fluctuations and noise trading is positive and significant by adding a market volatility as a control variable.

## Research Methodology

This paper describes the relationship between unsystematic risk fluctuations and noise trading is positive or not. Therefore, the present research is descriptive-correlative research and the combined data is used for this purpose.

From the point of view of reasoning, it is also classified as inductive research, because in this research findings based on the sample are generalized to the whole society.

As mentioned, this research seeks to answer the question of whether unsystematic risk fluctuations are capable of showing the effect of noise trading.

To answer the above question, as well as to test the hypotheses of this research, first, the relationship between unsystematic risk fluctuations and noise trading is investigated and then we examine the relationship between market fluctuations and noise trading, and finaly we investigate the relationship between unsystematic risk fluctuations and noise trading with controlling the return on the market fluctuations.

## Unsystematic risk fluctuation variable

In this research, we use $e_i$ (the random error variance) of the below equation, as the independent variable of the research and representative of unsystematic risk fluctuations, is used.

$$R_i = \alpha_0 + \beta r_m + e_i$$

$R_i$: Monthly return on share i relative to risk-free return;

In this research, we used the interest rate of mosharekat sukuk as a risk free return rate.

$\beta$: Beta

$r_m$: Surplus market returns relative to risk free return

$e_i$: Random error factor

In order to calculate the $R_i$variable, we used the below formulla:

$$R_{it} = \frac{D_{it} + P_{it}(1 + X_{it} + C_{it}) - (P_{it-1} + M_{it} * X_{it})}{P_{it-1} + M_{it} * X_{it}}$$

We have the following:

$R_{it}$: Stocks return i on day t

$P_{it}$:Stock price i at the end of day t

$P_{it-1}$:Stock price i at the beginning of day t

$D_{it}$:Is the dividend's share of i at the end of day t

$X_{it}$: Percent increase in capital from the claims and cash

$C_{it}$:Percentage increase in capital from the place of stock holding

$M_{it}$:The nominal amount paid by the investor for raising capital

For calculating market return, we use brlow formula:

$$\text{Market Return} = (\text{Market Index}_t - \text{Market Index}_{t-1})/\text{Market Index}_{t-1}$$

We have the following:

$\text{Market Index}_t$: Market index at the end of the day

$\text{Market Index}_{t-1}$:Market Index at the beginning of the day

β: beta indicates the sensitivity of the yield fluctuations of securities in compare with fluctuations in market portfolio yields and results from the division of covariance of securities portfolio returns with market return on market portfolio yield variance.

In this way, the beta corresponding to the market for each share is obtained.

$$\beta_i = \frac{cov(r_i, r_m)}{\sigma_m^2}$$

In this step, the regression of the above-mentioned variables is performed according to the equation below and we obtain the independent variable of the random error fraction $e_i$.

$R_i = \alpha_0 + \beta r_m + e_i$

To calculate the variance of a random error, we also use the following equation:

$\sigma_{ie}^2 = \sigma_i^2 - \left(\frac{\sigma_{im}^2}{\sigma_m^2}\right)$

$\sigma_{ie}^2$: The variance of a random error factor

$\sigma_i^2$: Variance of excess stock i return versus risk-free returns

$\sigma_{im}^2$: Covariance between excess returns per share and market surplus returns

$\sigma_m^2$: Market Risk Output Variance versus Risk-free Return

In this research, noise trading has been used as a dependent variable.

To estimate the noise-trading variable, the following criteria are used:

$\text{Mispricing}_{it} = \text{Ln}^{\text{Capital}_i/\text{I(Capital)}_{it}}$(Aabo et all, *2017)*

$\text{Capital}_i$: The market value of corporate equity and debt

$\text{I(Capital)}_{it}$: The result of the company's sales multiple in the middle of the ratio $(\frac{\text{Capital}_i}{\text{sale}})$of the company's activity industry

In addition, to prevent the effects of other variables on noise trading, we use the following variables as control variable:

Size:

In the present study, the size, logarithm of the value of the company's total assets is considered.

Leverage:

Indicating how much of the assets is provided from the place of debt and how much equity is available. In this research, we use the ratio of debt to the company's assets to calculate it.

Profitability:

In this research, we use return on asset (ROA) as a profitability criterion.

## Statistical population and research sample

The statistical population of this study is all companies accepted in the Tehran Stock Exchange between 2011 and 2016.

In this study, the following filters were considered to increase the ability to compare companies in the sample, and companies that could not pass these filters removed from Sample.

1- To increase the comparability of companies fiscal year, they will end in March,

2- During the period from 2011 to the end of 2016, they did not change the fiscal year or change of activity,

3- The companies in the research period have continuous activity and have no more than three months to stop trading, and

4- Because the nature and operations of financial companies (financial intermediation, investment, etc.) are different from other companies, they are not part of these companies.

## Research findings

Results from the first hypothesis

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -1.042890 | 0.369367 | -2.823451 | 0.0050 |
| IV | 17.14726 | 5.724363 | 2.995488 | 0.0029 |
| SIZE | 0.087750 | 0.026726 | 3.283336 | 0.0011 |
| LEVERAGE | -0.295779 | 0.095481 | -3.097785 | 0.0021 |
| PROFIT | 0.250030 | 0.115884 | 2.157591 | 0.0316 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| Weighted Statistics | | | | |
| R-squared | 0.929003 | Mean dependent var | | 0.086643 |
| Adjusted R-squared | 0.910473 | S.D. dependent var | | 1.222840 |
| S.E. of regression | 0.366779 | Sum squared resid | | 48.96775 |
| F-statistic | 50.13624 | Durbin-Watson stat | | 1.981821 |
| Prob(F-statistic) | 0.000000 | | | |

Results from the second hypothesis

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| SIZE | 0.088224 | 0.026624 | 3.313664 | 0.0010 |
| PROFIT | 0.190451 | 0.118046 | 1.613362 | 0.1075 |
| LEVERAGE | -0.316469 | 0.094404 | -3.352297 | 0.0009 |
| MARKET | 0.040712 | 0.014645 | 2.779892 | 0.0057 |
| C | -1.027607 | 0.367966 | -2.792673 | 0.0055 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| Weighted Statistics | | | | |
| R-squared | 0.928212 | Mean dependent var | | 0.103234 |
| Adjusted R-squared | 0.909476 | S.D. dependent var | | 1.218769 |
| S.E. of regression | 0.367618 | Sum squared resid | | 49.19205 |
| F-statistic | 49.54207 | Durbin-Watson stat | | 1.991734 |
| Prob(F-statistic) | 0.000000 | | | |

Results from the third hypothesis

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | -1.086890 | 0.368055 | -2.953064 | 0.0034 |
| MARKET | 0.032238 | 0.014661 | 2.198854 | 0.0285 |
| IV | 14.49786 | 5.789928 | 2.503980 | 0.0127 |
| SIZE | 0.090896 | 0.026616 | 3.415049 | 0.0007 |
| LEVERAGE | -0.299752 | 0.092033 | -3.256994 | 0.0012 |
| PROFIT | 0.198715 | 0.115675 | 1.717880 | 0.0867 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| Weighted Statistics | | | | |
| R-squared | 0.930146 | Mean dependent var | | 0.087189 |
| Adjusted R-squared | 0.911672 | S.D. dependent var | | 1.229249 |
| S.E. of regression | 0.366218 | Sum squared resid | | 48.68407 |
| F-statistic | 50.34961 | Durbin-Watson stat | | 1.998226 |
| Prob(F-statistic) | 0.000000 | | | |

**Conclusion**

The present study seeks to investigate the relationship between unsystematic risk fluctuations and noise trading in order to detect Noise with unsystematic risk fluctuations and respond appropriately. The results of the test of the first hypothesis indicate that, with increasing unsystematic risk fluctuations, noise trading also increase, because according to the results from the first model, which was tested on the basis of the hypothesis, the coefficient (17.14) indicating the effect of unsystematic risk fluctuations on noise trading were positive and significant. In other words, with increasing unsystematic risk fluctuations, noise trading also increase.

The results obtained from the first hypothesis test are completely logical in terms of theoretical and empirical foundations in the subject area of the current research. For example, De long et al. (1990) found noise traders believed they had important information that affect price and, in fact, noise traders prevented distortions from market efficiency and make the deviation of stock prices from their fundamental values. Usually, when the stock market bubble is formed, the severity of the effect of such traders has increased.

According to the results, the relationship between company size and noise trading (0.087) is positive in contrast to expectations. In other words, it was expected to show more noise trading in smaller companies, but according to the results of this model, traders have been more noisy in large companies, and with increasing size companies have increased their noise trading during the review period.

The relationship between the debt ratio and the noise trading (-29.57) is negative and significant, meaning that noise trading are seen in companies with higher debt ratios and noise traders tend to look for companies with low debt ratios.

Also, the relationship between profitability of the company and noise trading (0.25) is positive and significant, which means that with increasing profitability of the companies, the noise trades on their stocks have also increased, and in fact the noise traders Most have been active in highly profitable companies.

As discussed in the review of the goals and hypotheses of the research, based on the second hypothesis, it was expected that with the increase of the fluctuation of market returns, noise trading would also increase, so the prediction in this study was through The following hypothesis was tested:

"The relationship between fluctuations in market returns and noise trading is positive and significant..

Based on the results of fitting the model of the second hypothesis of the research, it can be claimed that the relationship between market returns and noise trading (0.04) is positive and significant, And this means that Noise will also increase when market volatility incresing.

To prove the third hypothesis, the relevant test was performed and it was found that the relationship between unsystematic risk fluctuations and noise trading (14.49) is positive and significant, that means, with the increase of unsystematic risk fluctuations, noise trading also increase.

The relationship between market volatility and noise trades (0.032) is positive and significant. In other words, with increasing market volatility, noise trading also increase.

The relationship between the size of the company and the noise trading (0.09) in contrast to expectations is positive. In other words, it was expected to show more noise deals in smaller companies, but according to the results of

this model, traders have been more noise in large companies, and with increasing size Companies have increased their noise trading during the review period.

The relationship between debt ratio and noise trading (-29.97) is negative and meaning that noise trading are seen in companies with lower debt ratios and noise traders tend to look for companies with low debt ratios. Also, the relationship between profitability of the company and noise trading (0.198) is positive and significant, which means that with increasing profitability, the companies reviewed the noise trades on their stocks has also increased.

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