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Developing the Capital Asset Pricing Model Using the Noise Based Behavioral Model (N-CAPM)

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Abstract
In this study, we aim to show the effects of noise in the process of stock valuation and a new behavioral analysis model of noise-based capital asset pricing (N-CAPM) or human judgments was presented to assess the effects of the judgments on decision makings.
Using five experts' opinions of capital market, who had not been related to each other, the stock valuation of five selected corporations was defined. In this direction, we have used the Dividend Discount Model (DDM), Free Cash Flow to Equity (FCFE), and Price-Earnings ratio (P/E), for the period of 2024-2026.
We found out that considering noise in the process of stock valuation decreases the fluctuations or risks of stocks compared with other market stocks and can produce less inflammation and fluctuation in values. Therefore, not considering the noise level can cause asset price deviation, make it unreal, and more increase the prices.
Of course, because of time-consuming valuation process of corporations, we had some limitations to use many other experts' views. Then we suggest that the next researchers, rather than three methods, choose one and an industry, for example automobile, to reduce the limitations and achieve the better results. Also, we hope that they would analyze the human factors such as individual's personality, view, and past experiences which affect decision making as well as the variables like stock turnover, general knowledge, and technical analysis on stock valuation. Understanding more deeply the market noise, managers can professionally manage the sudden evolutions and unexpected risks.

1. Introduction

Every day, a large number of securities are priced according to interaction of various variables each of them differently affect the prices. In many studies, the patterns or mechanisms of this market are examined. In financial economics texts, risk and return are two main factors for decision making on an investment. An individual decision, in this market, is based on choosing the high profitable and low risk assets. Assessing their sensitivity on the risk and return of an asset, investors have to choose their best portfolios. Basically, the researchers of financial economics have focused on considering the risk factor, relation between expected risk and return, and offering a model to show this connection. Capital Asset Pricing Model (CAPM) is one of the most important models for showing correlation of expected risk and return. Many theories of the modern financial economics are based on this classic model. CAPM explains the relation between anticipated risk and return. There is a balance between anticipated risk and return in the center of this model. These models, essentially, are used to access a portfolio (Zarifhonarvar, 2023). Over time, it was recognized that the model cannot sometimes measure well the relation between risk and return (Bodie et al, 2013; Zarifhonarvar, 2023). For example, Basso's study (1977) has showed that the stocks with high proportion of profit to price have more returns than the stocks with low proportion of profit to price. Or for instance, Adler (1981) has shown that the average stock returns of companies with low market value, was more than the stocks of companies with high market value. Therefore, it seems that defining factors other than stock price affect stock return. Hence, many efforts were made to improve fundamental models based on the different viewpoints about risk and return, including the models such as D-CAPM, C-CAPM, X-CAPM, etc. All data are considered in current prices according to the Efficient-Market Hypothesis; and any deviation of these changes affects rapidly on the prices. However, many exceptions of the relation between profit and return in financial markets have caused violation of Efficient-Market Hypothesis. These violations have led to create new theories in financial markets such as perspective theory by Daniel Kahneman and Rosenfield in 2016. These theories and many other events like financial crisis in markets have resulted in offering the behavioral-financial paradigm. Based on this paradigm, many economic and rational indicators, which are essential assumptions in traditional pricing models, have been violated in real world. Rejecting the many assumptions of classic theories, behavioral-financial paradigm, using some personal and behavioral features of investors, try to explain many events in financial markets. So far, a large number of researches are done to identify the kinds of financial biases, using personal and behavioral characteristics of investors. One of the newest asset pricing models based on behavioral patterns is X-CAPM (Barberis, 2013) which aim to price assets in accordance with behavioral patterns. On the other hand, when it comes to human judgment, a footprint of the noise theory can be found that is a theory on behavioral science, which explains the variation resulted from error. In other words, noise points to the difference between price and true value of stocks because of human decisions and factors. These factors can include psychological effects, fear and greed, the impacts resulted from behavioral deviations and news. Noise can cause unconformity between price and true value of stocks and lead to unfair and discontinuous changes in financial markets. For example, the level of experts' knowledge and the price effects of the past can increase the noise in financial markets. It can lead to considerable changes of stock prices of companies and their unfair valuation. Noise can unbalance financial markets and create discontinuous and unexpected changes of stock prices. This kind of difference in human judgments can result in producing the profitable opportunities for professional investors or unexpected risks for common investors. Generally, noise can negatively influence financial markets, because unfair stock valuation can lead to price inflation, stock price imbalance, decreased confidence of investors, and other significant effects on the investors' decisions. Accordingly, it is obvious that, to improve human judgments, the noises of individual thinking system must be recognized. Then, considering the current research gap around the human judgment role in stock valuation of companies in this market, this study has aimed to expand capital asset pricing model (CAPM), using the human judgment approach, and a new model is provided for noise-based capital asset pricing model (N-CAPM).

2. Literature Review

After presenting CAPM, many experimental and theoretical researches are conducted on the original model and its expansion. Several articles have been published about financial economics on this model, as both theoretical and experimental. Following the simple Sharp-Lintner model published in 1964-1965, some expanded models are suggested. Table 1 shows a complete list of models related to CAPM.

Table 1- Capital Asset Pricing Model (CAPM) and its expanded models

Model	Author/Authors
Mean-Variance algorithm	Markowitz (1952)
Sharpe-Lintner CAPM	Sharp (1964); Lintner (1965); Mossin (1966)
Black Zero-beta CAPM	Black et al. (1972)
CAPM with Human Capital	Mayers (1973)
CAPM with Consumption Goods	Breeden (1979)
International CAPM	Solnik (1974); Adler & Domas (1983)
Arbitrage Pricing Theory	Ross (1976)
Three factor model	Fama & French (1993)
Partial Variance Approach	Hogan & Warren (1974); Bawa & Lindenberg (1977; Harlow & Rao (1989)
The Three Moment CAPM	Rubinstein (1973); Kraus & Litzenberger (1976)
The Four Moment CAPM	Fang & Lai (1997)
The Intertemporal CAPM	Merton (1973)
The Consumption CAPM	Breeden (1979)
Production Based CAPM	Lucas (1978); Brock (1982)
Investment-Based CAPM	Cochrane (1991)
Liquidity Based CAPM	Acharya & Pedersen (2005)
Conditional CAPM	Jagannathan & Wang (1996)

Primary studies, on Sharp-Lintner model, has predicted the correlation between anticipated return and market beta. The problem of such researches was that incorrect estimates of beta for assets produced error of measurement. In addition, regression residual is considered as the source of variations. Researchers have suggested different methods to solve this problem. For example, Black et al. (1972) used stock securities. Beta for these incongruous portfolios was more accurate. Then, Fama and Makbeth (1973) asserted that, instead of a cross-sectional regression of average monthly return and beta, a monthly cross-sectional regression of monthly return over beta is necessary, that would decrease the problem of residual correlation.

Another approach first offered by Jensen (1968) who argued that the Sharp-Lintner model to explain the relation between anticipated return and beta can be tested by the time series methods.

Experimental studies are done in different countries such as Turkey, the United States of America, Finland, Sweden, Uganda, India, Italy, and Greek to investigate the gap between offered theories and real evidences. These studies have shown that the simple CAPM model cannot explain the relation between risk and return. Then, researchers such as Fama and French (1993) argued that experimental studies around this model had to be done more. Although the problems related to experimental researches can be resulted from the weakness of this model, from a theoretical point of view, the problems can also be resulted from lack of applied studies and reliable tests on the model.

In general, this model has many opponents as well as supporters. Some, like McGoun (1993), consider it as a huge failure, while others, like Levy (2010), argue that this approach is still reliable and practical. However, most researchers believe that adequacy of this model depends on when and in what circumstances it is used for decision making.

Due to wide usage of CAPM in financial researches, this model is considered as a standard one in theoretical and experimental literatures. This model was developed to explain the relation between risk of stock market and return. CAPM base on theoretical studies of Markovitz (1952) such as modern portfolio theory, mean-variance, and diversification was separately explained by Sharp (1964). From Mossin (1966) point of view according this model, risk of an asset is defined based on its return dependency to market portfolio return and the relation between anticipated return and risk is leaner and direct. Thus, CAPM is represented by Sharp and Lintner, using stock beta in 1960, as the following equation:

$$E(R_i) = R_f + \beta(R_M - R_F) \qquad (1)$$

In which E(Ri) is anticipated return, RF is the return of security with no risk, and RM is the return of all market investment. This model divides the risk up into systematic and unsystematic. Systematic risk or beta (i) is how a stock acts in relation to market stocks, as which the anticipated return is depended on. However, unsystematic risk is related to special condition of any stock (Bodie et al., 2013).

Although this model at first was paid attention by investors to explain the relation between risk and return, it was over time addressed that the model sometimes cannot measure well the relation between risk and return. For instance, the research by Basso (19770 has shown that the stocks with high proportion of profit to price gain more returns than the stocks with low proportion of profit to price. Or for instance, Benz (1981) has shown that the stocks of companies with low market values have average return higher than the stocks of companies with high market values; therefore, it seems that determining factors other than stock prices affect stock returns. So, many efforts to improve fundamental models are made according to a different view to risk and return, including the models C-CAPM, D-CAPM, etc. Based on efficient market assumptions, all information is considered in their current prices and any deviation of these variations affects price rapidly. Also, recently, the new behavioral models have connected risk and return using behavioral features of investors. However, the relation between stock value and Capital Asset Pricing Model (CAPM) was not addressed in these models.

On the other hand, recently, observing the noise in financial decision making of individuals, Kahneman and others (2016) has introduced the noise theory. According to this theory, some current risks of stock prices are noise risks or error probabilities in decision making. Generally, the aim of noise theory as an error source is to offer the patterns for decision making to optimize the policies in organizations and financial institutions; thus, the final aim of noise theory is to improve the quality of decision making. The noise theory, in relative terms, can also be as a comparison among different judgments and can decrease the decision-making mistakes of individuals.

So far, several studies are addressed the issue which follows:

Damodaran (2013) studied that how the noises of faire values can influence the bank capital adequacy ratios. If the error of measurement causes the deviation of reported capital levels from the fundamental levels, then legislators can provide a financially healthy bank with a trouble (error type 1) or provide a financially troubled bank with a challenge (error type 2), that results in the allocated unoptimized resources for banks, legislators, and investors. This study has concluded while noise leads to the errors of type I and II around the capital adequacy criteria of the Federal Deposit Insurance Company (FDIC), the type I is superior. Therefore, noise can lead to inefficient allocated resources in the regulatory sections (increasing the supervising costs) and banks (increasing the compliance costs).

Brogaard et. al (2022) reviewed the real effects of stock market efficiency by analyzing how the noise effect on price influences on allocated capital efficiency. In this review, using data of 42 countries, it was concluded that allocated capital efficiency in companies (sensitivity of corporate investment to the opportunities of development) and industries (industrial investment elasticity to value added) is decreased by the noise level.

Cowgill (2018) in a study has developed a formal decision-making model and proved that better learning completes experiments and human judgments in this technology.

Costello and Wats (2014) in their studies have considered systematic biases in possible judgments, commonly as the evidences which emphasize that individuals do not judge probability by rules of probability theory, but they use explorative ways that sometimes result in logical judgment or systematic biases. These views have mainly affected economy, law, medical sciences, etc.

In his study, Hilbert (2014) argues that a single coherent framework for long term researches on eight directions of cognitive decision making, seemingly unrelated, has suggested. During the six past decades, hundreds of experimental studies have led to the rules which determine how individuals are systematically misled about their decisions which are normally expected. Several productive mechanisms were suggested to explain those cognitive prejudices. Now, it is suggested that at least eight decision-making biases, which are experimentally discovered, can be created simply by assumption of noise deviations in the memory-based data process, that turn objective evidences (observations) into subjective estimates (decisions). An integrated framework is offered to show how the similar noise-based mechanisms can lead to conservatism, Bayesian probability orientation, unreal correlation, self-other orientation, secondary orientation, exaggerated expectations, hard-easy trust and effect orientation. Analytical tool of data theory is used to diminish the nature and limitations which explain the information for double and multiple decision making. The next composition offers formal mathematical definitions of biases and mechanisms and their underlying producers, that allows combined analysis of how are their connections. This synthesis helps the bigger target of carving a coherent picture of thousands of orientations seemingly unrelated and their productive psychological mechanisms. The limitations and questions of the research are going to be discussed.

3. Methodology

The present research, according to the above, is based on outcome, applicable, target oriented, descriptive, and based on the type of quantitative data and role of researcher, which is independent of the research strategy and process. This research has used five experts of financial markets, independently, with primary fixed data, to value the stocks of five companies during 1403-1405. Characteristics of the experts are as follows:

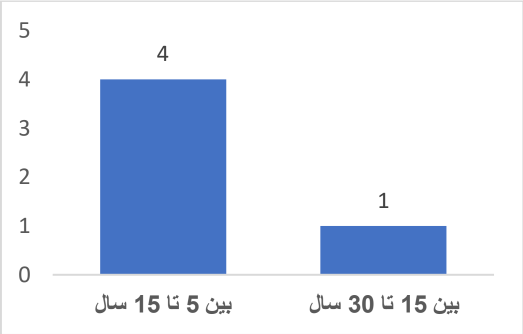

Chart 1- Distribution of experts' work experiences

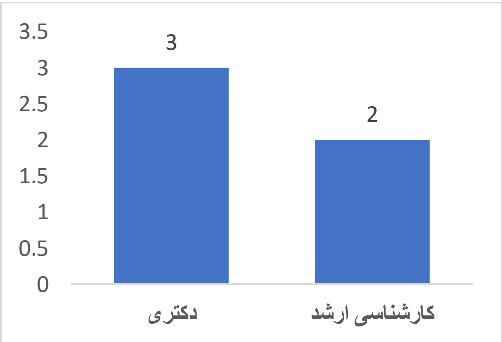

Chart 2- Distribution of experts' education

In this study, it is assumed that two factors are the sources of noise effects. The first factor: as there are different methods for calculating the intrinsic value of stocks and these methods do not necessarily lead to the same outputs, one of the noise factors can be the manner of different experts' decisions, that is used to measure the noise of mean and standard deviation of different methods about the effects of this noise. The second factor: as, because of measurement error in variables used in a method, the different stock valuation is possible, the second source is the risk resulted from different valuation in any method. Considering two source factors of noise risk, at first the standard deviation in any method is calculated, using the following equation:

$$K_j = \frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X}) \qquad (2)$$

Then, using the mean of standard deviation as a noise criterion, noise is calculated using the following equation:

$$K = \frac{\sum_{j=1}^{3} K_j}{3} \qquad (3)$$

It must be mentioned that, finally, the resulted k values will be adjusted using balanced methods in order to define the results of the problem as percentages. As assumed, a part of stock price variations is resulted from noise level. Using the calculated k parameter in previous stage, adjusted beta is calculated using the following equation for each period:

$$\beta_t = \frac{Cov(AK, M)}{VAR(M)} = \frac{K_t Cov(A, M)}{VAR(M)} = K_t\beta \qquad (4)$$

Therefore, in this method, the leaner chart of stock market, instead of constant slope, can has different adjusted beta, considering the calculated noise level in each period, that change of investment opportunity is possible. Now, if the parameter k as a fixed value (here, k is noise level) is multiplied by stock price, the stock beta is:

$$\beta = K\beta^T \qquad (5)$$

In above equation, Kβ is shown as the stock beta. That is, because the current stock price variations involve the noise effects, a part of calculated beta using traditional methods includes noise effects that the rate of Kβ has been considered in beta calculations. Now, if stock beta can be divided into its constructive components, a better criterion can be considered for measuring stock beta. In above equation, k is the noise rate, β is the stock beta, and β^T is the adjusted beta.

Then, considering the divided beta into two parts of k and β variations, stock risk in question can be defined more effectively. Therefore, using the above equation, stock beta in addition to market correlation coefficient can be depended on the noise rate measured by expert judgments of capital market as for the stock values; as due to the different amounts of k, the stock beta amounts are changed. To calculate adjusted beta considering the recognized noise effects, a better relation between a stock price variation and market risk can be established which is impossible in traditional models. Now, calculating the adjusted beta, asset pricing model can be defined as follows:

$$E(R_i) - R_f = \beta(R_M - R_F) = K\beta^T(R_M - R_F) \quad (6)$$

Here, to manage the noise effects in calculating stock beta, the above equation is divided into k, then:

$$\frac{E(R_i) - R_f}{K} = \beta^T(R_M - R_F) \quad (7)$$

According to the above equation we can see that, in case of managing the effect of noise on stock price variation, the stock risk can be more effectively measured using adjusted beta. Also, as for the asset pricing model using adjusted beta, it is required the following assumptions:

The noise effect in the marker index is zero like white noise.
The noise effect on a stock value is constant and the same in a time period.
Standard deviation resulted from stock valuation by different experts is a good criterion for measuring noise. Expectations of investors, considering the noises of their decisions, cause more stock price fluctuation as the more the noise amount increases, the more the price varies.
The risk of securities is measured by its beta value.
Securities in a very competing market are changed with no fee and everybody has simultaneously accessed their data with no fees, that these amounts become varied because of individual measurement errors.
The tax does not affect the investor's decisions. Because of measurement errors, investors do not have identical expectations about security returns. The asymmetrical market condition means that individuals do not gain return as much as risk and one of its factors is return of the noise amount or measurement error.
Considering the assumptions used in adjusted beta, it has been clear that this model can improve some assumptions of fundamental model CAPM.
As emphasized, the noise in a system can be evaluated by auditing the noise. In an experiment, some experts have independently made judgments about a similar subject (real or fake). In this case, not knowing it, the real noise amount can be measured and dispersion of shoots to the target can be compared. Auditing noise in many systems, including finance and capital, can evaluate the judgment variations. Sometimes, this method may consider defects of skills or instruction and then measure system noise. In the following, independent experts' judgments are analyzed.

4. Findings

In this section, the results are presented.
Stock price valuation:
In this study, using five experts' opinions about capital market, who had not connected to each other, the stock valuation of five selected corporations (Pars petrochemical, Khalij-e-Fars petrochemical, Sadid, Shabandar, and Shapna) was done for the time horizon of 2024-2026. The stock valuation approaches

in this study, including the methods of DDM, FCFE, and P/E, are among the most common approaches of valuation in the capital market. Totally, the results of the stock valuation for five selected corporations in the research are indicated in the table 2.

As seen, results of stock price valuation by different experts have been varied in five corporations as well as three valuating methods. It is worth mentioning that the selected experts of this research were not connected to each other.

Table 2- Results of stock price valuation by experts (million Rials) - Source: this research

Expert	Co.	DDM	P/E	FCFE
Expert 1	Pars petrochemical	3386	3720	5137
	Khalij-e-Fars petrochemical	13232	13088	19672
	Sadid	11015	11328	38597
	Shabandar	121657	188789	247625
	Shapna	8535	7581	10176
Expert 2	Pars petrochemical	3795	3920	5820
	Khalij-e-Fars petrochemical	13685	13500	20500
	Sadid	11987	11850	38652
	Shabandar	122589	190325	272990
	Shapna	8998	7895	10500
Expert 3	Pars petrochemical	4582	4292	6200
	Khalij-e-Fars petrochemical	14652	14253	21600
	Sadid	12560	12543	38800
	Shabandar	125653	189523	275602
	Shapna	9586	8542	11352
Expert 4	Pars petrochemical	4231	4120	5650
	Khalij-e-Fars petrochemical	13999	13952	22000
	Sadid	12502	12645	38425
	Shabandar	125024	189356	256845
	Shapna	9321	8213	10352
Expert 5	Pars petrochemical	2985	3348	4652
	Khalij-e-Fars petrochemical	12564	14250	17700
	Sadid	10262	10856	38150
	Shabandar	119586	173202	222860
	Shapna	6854	6985	10000

To measure noise:

In the following table, the results of recognizing noise in valuation of each expert are indicated as percentages:

Table 3- Noise in stock price valuation by experts

Co.	Noise (%)
Pars petrochemical	%15
Khalij-e-Fars petrochemical	%61
Sadid	%14
Shabandar	%12
Shapna	%37

Considering the numbers (12% - 61%) resulted from the experts' judgments, it can be said that views and analyses of experts on stock valuation are very various. The difference in valuation resulted from different expert views indicates the subject of discussion. The varied views (from 12% to 61%) suggests that experts have different viewpoints in valuating stocks of others. The differences may be due to different interpretations of information, different analysis methods, different experiences in market, or different assumptions to predict the future.

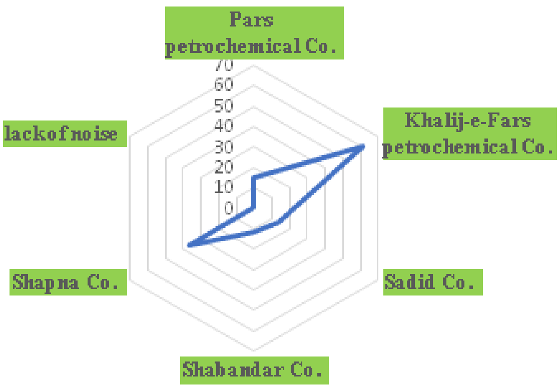

Chart 3- Noise in stock price valuation by experts

Results indicate that noise effects or human judgments can cause meaningful differences in stock price valuation. Human judgment, as an important factor in the process of stock valuation, may be effective because of the following factors:

Firstly, inaccurate predictions – because of incorrect data or interpretations, experts may provide inaccurate predictions which cause meaningful differences in stock valuation.

Secondly, emotional effects – the emotions such as fear, greed, hope may affect expert decision and cause variation of stock valuation. For example, emotions can lead to relative increase or decrease of stock prices, not considering their real values.

Thirdly, group behavior – in stock market, experts and investors may have been influenced by views and opinions of each other, and group decisions may have influenced on valuation, that can cause meaningful differences in stock valuation.

Fourthly, different methods and assumptions – experts can use different methods and assumptions for analyzing. These differences can result in meaningful differences in stock valuation. Generally, stock valuation is a sophisticated function also depended on psychological trends and human factors. To consider these factors and examine more details can help more accurate analysis and better understanding of stock valuation.

Noise is occurred under many factors that few of them are:

The effects of nonlogical factors: experts' judgments in stock pricing may be influenced by nonlogical factors, including fear, greed, group effect, past price effects, and behavioral deviations. These factors can cause discontinuous and unfair variations in stock price.

Non-identical judgments: experts' judgments about stock value may be different. This difference can be due to different viewpoints, different valuation models used, different analyzes and assumptions about capital interest rate and profit growth. These differences on judgments can lead to different stock valuation and known as a noise.

Noise of market: noise of market is mentioned as noncontinuous and unfair variations in stock prices because of nonlogical factor effects. The noise can be resulted from experts' decisions and the analyzes that lead to different stock valuations. Thus, analyzes show that experts' judgments can create different stock valuations and this difference can be considered as a noise in the stock valuation system. This can present important conclusions on dynamism of financial markets and the roles of nonlogical factors in the process of stock valuation.

Calculating the adjusted beta coefficient:

In this study, beta coefficient was used for calculating the Capital Asset Pricing Model. Beta coefficient points to the fluctuation or risk-taking of stock to the other stocks in market. One of the most common methods to estimate stock beta is using the historical market beta. In this step, as assumed, a part of stock price variation results from noise rate. Using the parameter k calculated before, adjusted beta has been calculated for any time period.

Decreased beta coefficient of stock valuation means increased risk and decreased stock value. The beta coefficient of stock valuation is a financial term which is given as a ratio to define the value of a company. Decreased coefficient suggests that market considers less value for the company stocks and there is less probability to confirm the future profits and development of company. This can be resulted from the factors such as increased common risk in market, problems of company performance, or increased interest rate. In the following, the Capital Asset Pricing Model based on considering noise is presented.

Noise-based Capital Asset Pricing Model (CAPM):

One financial concern of researchers is to introduce the stock valuation models in accordance with the real behaviors of investors. So far, many researches have been done about stock pricing modeling. The financial views are developed,

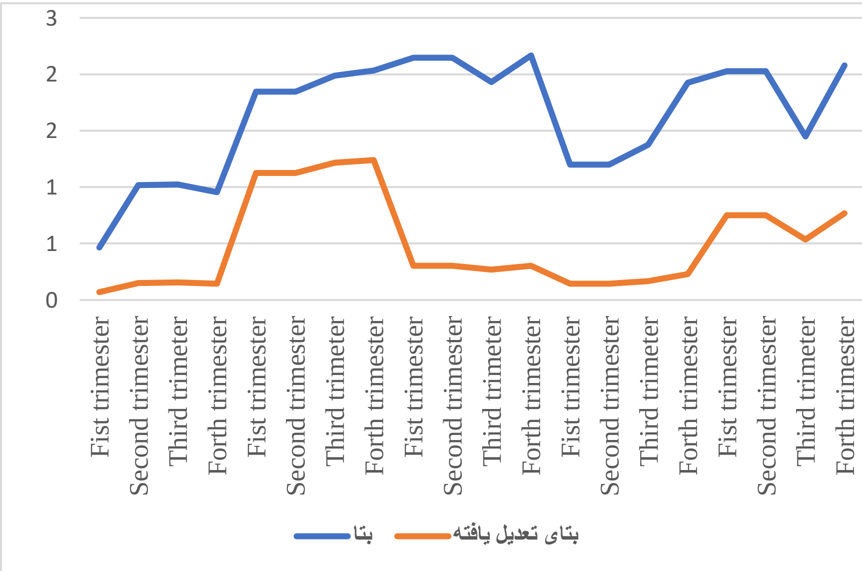

Chart 4- Adjusted beta and beta coefficient in accordance with the noise of stock price valuation (Source: current research results)

As shown, to consider the noise in the process of stock price valuation decreases the fluctuation or risk-taking of stocks compared with existed stocks in market. This interval is shown well in the chart. introducing CAPM BY William Sharp in 1962, that defined the relation between risk and return in accordance with β criterion. Although, at first, investors paid attention this model to express the relation between risk and return, during the time, it was recognized that the model sometimes cannot measure well the relation between risk and return. For instance, Basso research (1977) showed that the stocks, which have high prices compared with profits, gain more returns than the stocks with low ratio of profit to price. Or for example, Benz has showed that corporation stocks with low market value have higher average return than corporation stocks with high market value; so, it seems that determining factors other than stock prices affects stock return. Therefore, many efforts are made to improve fundamental models, based on a different look at risk and return. For example, the models such as C-CAPM and D-CAPM are named. In accordance with efficient market assumptions, all data are considered in current prices; and any deviation of these variations affects quickly the prices. However, many exceptions concerning the relation between profit and return in financial markets have voided the efficient market assumptions. These contradictions in efficient market assumptions have created new theories in financial markets like perspective theory by Daniel Kahneman and Amos Torsky in 1979. These theories and many other events such as financial crisis in financial market have led to introduce the financial-behavioral paradigm. According to this paradigm, many rational and economic indexes, that are essential assumptions in traditional pricing models, are voided in real world. Financial-behavioral paradigm, rejecting many assumptions of classic financial-behavioral theories, explains many events in financial markets using some behavioral and personal characteristics of investors. So far, many researches are done to identify kinds of financial biases using behavioral and personal characteristics of investors. One of the asset pricing models is based on behavioral patterns of model X-CAPM that aim to price asset based on behavioral patterns (Barberis, 2013). In this research, attempts have been made also to identify a model to valuate capital asset based on noise (N-CAPM). As it was presented in part 3, the model considered by current research is as follows:

$$E(R_i) - R_f = \beta(R_M - R_F) = K\beta^T(R_M - R_{\text{,}} \quad (8)$$

In this equation, beta coefficient is adjusted beta based on noise. The common CAPM, in accordance with current research, is presented as a new model in the form of N-CAPM like the following table.

Table 4- Noise-based Capital Asset Pricing Model (2022) - Source: current research results

Year	Co.	Beta	Noise	Adjusted	CAPM	N-CAPM
First trimester	Pars petrochemical	0/465245	0/15	0/069787	2/138681	0/473802
Second tri.	Pars petrochemical	1/018119	0/15	0/152718	7/683536	1/30553
Third tri.	Pars petrochemical	1/024995	0/15	0/153749	11/06545	1/812817
Fourth tri.	Pars petrochemical	0/953544	0/15	0/143032	16/99098	2/701647
First trimester	Khalij-e-Fars petrochemical	1/84469	0/61	1/125261	55/81584	34/11786
Second tri.	Khalij-e-Fars petrochemical	1/84469	0/61	1/125261	92/41448	56/44303
Third tri.	Khalij-e-Fars petrochemical	1/990364	0/61	1/214122	26/49261	16/23069
Fourth tri.	Khalij-e-Fars petrochemical	2/03758	0/61	1/239982	70/91997	43/33138

Table 4- Noise-based Capital Asset Pricing Model (2022) - Source: current research results

Year	Co.	Beta	Noise	Adjusted	CAPM	N-CAPM
First trimester	Sadid	2/149219	0/14	0/300891	36/28687	5/234962
Second tri.	Sadid	2/149219	0/14	0/300891	57/02683	8/138556
Third tri.	Sadid	1/933463	0/14	0/270685	64/87369	9/237116
Fourth tri.	Sadid	1/933463	0/14	0/270685	90/7151	12/85491
First trimester	Shabandar	1/197979	0/12	0/143757	13/05827	1/725393
Second tri.	Shabandar	1/197979	0/12	0/143757	13/76508	1/81021
Third tri.	Shabandar	1/374857	0/12	0/164983	25/29865	3/194238
Fourth tri.	Shabandar	1/92569	0/12	0/231083	50/20944	6/183532
First trimester	Shapna	1/450007	0/37	0/536503	32/39916	12/10109
Second tri.	Shapna	2/030067	0/37	0/751125	8/970192	3/432371
Third tri.	Shapna	2/030067	0/37	0/751125	8/970192	3/432371
Fourth tri.	Shapna	2/080841	0/37	0/769911	46/41629	17/28743

Table 4- Noise-based Capital Asset Pricing Model (2022) - Source: current research results

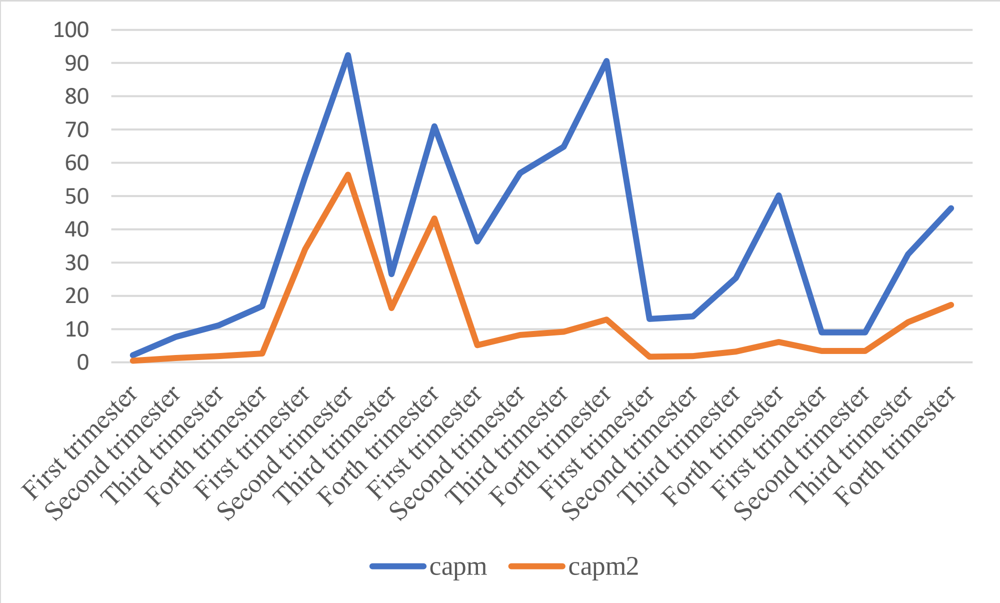

Chart 5- Capital Asset Pricing Model compared with Noise-based one - Source: current research results

As shown in the table, classic capital asset pricing model differ from noise-based one. According to current research results we can conclude that considering the noise (human errors) in asset price valuation can accompany less fluctuation and inflammation of valuating. As chart shows, CAPM in the trend of considering noise have less fluctuation and CAPM amount.

5. Discussion

Capital Asset Pricing Model considering human judgments has a meaningful difference with the model which acts not considering the human errors. The pricing model considering human judgments, because of psychological effects and human decisions in decision making trends, may lead to different results than the model not considering these errors. The factors such as risk-taking behaviors, presumptions, and human experiences can have an important impact on the decisions of pricing models; thus, the results of these two models have a meaningful difference with each other and, to choose a suitable model depended on the very cases and condition, the criteria of human judgments
have to be considered.

Considering noise (human judgments) in asset price valuation can prevents fluctuation and inflammation because the amounts resulted for CAPM is placed in the stage of considering noise of less CAPM as well as have less fluctuation; therefore, the assumption has been confirmed. Explaining this conclusion, we
can say that capital asset pricing based on adjusting the human judgments generally cause the resulted amounts, compared with the method based on no human adjustment, are closer to the most real amounts. Because, this method aims to decrease the human factor impacts like recognized errors or definition of value; and consider more information in the asset pricing process. For example, in capital asset pricing, essential factors of main data can be assessed quantitatively; but decision making influenced by human factors such as personal imagines about the value of the asset are important. So, with adjusting the

human judgments and using the quantitative data, we can commonly achieve more accurate and real results of capital asset pricing. This can help to increase accuracy of estimating the asset values and guide decision makers to better financial decision making. This conclusion is similar to the one resulted from the studies done by Damodaran (2023), Kahneman et al. (2016), and Hilbert (2014). According to the gained results, the following suggestions are developed:

Market analyzers have to examine carefully the used pricing methods. Do these methods truly consider human judgments? Are human effects adjusted? Therefore, investors are suggested to notice the suitable human behaviors and the limitations which they have to consider in their decision making.

It is suggested that market analyzers and investors participate in the scientific researches on the roles of human judgments in stock valuation and use the newest achievements of this field. Also, continuous training of market analyzers and investors on better methods of risk management and valuation, considering human factors, is necessary. As well as, taking risk management strategies, considering human judgment effects and possible investors' behaviors in different market condition for decision makers and analyzers, are effective and using the method based on data and artificial intelligence to analyze more accurate and improve predictions considering human role in decision making of market in this field will be effective.

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