Price clusters and stock price stability

Clusters de preços e estabilidade do preço das ações

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Abstract

Understanding the factors affecting stock return volatility, for analysts, investors and company executives, it is critical. In this study, using a traditional approach, we identify the factors influencing volatility and how price friction is formed on stock price stability, and in particular, examining the clustering test for price increases. This study was carried out by examining the price clusters and stock price stability in the stock market and the OTC market between 2009 -2010. Econometric software was used to investigate the research variables. In this study, we tried to study stock price volatility in proportion to stock price clusters. Research findings showed; there is no significant relationship between stock price volatility and price clusters in the OTC market and the stock market.

Keywords: Price Clusters; Stock Price Fluctuations; Stock Returns Fluctuations; Stock Market; OTC Market

Resumo

Compreender os fatores que afetam a volatilidade do retorno das ações, para analistas, investidores e executivos da empresa, é fundamental. Neste estudo, usando uma abordagem tradicional, identificamos os fatores que influenciam a volatilidade e como o atrito dos preços é formado na estabilidade dos preços das ações e, em particular, examinamos o teste de agrupamento para aumento de preços. Este estudo foi realizado examinando os clusters de preços e a estabilidade dos preços das ações no mercado de ações e no mercado de balcão entre 2009 e 2010. O software econométrico foi utilizado para investigar as variáveis da pesquisa. Neste estudo, tentamos estudar a volatilidade do preço das ações na proporção dos clusters de preços das

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ações. Os resultados da pesquisa mostraram; não há relação significativa entre a volatilidade do preço das ações e os clusters de preços no mercado de balcão e no mercado de ações.

Palavras-chave: Clusters de preços; Flutuações dos preços das ações; Flutuações dos retornos das ações; Mercado de ações; Mercado de balcão

1 Introduction

For the past three decades, modeling and predicting asset volatility has been one of the major issues in the financial field. When referring to the stock return process, volatility, the standard deviation of the process, is often defined this measures the random component distribution of returns. This is why most people interpret volatility as uncertainty. Large volatility values make the stock return component unpredictable, as well as its smaller values; it can estimate the expected return. As it grows, it makes it very difficult to predict future returns on assets from historical returns (EDRAKIL AND TEHRANI, 2012). Stock prices change depending on how much supply and demand change. Given the highly non-linear nature of stock price movements, predicting stock prices and timing a buy-and-sell decision is a very challenging task. There is a risk that there will be a tendency for collective movement in the stock market. Preliminary studies have examined stock market forecasts (KLOSE, 1933), studies have claimed to be random movements in stock prices (Cotter, 196), (FAMA, 1965). The labor market hypothesis has ruled out the possibility of any additional return on the market. However, recent studies, for example (ATSALIX & WALLONIS, 2009), (NAIR & MONDAS, 2015), NAIR & MOHAN, 2015) have shown that; it is possible to predict stock price movements and predict additional returns. Given the complex nature of the market and recent financial crises, a better understanding of stock price movements is essential, in this regard, different statistical methods have been used to analyze financial data and explore the relationship between these variables with stock prices. For example, returns do not show a serial correlation asset, however, the long-term memory of the stock returns with a longer break is longer and based on the series of financial returns, the Gaussian distribution method and the absolute value of the equity series; it tends to follow a particular law. It has also shown that; there are nonlinear phenomena such as cluster oscillations and switching behaviors (GIANG & CHI, 2012; ZHANG & WANG, 2015). Other studies have shown that when multiple assets are considered together, most returns series are correlated, and this relationship becomes even larger in times of financial crisis. Correlation and time series analysis play an important role in predictions (CYAN et al., 2016).

Many economic theories have focused on the formation of equilibrium prices. However, in practice, due to friction, it will have a detrimental effect on the equilibrium price. For example, empirical research has shown that; Prices tend to move around the value and market value categories. Explaining this kind of abnormal price behavior is usually categorized by two views. First, investors prefer a certain number of prices, which is to reduce cognitive processing costs. Second, the first reason is not a unique explanation, and it is believed that investors prefer trading at certain prices, which is to reduce negotiation costs. Whereas previous research on financial markets has made categories in financial markets but few studies have examined the impact of classification on the quality of financial markets. The purpose of this study is to test the clustering degree hypothesis on the values of stock price increases that lead to lower stock stability. The theory of this hypothesis focuses on the information transmission system to market participants. When prices are around price increases, they may decline due to a lack of pricing information on stocks. Therefore, higher clustered stocks may have higher volatility levels. Survey results show that: investor preferences over price limits - whether due to behavioral bias or avoidance of negotiation costs - due to lack of information, can affect stock prices and increase stock price volatility. This research has been conducted in light of the literature on stock price volatility and its volatility. Managers are trying to maximize shareholder wealth by taking into account the level of stock price volatility; these fluctuations can affect the cost of corporate capital. Early studies have shown excessive volatility in financial markets, in this study, we examine the level of price friction and the fluctuations of the clusters around the stock closing prices. This research is conducted in the period of 2010-2016.

2 Literature Review

Risk assessment and return are important components in investment decisions. These are basically two sides of a coin that one cannot evaluate without the other. The positive relationship between risk and return indicates the risk aversion of investors. The stock market naturally reflects business cycles and economic conditions. Based on economic and financial theories, stock prices are determined by the present value of its expected cash flows. Thus

any factor that affects the present value of expected cash flows of stocks will clearly affect the stock price (LEVINTS & GAVANTEX, 2015). According to economic theories, the stock price index should reflect the expectations of individuals for the future performance of companies, while corporate profits reflect the level of economic activity. If the stock price index accurately reflects information on the future trend of the underlying variables, then it can be used as a leading variable to predict volatility in economic activity. Therefore, the scientific relationships and dynamic interactions between macroeconomic variables and the stock price index are crucial in formulating a country's macroeconomic policies. Many studies have addressed the relationship between stock price indices and macroeconomic variables (For example, CHANG AND TAI, 1998; KARA MUSTAFA & KOKOKALE (2004) AND MILLER & SCHOFENG (2001). The stock market is crucial for determining economic progress. It is essential to focus on the factors that generate equity returns. While financial theories focus on specific companies and industries, there is a growing belief among financial researchers that macroeconomic variables play a critical role in determining the market performance of stocks (TRUFFY & KUMAR, 2014). Predicting the volatility of stock markets and the degree of stability of these markets is one of the most important issues studied in the financial markets of the world. Fluctuations as an effective factor in determining investment risk can play an important role in investor decision making and it is crucial in determining the return on corporate equity in different financial markets. One important thing is that the nature of the volatility varies across markets. Also, while the use of statistical and econometric methods in the study of volatility in most developed countries' financial markets has received much attention, but there has been no universal way of examining high reliability stock returns. That is, if one market is more efficient in one market, it will not perform in another. The issue of stock market turbulence over the last few decades has been one of the most important issues in the financial literature. The main function of financial markets in the economy is to provide a method of directing and allocating capital from the holders of surplus funds to investors in need of financial resources. During this process, the price of financial assets is caused by volatility in economic activity, a form of price volatility, which is considered as a common occurrence in market performance. However, by finding volatile patterns for different stocks on the market and using stock price forecasting, a more efficient

process of capital allocation can be made. Cluster turbulence patterns are among the turbulent patterns of stock returns. Modeling returns volatility in stock markets, from the perspective of academic researchers and financial science practitioners, is important in terms of its use in predicting stock returns. Studies have shown that; information about financial variables flows through the assets market over time. This has become more important as financial markets become more interconnected and increasingly interconnected. The mechanisms of contagion between returns and volatility of different assets are important for a number of reasons. First, contamination mechanisms give us information about market efficiency. The spread between return on assets indicates a lucrative trading strategy and if the profitability of this trading strategy is higher than its operating costs, it potentially provides evidence of market inefficiency. Second, the contagion mechanisms are important in asset management, because having information on the impact of returns spread on portfolio selection and risk reduction is very useful. Third, information on the spread of asset turbulence can be used to predict turbulence; therefore, asset turbulence spreads are applied to such topics as option pricing, portfolio optimization, and risk exposure and risk management. The returns of large and small shares are correlated to different stock exchanges. In addition, numerous studies, some of which are described below, have shown that: This is asymmetric intersection solidarity, that is, the returns of small-cap stocks are correlated with the lagged returns of large-cap stocks, and however, the returns of the portfolio of large corporations do not have a significant correlation with the delayed returns of the portfolio of small companies. This asymmetric delay correlation between large and small shares, which is a particular mode of asset circulation, is called the priority-delay effect. In other words, , the hypothesis states that the delays in the portfolio of small coats are delayed by the returns of the portfolio of large corporations, but the opposite is not true. One of the first studies to investigate the stochastic step hypothesis using size-order stock portfolios is the study of LU and MCCONNELL (1998). He strongly rejects the existence of a random step using the weekly data of five portfolio-sized stocks from Neice and Aimex and showed that although individual returns have weak and usually negative autocorrelation, there is a strong positive correlation between returns. Lu and McConnell attributed these results to the existence of a cross-correlation between returns on individual shares. In

another study, LU AND MCCONNELL (1990) found another notable difference between the behavior of a small share portfolio and a large share portfolio and showed that the yields of small stock portfolios are more predictable than those of large stocks. They also showed that the delayed returns of the portfolio of large firms can explain a significant portion of the current returns of the small portfolio; but the opposite is not the case. Therefore, they observed an asymmetry in the predictability of returns of large and small firms' stock portfolios. Other researchers then tested the existence of a late-priming effect in different markets and for different periods.

HARRIS (1991) has shown that there is a positive relationship between the number of clusters and the yield fluctuations. However, these results are not the same for annual observations. Recent studies have also shown a positive relationship between volatility and stock price clustering, in general, it supports the hypothesis of BALL et al (1985) that clustering depends on known values. CHANG AND ZHANG (2014) and ROLL & SABRIAM (2010) suggested that; the range of daily quotations explains well the extent of trading. ALEXANDER AND PATTERSON (2008) examined the effect of price clusters on trading volume. They found that the average size of transactions around the highest prices was traded. CONBURY AND WATSON (2008) found that price movements between the New York Stock Exchange and NASDAQ were similar, given the firm's other firm characteristics. In contrast, GROSSMAN (1997) stated that; Market structure plays a decisive role in explaining stock cluster prices. CHRISTIE AND SCHULTZ (1994) showed that; Spread and clustering are positively correlated as sellers operate in their trades based on their preferences across different industry groups. HUANG AND STONE (1996) also showed a relationship between clusters and price range, they stated that the relationship between these two variables is influenced by economic factors. ADRIJACKING WEJANG (2008) examined portfolio selection based on financial strength index using data envelopment analysis. They used a series of financial ratios to estimate firms' financial strength and their correlation with actual stock returns. The financial ratios used in this study are divided into 6 categories, including: Profitability metrics (including return on capital, return on assets, net profit margin, earnings per share), Operational efficiency criteria (including accounts receivable turnover, inventory turnover, asset turnover), Liquidity criteria (including current ratio, instant ratio and debt to

equity ratio), Leverage criteria (including leverage ratio, total debt-to-asset ratio, total debt-to-equity ratio), Company Outlook Criteria (Including Price to Income Ratio and Market Value to Office Ratio) And growth metrics (including earnings growth rate, net profit growth rate and earnings growth rate per share). In this study, using cluster analysis based on the industry standard global index, we have shown that traditional approaches used in hybrid clusters provide a good link for portfolio diversification.

BENJAMIN and JEFFERIES (2016) examined stock clustering and stock price stability. In this study, using a non-traditional approach, we identified stock price volatility based on a series of frictions affecting stock price stability. The results showed that there is a strong and positive relationship between stock price clusters and stock price volatility.

3 Model and Data

During this study, we study the frequency of clusters, yield fluctuations and price fluctuations. To estimate the frequency of clusters (cluster %), the closing price is determined around the price in the given period. Clusters are defined according to defined industry codes. Two criteria are used to measure stock price stability. The first variable is the Rvolt, which is considered as the standard deviation of daily stock returns. The second variable also uses low frequencies of price volatility (Pvolt) and derives the difference between the high and low prices of the monthly index.

Several other criteria are used as control variables for multivariate analysis. Mktcap is considered the size of the company and it is obtained by multiplying the closing price by the number of shares issued. Company size is negatively correlated with the abundance of price clusters. The price is also the average share price over a month. The nominal price per share is likely to be positively correlated with price clusters. The spreading of the stock price is also another variable to consider which is obtained by averaging the daily purchase price over a month. Liquidity variable (illiq) is also measured by Liquidity AMIHOOD (2002) and it is obtained by dividing the absolute value of the return by the volume of the transaction. Turnover is also derived from the proportion of monthly transactions relative to large stock market transactions. Trading volume with stock clusters is expected to be inversely related.

According to the variables mentioned, the relationship between the variables in two markets is investigated using multi-variable regression model and we compare the relationships between the two markets.

$$volatility_{torism_t}$$
$$= \beta_0 + \beta_1 cluster_{i,t} + \beta_2 Market\ index_t + \beta_3 \ln(mktcap_{i,t}) + \beta_4 \ln(price_{i,t})$$
$$+ \ \beta_5 turn_{i,t} + \beta_6 speard_{i,t} + \beta_7 illiq_{i,t} + \varepsilon_t$$

In this paper, we attempted to eliminate the deficiencies in previous studies by applying the latest estimation methods in panel data and to present consistent and reliable results. In this study, the price information and returns of companies are determined based on the industrial clusters given in Table (1) and the research model is tested.

Table 1- Industry codes

Industry codes ISIC	Industry name	Industry codes ISIC	Industry name
17	textiles	27	basic metals
19	Tanning, leather and footwear	28	Metal products
20	Wooden products	29	equipment and machinery
21	Paper products	30	Electric appliances
23	Oil, nuclear	33	Measurement, medicine
24	Chemical	34	Vehicle and auto parts
25	Rubber & Plastic		

To test the research variables, two markets are examined. The return on research at the stock exchange was between 2010- 2016. 103 companies were systematically eliminated from the stock exchange. A total of 31 companies were selected as examples from the crossover.

4 Result

4.1 Descriptive Statistics

The first step in statistical analysis is to determine the summarized characteristics of the data and calculate the descriptive indices. The purpose of this analysis is to identify the internal relationships of variables and to show the behavior of the subjects in order to provide the bases for statistical analysis and to provide descriptive characteristics for further analysis (Hooman 1991). Data analysis in this section was performed by calculating central indices such as mean and median and dispersion indices such as standard deviation, maximum and minimum values of variables.

Table 2- Descriptive statistics of the research variables of stock companies

	CLUSTER	ILLIQ	LNMKTCAP	LNPRICE	MARKET	PVOLT	RVOLT	SPEARD	TURN
Average	6324.892	294462.1	25.58841	8.593471	6158.133	121.9927	234.6785	69.1581	3.2E+08
Middle	3350.55	235209.94	25.52837	8.43221	3248.132	66.14319	131.9535	38.04795	31431627
maximum	54078	35414119	29.77535	11.00829	60570.04	1158.34	5004.15	579.1698	1.01E+10
minimum	387	420.0518	20.83247	6.123874	457.4348	0.025641	16.78	0.01	6296
Standard deviation	7686.386	2087138	1.600561	1.016293	7255.984	166.8533	404.6806	86.35593	1.07E+09
Skewness	2.902513	14.20767	0.658656	0.343733	3.07685	3.220523	7.596093	2.875184	6.072996
Elongation	12.88346	217.7338	3.574888	2.544987	16.21832	15.22606	76.16677	12.9252	42.56867

Jark-bra	3149.801	1149030	46.98366	20.56691	5116.869	4593.761	136407.6	3154.279	41723.75
meaningful	0	0	0	0	0	0	0	0	0
Company Number	103	103	103	103	103	103	103	103	103
View count	721	0	0	0	0	0	0	0	0

Table 3- Descriptive statistics of research variables in the initial state of the stock

exchange companies

	CLUSTER	ILLIQ	LNMKTCAP	LNPRICE	MARKET	PVOLT	RVOLT	SPEARD	CLUSTER
Average	2620.473	900644.9	24.83772	7.053786	32155.48	76.01046	53.64694	13.49117	2620.473
Middle	1821.342	9818.755	24.87383	6.98813	22678.23	49.81006	35.22103	5.057712	1821.342
maximum	18568.11	69012658	29.41772	9.833326	80219	679.4	480.4083	286.4375	18568.11
minimum	25.85075	538.1617	23.10717	6.335276	7972	0.1	0.1	0.030568	25.85075
Standard deviation	2646.136	6651813	1.354338	0.651842	25192.76	96.76808	68.4127	27.96544	2646.136
Skewness	2.879793	8.256684	-0.31983	0.646865	0.609403	2.90564	2.911288	5.009948	2.879793
Elongation	13.49551	76.62709	2.125256	3.160561	1.677015	13.71442	13.74167	38.1095	13.49551
Jark-bra	1209.978	46704.12	6.619995	14.95259	21.67131	1253.563	1259.508	11005.32	1209.978

			0.025 192	0.00 0272					
mean ingful	0	0	0.025 192	0.00 0272	0	0	0	0	0
Com pany Number	30	30	30	30	30	30	30	30	30
View count	210	210	210	210	210	210	210	210	210

4.2 The linearity of the variables

Linear econometrics occurs when two or more of the two (independent) explanatory variables in a multivariate regression are highly correlated to each other. The correlation here implies a linear relationship between the independent variables. Depending on the severity of the correlations between the independent variables, the magnitude and type of the correlations will vary. Linearity is more or less present in all regression models; what is important is the intensity of the correlations between the independent variables. The existence of a "perfect line" violates the classical regression model assumptions. In this study, correlation coefficient between them was used to investigate the linearity between explanatory variables. The results are shown in Tables (4) and (5).

Table 4- Value of correlation coefficient in stock exchange companies

Correlation	CLUSTER	ILLIQ	MKTCAP	PRICE	PVOLT	RVOLT	SPEARD	TURN
CLUSTER	1							
ILLIQ	-0.202	1						
MKTCAP	0.14	0.266	1					
PRICE	0.502	-0.548	-0.23	1				
PVOLT	0.066	-0.1	-0.376	0.404	1			

RVOLT	-0.202	0.532	0.266	-0.544	-0.098	1		
SPEARD	0.47	-0.27	-0.17	0.594	0.418	-0.266	1	
TURN	0.074	0.47	0.098	-0.432	0.164	0.47	0.412	1

Table 5- Correlation coefficient value in the stock exchange companies

Correlation	CLUSTER	ILLIQ	MKTCAP	PRICE	PVOLT	RVOLT	SPEARD	TURN
CLUSTER	1.000							
ILLIQ	-0.212	1.000						
MKTCAP	0.103	0.140	1.000					
PRICE	0.310	-0.211	0.026	1.000				
PVOLT	0.012	0.010	0.010	0.145	1.000			
RVOLT	0.098	0.210	0.28	0.214	0.239	1.000		
SPEARD	0.071	-0.312	-0.064	0.417	0.076	0.076	1.000	
TURN	-0.067	0.298	0.251	-0.129	0.234	0.235	-0.254	1.000

As it is known, the highest value of the correlation coefficient between the variables is 0.554 and other very small amounts obtained this indicates that there is no high linearity between the explanatory variables.

4.3 Model Estimates:

Self-correlation test is one of the classic assumptions of regression. Watson's statistic is a test statistic that is used to examine the existence of autocorrelation (the relationship between values separated by a specific lag) between residuals in regression analysis. The value of this statistic is always between (0 to 4) and the thresholds to accept are as follows: The value of 2 for this statistic indicates the lack of self-correlation, which is the optimal condition in the main residual assumptions in regression analysis. Not at all less than 2 consecutive positive correlations (Is a continuous correlation in which the positive residual value for one observation increases the chance of the positive residual for the other observation, and vice versa) and a value greater than 1 indicates a negative continuous correlation between the residuals. It should be noted that if the test statistic is less than 1 or more than 1, the alarm is a positive or negative correlation between the residuals. As it is known, the value of this statistic in this study is close to 2, this value indicates the absence of autocorrelation, which is the case in the main assumptions about residuals.

Table 6- Estimation of research model

variable	Stock companies				OTC companies			
	volatility=PVOLT		volatility=RVOLT		volatility=PVOLT		volatility=RVOLT	
	Coefficient	Significant	Coefficient	Significant	Coefficient	Significant	Coefficient	Significant
CLUSTER	0.023085	0.418425	-0.000021	0.21816	-0.0572412	0.647325	0.0467424	0.5831
ILLIQ	-0.5432643	0.445575	1.4418656	0	0.0316194	0.000075	0.3859214	0.00014
LNMKTCAP	-0.92249	0	0.3704512	0.68805	3.11E-01	0.004725	2.04E-01	0.00518
LNPRICE	0.8543912	0.06465	0.0218666	0	0.2986654	0.0012	0.1301094	0.00336
MARKET	-0.568781	0.0951	-0.0037366	0	0.133629	0.23565	0.0904562	0.21511
SPEARD	-0.0368523	0.546525	0.000238	0	0.3554873	0.22545	0.2399115	0.20678

TURN	0.0868995	0.05145	-2.38E-05	0.22266	-0.3996476	0.043125	-0.2584821	0.04592
C	-9.5666994	0.175575	-0.0156618	0.00009	-31.169207	0	-19.239177	0
Model overall fir	F=13.64078		F=22.4095		F=12.2309		F=15.32045	
	prob(F)=0.000		prob(F)=0.000		prob(F)=0.000		prob(F)=0.000	
	D.W=2.0857		D.W=1.87432		D.W=1.90905		D.W=2.046063	
	$R^2=$ 0.28164		$R^2=$ 0.72368		$R^2=$ 0.49702		$R^2=$ 0.617508	

The results of estimating the model regression model are reported in Table (6). The results of model estimation and significance level for Fs are all less than 0.05. It indicates that the input variables, including control and independent variables, are significant at 95% confidence level and indicate appropriate fit of the model.

- Investigation of the effect of CLUSTER price clusters on stock price volatility shows that: The coefficient value for volatility = PVOLT is equal to (0.023085) and is significant (0.418425) which is not greater than the 5% error level and is not significant.

- Investigation of the effect of CLUSTER price clusters on stock price volatility shows that the coefficient value for volatility = RVOLT is equal (-0.000021) and is significant (0. 2424) which is not greater than 5% error level.

- Investigation of the effect of CLUSTER price clusters on stock price volatility shows that: The coefficient value for volatility = PVOLT (-0.0572412) is obtained and the value is significant (0. 6473) which is not greater than 5% error level.

- Investigation of the effect of CLUSTER price clusters on stock price volatility shows that the coefficient value for volatility = PVOLT (-0.0572412) is obtained and the value is significant (0. 6473) which is not greater than 5% error level.

- Investigation of the effect of CLUSTER price clusters on stock price volatility shows that the coefficient value for volatility = RVOLT is equal (0. 0467) and is significant (0. 5831) which is not greater than 5% error level.

(Continue...)

5 Conclusion

There is a great deal of evidence today that financial asset price volatility is spreading to other assets and markets. The extent of the turbulence is increasing with the expansion of telecommunication systems and interdependence of financial markets. It is important to identify the mechanisms of return volatility and price volatility fluctuations between different financial assets for various reasons. The volatility of asset fluctuations gives us information about market performance. In an efficient market, returns on one asset should not be predictable using previous returns on other assets. The turbulence between return on assets also makes it possible to use a profitable trading strategy. If the benefit of this strategy is higher than its trading cost, it is potentially a cause for market efficiency. Identifying the turbulence mechanisms in financial markets also plays an important role in portfolio selection and risk reduction or in other words portfolio management. In this paper, we tried to study stock price volatility in proportion to stock price clusters. The research findings showed that: There is no significant relationship between stock price volatility and price clusters in the OTC market and the stock market. Investing in stock price changes in the stock market is always an important issue. The importance of this issue stems from its use to predict stock prices in the stock market. Investigating and analyzing the volatility across markets for decades has been the subject of much practical emphasis by theorists and researchers in various fields. The complex environment of the financial and economic markets and the close relationship of these markets with each other, as well as the critical need to anticipate future financial and economic scenarios, Researchers have encouraged the financial sector to discover and analyze these inter-market relationships so that they can take an effective and forward-looking step toward achieving the goals of the financial and economic system. Given the applicability of the present research topic and the vast research space, the following researchers are suggested:

1- It is suggested that the impact of different classes of firms on the capital market from the parallel markets of the capital market be examined separately; The model extracted

from this study will be effective in predicting the volatility of returns in the relevant industry.

2- It is suggested that; Test the effect of volatility of financial intermediation index volatility on industry index volatility; by performing this test, the extent and nature of this contagion is determined and the estimation model of this study predicts the fluctuations of firms in the financial intermediation index because companies in the financial intermediation industry have devoted a percentage of their portfolio to investing in manufacturing companies in the industry index and are impacted by a lag in their returns.

3- It is recommended that the present study be evaluated to compare the results with other existing models, to ensure the effectiveness of each of these models for users to achieve. Always stepping on the path to the goal is accompanied by constraints that make it slow. Research as a process towards achieving the goal of problem solving is no exception. In this regard, the limitations of the present study are as follows:

One of the most important limitations of the research is the existence of inflation, which makes the information in the financial statements unable to accurately represent the financial position and results of corporate operations.

- The hypotheses of this study were examined in general while we could examine and compare them separately for certain industries.

- Using different accounting methods by different companies makes the difference in the financial statements of companies not only influenced by their financial and operating decisions; As a result, financial information does not properly reflect the financial and operating status of companies.

- Due to the sampling method used in this study, many of the member companies of the statistical community were excluded from the sample because of lack of some of the desired characteristics. Therefore, caution should be exercised when generalizing the results of the research to all listed companies in the Tehran Stock Exchange.

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