The Asymmetric Relation between the Changes Occurring in Shares' Prices and Those Occurring in the Volume of Transactions

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Abstract
The main purpose of the research is to identify and analyze the asymmetric relationship between the amount of changes of shares’ price and the amount of changes of transactions’ volume based on the assessment logarithmic model in the stock exchange of Tehran. To do so, a sample of 45 ﬁrms was selected from the population of ﬁrms accepted in the stock exchange of Tehran during the years starting from 2005 to 2009. Having investigated the issues related to the abovementioned asymmetric relationship, three hypotheses were put forward to be analyzed. Considering the coeﬃcients acquired in the ﬁrst hypothesis, it was shown that the coeﬃcient related to positive changes is signiﬁcant at the p-value of 5%. This means that positive changes in the price of shares will lead to the increase in the volume of transactions. The analyses performed on the second hypothesis also showed that negative changes in the price of shares are effective on the decrease of transactions’ volume. Thus, the second hypothesis was also accepted. The analyses on third hypothesis showed that negative and positive changes of shares’ price do not have equal and similar effects on the changes occurring in the volume of transactions. In fact, the results indicated that there is an asymmetric relationship between the independent and dependent variable in the stock exchange of Tehran, thus approving the third hypothesis.

Keywords: Change of Shares’ Price, Volume of Transactions, Asymmetric Relationship, Assessment Logarithmic Model.

1. Introduction
Today's world is the world of changes. The current dynamism and the quick changes occurring now in human societies are owing to the appearance of computer equipments, communication satellites, intellectual systems and modern technology. In such a condition, if a country wants to benefit from a secure and healthy economy, it should be founded on a competent market. Stock
exchange is a type of market which in most countries forms the main core of their capital market. The mechanism of the market is so that it, in addition to giving a share to the public in the ownership of firms and apart from presenting a legal mechanism for the selling of the shares of firms and controlling its subsequent transactions, it controls the liquidity, and hence having fluctuation reduced.

On the other hand, through optimum allocation of resources to manufacturing units, stock exchange can manage to provide the society with employment and economic boom. The market (i.e. stock exchange) can also be accountable to various investors with dissimilar motivations and different levels of risk-taking. With what mentioned above, if stock exchange acts in a way that investors can acquire a suitable output based on the amount of risk-taking they adopt, it will lead to the utmost participation of the public to finance (i.e. to provide money for) industrial units and to take part in firms' ownership, the improvement of investors' portfolio, reduction of information asymmetries existing in market, the increase in the amount of commitment and efficiency on managers' part and also to the growth and enhancement of Gross Domestic Production. The changes occurring in the prices of shares in Tehran stock exchange and the analyses related to such changes, that have currently found a specific popularity, help investors to decide whether or not to invest in the shares of the firms existing in this market, based on the information, such as the table showing the changes of shares' prices and the changes occurring in the volume (amount) of transactions, that are minute by minute informed to interested individuals through internet sites. Although the topic of this research can play a critical role in improving the decision-making status of investors and stockholders, hence having their problems solved, unfortunately no studies have so far been institutionalized in the stock exchange of Tehran. Tehran's stock exchange is a young market which is really in need of such studies. Investment and its notions are at present enumerated as the most important issues that are highly taken into account in the fields of accounting and management.

One of the most significant methods to accomplish financial successes during the past several decades has been to purchase shares from big firms. Stock exchange market has always been commonly accepted as one of the most important factors for the absorption of capital and investment in the world. This market enables people to participate in the growing and active industries by a small amount of capital on hand and thus to achieve more profit from their liquidity. Although the market is universally considered as one of the resources for achieving big financial and economic successes, having not enough knowledge from, and being unaware of, the literature and the general rules of stock exchange can in most cases cause irreparable losses for various individuals who are interested in investment in such markets. It is usual for investors to invest their money in various industries based on their need to liquidity. In other words, what is important for investors when they start an investment in a specific industry is to be able to get back their money (i.e. their invested capital) when they need it. This means that they hope to be able to quickly sell their bonds and to easily change them into cash (i.e. to have the ability to get access to their liquidity) at the time of need. This ability can be recognized through features including firm's volume of transactions, the number of shares bought and sold, the number of transactions, number of buyers, number of sellers, etc. The most important criterion which is now used in many of the world's stock exchanges for measuring the superiority of a given firm is its liquidity power (i.e. the ability to easily change the invested capital into cash) and the current value of its shares. The recognition of superior firms in the stock exchange of Tehran is based on a combination of shares' liquidity power and the effectiveness of firms on market and also on the basis of the following triple criteria:

1. The amount of dealings done in the transaction saloon including the number and value of shares bought and sold.
2. The difference of dealings in the transaction market including the number of days of dealings and the times and volume of transactions.
3. The representative measurement variable or the effectiveness on market, including the mean of the number of shares issued and the mean of the current value of firm's shares in the period under analysis.

In order to recognize more active firms in the stock exchange of Tehran, its liquidity power (i.e. the ability to easily change the invested capital into cash) is of the highest amount of importance. Moreover, the existence of measurement variables beside indicators of activity in the stock exchange can give a more transparent picture of firms' activity ratio and especially of the flow of their shares in the stock exchange.
2. Research Background

Epps presented a model based on which the volume of transactions in the dealings with positive change of price is more than those in which the trend of price changes is negative. He supposed that there are two groups of investors, optimistic and pessimistic. The main difference between the two groups is that the former, i.e. the optimistic group, has a faster and more suitable identification of investment profitability and thus here, in this group, the demand curve moves faster than the supply curve and consequently there is a higher amount of correlation between the volume of transactions and price when the price curve becomes ascending. Long (2007) in a study analyzed the relationship between shares' price and transactions' volume in the stock exchange of Tehran. The research provides some primary evidence for the existence of relationship between the price and volume of transactions in capital market. In this research he tested two methods for the relationship between price and volume of transactions.

First, he analyzed the general relationship of the price and volume of transactions between the volume of transactions of shares and the changes of shares' prices and then tested the linear relationship between price and volume of transactions in the transaction market at the time of increase or decrease of price. The results of the research indicate that there is a correlation between the absolute value of the changes of price and volume of transactions at a high level with the increase or decrease of price. Thus, concerning the increase or decrease of price, there is no linear relationship between the price and volume of transactions. A significant deviation was found in the linear relationship between price and volume of transactions on the days during which the return of shares was positive against the days on which this return was negative. The empirical studies recently done have generally dealt with investigating the effect of profit declaration on the range of the prices proposed for the selling and buying of shares. Having performed a study on 25 firms, Osborne (1959) founds a change in the range of the prices suggested for the selling and buying of shares. Ying (1966) in his research tried to analyze the effect of various criterions of liquidity power (i.e. the ability to easily change the invested capital into cash) on the pricing of assets. Using the transactions' flow as a criterion of shares' liquidity power and the data of Tokyo's stock exchange for a time period between 1976-1993, he concluded that the shares with higher turn have an occasional tendency to lower anticipated output. Al-Saad (2004) examined the relationship between output and liquidity power for the shares accepted in the stock exchange of New Zealand. Simultaneously using the difference of the prices proposed for the selling and buying of shares, the rate of shares' flow, and the difference of the prices proposed for the depreciatory trading of shares (as the criteria for shares' liquidity power), they concluded that the effect of liquidity power of these three indicators has no stability and is volatile.

However, there is evidence for the increase of liquidity power in the month of June. Moreover, Morgan (1976) has dealt with investigating the relation between variance of price-volume change in specific shares and the positive and well-documented relationship. Epps and Epps (1976) tested a similar relationship and got to the same results. Concerning the advanced sales (forward sales) markets, Cornel (1981) found a positive relationship between volume changes; moreover, regarding some specific advanced sale contracts, he found some changes in the diversity and volatility of prices. Later on, Rutledge (1984) and after him Grammatikos and Saunders (1986) approved such results. Investigating the asymmetric relation existing in relatively small and new markets of Kuwait, Al-Saad (2004), Brailsford (1986) and Cooper et al. (2000) presented some evidence for the existence of asymmetric relation between price and volume change that can be observed by a number of shares, transactions and values of traded shares. They also found that the volume of transactions in growing markets is more than the markets which are declining. They understood that major traders working in the stocks of Kuwait are not forced engage themselves in wholesale dealings and to be worried about reduction of prices because it is always expected that market be supported. Jenningd et al (1981) referred to the difference existing between the viewpoints of optimistic traders (more informed people) and pessimistic ones (those with less information) as one of the explanations present in this regard. Their main discussion is that short-term sellers have more tendencies toward the information that stimulates price changes and also the long-term conditions that lead to a higher volume on the part of transactions and positive change of prices than long-term investors. Investigating the asymmetry present in advanced-sale markets, Karppoff (1987) argue that if the solution for the problem is to exert some restrictions for short-term sale, then the data of advanced-sale markets will show no relations between the change of price and volume. Therefore, the prices of short-term sale will be a valid explanation for the existence of positive relationship in stock exchange markets. Using the distinctive trading
behavior of informed traders against ignorant traders, Wang (1994) dealt with explaining the 
Price-Volume asymmetry. 
Later on, Cooper et al (2000) chose Wang’s model to investigate this asymmetry in order to 
approve the comments about selling and buying of lands and properties and came to the same 
conclusions. Smirloki and Starks (1985), Wood et al. (1985), Moosa and Korczak (1999), and 
Moosa et al. (2003) provided some evidence that confirmed the asymmetry along with the 
negative relation between the changes of price and volume. 
Smirloki and Starks (1985) found that the relation existing between volume and change of absolute 
value of price was smaller regarding little increase of price than little decrease of price. They 
referred this finding to the little increase of higher prices and lack of information entrance. Wood 
et al. (1985) did another study and came to the same results. Doing a great deal of investigation, 
Moosa and Korczak (1999), and Moosa et al. (2003) found that there has been less symmetry of 
volume-price relationship in the markets with little increase of price than those with little decrease 
of price. They also refer this finding to the little increase of higher price and lack of information 
arrival. Investigating the symmetry of relationship between volume and price of advanced markets 
of crude oil, Moosa and Korczak (1999), and Moosa et al. (2003) reported negative and also 
stronger relations. 
Eventually, no relationship was found for the existence of symmetry between volume-price in the 
studies performed so far. Using daily transactions, Godfrey et al.(1964) found no relations 
between price-volume changes. Investigating the dynamic relations between broad trading 
activities of market and the profit of a great many of stock markets, which was acquired through 
daily and weekly data, Grifeen et al managed to obviously support the symmetric relationship 
between the changes of price and volume of transactions. In order to verify corporate prices model 
and using the asymmetric variances, Grifeen et al. (2004), like Epps and Epps (1986), presented a 
report of volume reaction to positive and negative shocks of profit. Westerfield (1977) also 
observed some important changes in the range of the price proposed for the selling and buying of 
shares after the announcement of profit, i.e. in case thirty days before the announcement of profit 
no important information is issued by firm. 
Using daily information, Granger and Morgenstern (1963) presented some evidence based on 
which the prices proposed for the selling and buying of shares after the announcement of profit 
will have a broader range for a period of only one day; but, before the profit is announced, the 
range of price change was observed to have a decrease. Karpoff (1986) noticed that announcement 
of profit will enhance informational asymmetry in market. Based on the informational asymmetry 
model proposed by Copland and Galy (1983) and Miloran and Golshtan (1985), two types of 
dealers can be presumed to be actively performing transactions in market: a) cash dealers b) 
informed dealers. Informed dealers try to do so because they have some confidential information 
about the price changes. Cash dealers (uninformed dealers), however, do transactions in market 
only because of having liquidity (ready money) on hand. However, this model refers to the 
relations between the difference of selling-buying prices and informed people in market. 
Market traders make a lot of losses when they do business deals with such people (i.e. informed 
dealers), so they try to compensate for their losses by expanding the range of prices proposed for 
the selling and buying of shares. Based on this model, informational asymmetry in market will 
lead to the expansion of the range of prices suggested. In the model proposed by Kimm and 
Vorchia, some informed individuals, including major shareholders, try to push general information 
present in market (such as profit announcement) toward confidential information. It is clear that 
such people highly benefit from informational advantage in comparison with others and thereby 
are able to have a better evaluation of the performance of corporation through profit 
announcement. Of course, their main focus is on how effective informational asymmetry is on the 
transaction of informed people before and after profit announcement. To them, profit 
announcement will lead to the increase of transaction volume and development of informational 
asymmetry. Kimm and Vorchia explain the effects of such announcements in the following two 
forms: first, profit announcements will pave the way for the occurrence of equal transaction in 
market. This is because such an announcement will give rise to the spread of information among 
all the people present in market, and thereby an increase in informational asymmetry is predictable 
on the days before the announcement of profit. Second, market is full of people with different 
abilities for the processing of information. Based on this viewpoint, informational asymmetry 
should not increase before the announcement of profit but should take a rising movement after this 
announcement. This is because some dealers have more ability than others to process information.
In fact, it is information processing, rather than informational asymmetry that leads to the increase of transaction volume in an environment with less liquidity. At this time uninformed dealers refuse to do transactions in market on account of the increase that has occurred in the range of prices proposed for the selling and buying of shares. Gunduz and Hatemi (2005) found that transaction volume will enhance as a result of increase in informational asymmetry. Orosel (1998) highlighted the importance of concentration on stock market activity during the time period before and after profit announcement. To Orosel, investors with short-term investing outlooks enhance their search for confidential information before the announcement of profit. This means that a high level of informational asymmetry we will be observed before time at which profit is announced. Al.Deehani (2007), in his study, detected no considerable increase in the range of prices proposed for the selling and buying of shares. Ying, (1966) refers to some factors according to which some important changes will be observed in the prices of shares just around the time period of profit announcement. To him, such factors can induce dealers to gather more and more information about market. He noticed that both the changeability of profit and reaction of market to the unexpected profit will have positive relationships with the range of prices proposed for the trading of shares before the announcement of profit. Thus, the range of prices recommended will have a rising trend on the day of, the day before, and the day after the announcement of profit.

Gong-Meng et al. (2001) has reported the existence of a small difference in the range of prices proposed for the trading of shares at the time period around profit announcement. Having investigated the active firms in the stock exchange of Euro Next, Paris, Tauchen and Pitts (1983) observed how extensive the range of prices recommended for dealing of shares is at the time of profit declaration. Using self-regressive distributive-interval method along with a series of restriction coefficient tests, Al.Deehani (2007) in his essay tried to recognize the asymmetry in the relation of volume-price in the price indexes of 9 different stock exchanges of 8 different countries. Reassessment of the studies in this field showed that the relation between volume-price in stock markets is still considered as a controversial issue that needs more discussion and research. With respect to the existent evidence concerning the asymmetric effects of volume-price relations, the empirical research in this area can be divided into three main groups. The first group of research is associated with those situations in which the asymmetry is related to more volume and positive changes of shares' prices. The second group of research presents the evidence regarding the existence of asymmetry in situations in which more volume is connected with negative changes of price. The third, and the last, group of research has not been able to present any evidence regarding the effectiveness of asymmetry. According on Karpof (1987), much of the research in this field is done on the basis of specific shares. In the article of Karpof, nine different developed stock markets and nine less-developed markets were analyzed to determine whether the relationship between volume and price is asymmetric. In this essay self-regressive distributive method was used for the sampling of asymmetric effects which link the business volume to positive versus negative changes of shares' prices.

The results of estimating the models and testing the hypotheses have shown that the relationship does exist and that it is asymmetric in most of the markets analyzed. The results encompass two practical and theoretical concepts. The theoretical concept means to add some additional asymmetric evidence from a sample that includes a considerable number of stock markets from different countries. Practical concept means that investors prefer to embark on trading a lot of shares only when the prices are increasing, because there are strong relations between positive change of price and volume. Consistent with the findings of the present research, the note that should be taken into account concerning future practical studies is that a distinction should be thought of between the two groups of stock markets, i.e. the group that provides a short-term possibility and the one that does not make the possibility achievable at all. Using simulation model, a great many of explanations related to the assumptions of short-term sale which are adopted in this essay and many other studies could be testes. Assogbavi et al. (2007) in an essay examined the relationship between shares' price and volume in the stock exchange of Russia. The essay analyzes the relationship between ordinary shares and volume of transactions in the stock exchange of Russia. He analyzed the strong evidence of the existence of bilateral relationship between volume and change of shares' prices through weekly gathering of data on the basis of Granjer causality.

The research findings confirm the evidence reported by the studies performed in many of the developed markets, such as those reported by Moosa et al. (2003) and Granger and Morgenstern (1963) However, the positive relationship between the shares' price and the low volume of
transactions in the stock exchange of Russia shows and may indicate that such differences are caused by the institutions and the information trend prevailing in the stock exchange of the country which are important enough to influence the process of evaluating the bonds of the country, and the process of evaluating ordinary share is indicative of this concept. Investors in Russia try to put their investing strategies on the basis of immediate decisions, but because the operational structure of the stock exchange of Russia prevents them to react against the entrance of new information, such investors are forced to organize their strategies at the time of trading in markets in another form.

3. Hypotheses

In order to investigate the asymmetric relationship between the amount of changes of shares' prices and the changes of transaction volume, and based on the assessment logarithmic model in the stock exchange of Tehran, the following three hypotheses were put forward and tested.

H1: The increase of shares' prices goes along with the increase of shares' transaction volume.
H2: The decrease of shares' prices goes along with the decrease of shares' transaction volume.
H3: The amount of increase occurred in the volume of transactions as a result of increase in the price of shares is not equal to the amount decrease occurred in the volume transactions due to the decrease of shares' prices.

4. Research Methodology

Due to the high volume of data, Yazd welding industry (Bekab) was chosen as an example, for which the stages of testing the research hypotheses are explained. Concerning the aim, the research is an applied one and with respect to method of data gathering, it is among correlational descriptive methods. Such methods consist of a collection of methods the aim of which is to describe the conditions or phenomena under analysis and to explain the relations between such phenomena. With respect to the research literature and concerning its theoretical foundations, library studies and other secondary sources of information, including books, essays, and internal and external theses, were used to gather data for the research.

With respect to the subject, the research is put in the areas of accounting, financial management; and, its area of activity is shares' prices and transactions' volume. The research was done in Iran and due to the limitations on the country's financial markets (the markets of money, foreign exchange, capital, commodity, etc.), the research population was reduced to Tehran stock exchange. Of the main characteristic of this population are its being formal, comprehensive, orderly presentation of daily information and credibility. In general, the research covers a time period starting 2005 to 2009.

However, because some of the firms have only recently registered and started their activity in the stock exchange of Tehran, and thus may have not enough financial dependency, it was the researcher himself who, by his own subjective standards, chose the time limits for the research. The reason underlying the choice of a five-year time period with daily information was that the results of economy assessment tests are highly dependent on the length of the time period under analysis and that with the increase of this time period, the ability to inference data from this period and also reliability and confidence to such data will enhance. Regarding the statistical data, the information needed by firms was gathered through the databases of Tadbir pardaz (policy maker), Dena shares, and the official site of Tehran stock exchange. Then after adding the data together and also after the settlement of disharmonies, the calculations needed were prepared to be analyzed using Excel Electronic spreadsheet software and the final analysis was done using Spss software. The information required for measuring the transaction volume of Tehran's stock exchange was gathered (daily, weekly, monthly and annually) through their financial statements. To gather the data for testing the research hypotheses, three methods can be used in the stock exchange of Tehran: 1) using daily data related to index, 2) using daily data of firms present in stock exchange, 3) using inner-daily data of stock firms (i.e. firms present in stock exchange).

Due to the following reasons, the present study has used daily data of firms present in stock exchange. A) The total index of Tehran's stock exchange is based on the capital of stock firms (i.e. firms present in stock exchange) and may change; thus, the changes of index may not be a true and accurate indicator of the whole market. B) The volume of transactions occurring in the stock exchange of Tehran is usually high, so it is practically impossible to separate it from total transactions via inner-daily data (every 5 minutes, etc.). Moreover, to select the firms and the area
for analysis and to acquire reliable results, the following issues have been taken into account, 1: bullishness and stagnation of the period under analysis, 2: the ability to change the shares of firms into cash, 3: the number of firms to be analyzed.

The research population included all the firms accepted in the stock exchange of Tehran. To choose the sample from this population, the following issues were considered as obligatory (i.e. for firms to be accepted as the sample for the research, they should have obeyed the following rules): 1) only the firms that have entered the stock exchange of Tehran before 2005, 2) the firms that have had profitability during the period between 2005 to 2009, 3) the firms whose shares have been transacted (i.e. bought and sold) in more than 70% of workdays, 4) the samples should be among the industries selected by the stock exchange of Tehran as the most active ones. To explain, every three months the stock exchange of Tehran presents a list of 50 active firms based on the degree to which their shares have been changed into cash (the issues that are taken into account in this list are the number of days on which transactions have occurred during the previous three months, the volume of transactions on each day, etc.). 5) The firms in which no closedown, elimination or merging have occurred during this period and are successfully continuing their activity.

Having obeyed all the conditions necessary for the selection of the research sample and in order to increase the dependability of the research, Purposive optional nonrandom sampling was used in this study. Moreover, having chosen the dependent and independent variables and after doing the primitive processes with the use of Micro fite, Eviews, And Excel softwares, to test the research hypotheses Pearson correlation coefficient and t-test were used. Then, the significance level (p-value) was decided to be 5%. To test the hypotheses in this research, a self-exploratory formula with the extended logarithmic interval was used as follows:

$$V_t = \alpha + \sum \beta_j V_{t-j} + \gamma^+ \Delta p^+ + \gamma^- \Delta p^- + u_t$$

Where $V_t$ is the logarithm of transactions' volume, $\Delta p^+$ is the positive change in shares' price (in a logarithmic form) and $\Delta p^-$ is the negative change in the shares' price (in a logarithmic form). Moreover, $\Delta p = \Delta p^+ \text{ if } 0 \leq \Delta p \text{ and } 0 = \Delta p^- \Delta p^- \text{ if } 0 \geq \Delta p \text{ and } 0 = \Delta p$.

Two independent variables were selected for the research. These two variables included logarithmic change (i.e. increase and decrease) of the shares' price and the logarithm of transactions' volume in the form of intervals or on previous workdays of stock market. The logarithm of transactions' volume on the workdays of stock exchange was also selected to work as the dependent variable of the research. The independent variable "change in shares' price" was divided into two types of change including positive change of shares' price and negative change of shares' price (both in a logarithmic form). In practice, three variables of positive change in shares' price, negative change in shares' price and intervals of the logarithm of transactions' volume worked as the dependent and independent variables of the research (table1).

<table>
<thead>
<tr>
<th>Research variables</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive change of shares' price (logarithmic)</td>
<td>dplogp</td>
</tr>
<tr>
<td>Negative change of shares' price (logarithmic)</td>
<td>dplogp</td>
</tr>
<tr>
<td>Logarithm of transactions' volume</td>
<td>logv</td>
</tr>
</tbody>
</table>

As it is usual for time series to be inconstant and unreliable in investigations of macro-economy and because their inconstancy and unreliability may lead to the occurrence of false regression in empirical studies, thus the reliability of the research hypotheses was tested by the unit root augmented Dickey-Fuller test statistic. Regarding the results of table 2, the absolute values of the statistic related to testing the variables "positive change of shares' price, negative change of shares' price and the logarithm of the volume of transactions" are above the critical value of ADF at the significance level of 1%. As a result, the model under analysis is reliable and has constancy for the welding industry of Yazd (Bekab).
Table 2. Summary of the results of the unit root and Dickey-Fuller test statistic

<table>
<thead>
<tr>
<th>Null Hypothesis: DNLGP has a unit root</th>
<th>Augmented Dickey-Fuller test statistic</th>
<th>0.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test critical values:</td>
<td>1% level</td>
<td>-3.436474</td>
</tr>
<tr>
<td>5% level</td>
<td>-2.864132</td>
<td></td>
</tr>
<tr>
<td>10% level</td>
<td>-2.568202</td>
<td></td>
</tr>
<tr>
<td>Null Hypothesis: DPLOGP has a unit root</td>
<td>Augmented Dickey-Fuller test statistic</td>
<td>0.0000</td>
</tr>
<tr>
<td>Test critical values:</td>
<td>1% level</td>
<td>-3.436474</td>
</tr>
<tr>
<td>5% level</td>
<td>-2.864132</td>
<td></td>
</tr>
<tr>
<td>10% level</td>
<td>-2.568202</td>
<td></td>
</tr>
<tr>
<td>Null Hypothesis: LOGV has a unit root</td>
<td>Augmented Dickey-Fuller test statistic</td>
<td>0.0000</td>
</tr>
<tr>
<td>Test critical values:</td>
<td>1% level</td>
<td>-3.436493</td>
</tr>
<tr>
<td>5% level</td>
<td>-2.864140</td>
<td></td>
</tr>
<tr>
<td>10% level</td>
<td>-2.568206</td>
<td></td>
</tr>
</tbody>
</table>

The table 2 presents a summary of the results of the unit root augmented Dickey-Fuller test statistic which is indicative of the reliability of the model for all the firms under analysis. One of the classic assumptions in the assessment of economy is the existence of no relationship between residuals in different time periods (i.e. no systematic pattern should be found between various observations on each independent variable). Simply stated, the classic model assumes that the error of one observation is not influenced by the error of another observation. In other words, when the periodic data, including FDI regression on independent variables such as fluctuation, foreign exchange rate in market, tax on firms, etc., are taken into account, then no effect of fluctuation on firms is expected to be observed, and if a correlation is observed among the independent variables, it is because of serial correction between them. To see whether or not there is any serial correlation, LM test (or Breusch-Godfrey test) was used (table 3).

Table 3. Results of the Serial Correlation test

<table>
<thead>
<tr>
<th>Breusch-Godfrey Serial Correlation LM Test:</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
</tr>
<tr>
<td>Obs*R-squared</td>
</tr>
</tbody>
</table>

As F=0.075618 and concerning the table 3, because Prob= 0.9272 is more than the significance value of 5%, it can be concluded that the model is not engaged with serial correlation in the welding industry of Yazd (Bekab). Another classic assumption in the assessment of economy is homoscedasticity of the variance of error parts in different periods (i.e. in different observations). As error variance equals the variance of the dependent variable, the problem of heteroscedasticity of variance is related to heteroscedasticity of the variance of the dependent variable in different time periods. To see whether or not the model has heteroscedasticity of variance, Breusch-Pagan-Godfrey test was used (table4).

Table 4. Results of Breusch-pagan-Godfrey

<table>
<thead>
<tr>
<th>Heteroskedasticity Test: Breusch-Pagan-Godfrey</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
</tr>
<tr>
<td>Obs*R-squared</td>
</tr>
<tr>
<td>Scaled explained SS</td>
</tr>
</tbody>
</table>
As F=0.737092 and considering the table 4, because Prob= 0.5957 is more than the significance value of 5%, it can be concluded that the model is not engaged with homoscedasticity in the welding industry of Yazd (Bekab). Moreover, as discussed before, the aim of the research is to investigate the long- and short-term relationship between the variables of "change in the shares' price" and "change in shares' volume of transactions". Thus, using the software Microfit 4 and based on Schwarz Bayesian criterion, the best model with the appropriate interval was estimated via assessment logarithmic model (table5). Schwarz Bayesian criterion economizes on the number of intervals. Consequently, the estimate will have a higher degree of freedom (df). Using Microsoft software, the best model, that is the following function, was selected.

Substituted Coefficients:

\[ \text{LOGV} = 1.8546684226 + 0.209237509679*\text{LOGV}(-1) + 0.195050222417*\text{LOGV}(-2) + 0.15062071222*\text{LOGV}(-3) + 15.051510875*\text{DPLOGP} - 6.59941832942*\text{DNLOGP} \]

As can be observed, in the above regression all the coefficients, i.e. DPLOGP and DNLOGP, are significant. Before estimating the long run coefficients via logarithmic assessment model, to make sure of the existence of long run relationship between the variables of price changes and the changes of transaction volume, it is necessary to apply a co-aggregate test. To do this test, one is subtracted from sum of coefficients with the interval of the dependent variable (logv(-t)) and the result is divided by sum of its standard deviation as follows:

\[ t = \frac{\sum_{t=1}^{p} \Phi_t - 1}{\sum_{t=1}^{p} S_{\Phi_t}} = \frac{0.698342 - 1}{0.214276} = -3.96854 \]

Because the absolute value of acquired t is more that the absolute value of critical values presented by Benerji, Dula and Mester (-3.8), the null hypothesis which is based on the existence of no long run relationship is rejected with 95% confidence (i.e. at the significance level of 5%). The result is that there is a long run relationship between the variables price changes and the changes of transactions' volume. Now having been confident of the existence of the above relationship, the long- and short-run pattern of this relationship is estimated using Microfit 4 software. Hence, the long run model is estimated using assessment logarithmic model and the summary of its results is presented in the table6.

Table 5. The pattern coefficients of the model asserted by Yazd welding industry (Bekab)

<table>
<thead>
<tr>
<th>DNLOGP</th>
<th>AR(1)</th>
<th>-5.455509</th>
<th>1.565599</th>
<th>-3.484614</th>
<th>0.0005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.416748</td>
<td>0.085736</td>
<td>-4.860818</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

| R-squared   | 0.233462 | Mean dependent var | 4.352239 |
| Adjusted R-squared | 0.228957 | S.D. dependent var | 0.603631 |
| S.E. of regression | 0.530043 | Akaike info criterion | 1.575069 |
| Sum squared resid | 286.8454 | Schwarz criterion | 1.608675 |
| Log likelihood | -802.5854 | Hannan-Quinn criter. | 1.587824 |
| F-statistic | 51.82707 | Durbin-Watson stat | 1.99917 |
| Prob(F-statistic) | 0.000000 |                     |          |

Inverted AR Roots | -.42
Table 6. Long run pattern of assessment logarithmic model

Estimated Long Run Coefficients using the Assessment Logarithmic Model Approach
Assessment Logarithmic Model (3,0,0) selected based on Schwarz Bayesian Criterion
Dependent variable is LOGV
1027 observations used for estimation from 6 to 1032

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPLOGP</td>
<td>33.7490</td>
<td>5.7446</td>
<td>5.8749[.000]</td>
</tr>
<tr>
<td>DNLOGP</td>
<td>-14.7944</td>
<td>3.9978</td>
<td>-3.7006[.000]</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>4.1676</td>
<td>.048022</td>
<td>86.7857[.000]</td>
</tr>
</tbody>
</table>

With respect to the t statistic calculated in the table 6, the coefficients of positive and negative changes of price and volume of transactions are significant. In fact, in the long run, there is a negative relationship between negative changes of price and transactions' volume also positive relationship between positive changes of price and transactions' volume. A good explanation for the numerical quantity of coefficients is that if in the long run the variable negative changes of price increases a hundred units, the variable volume of transactions will decrease 14.7944 units. Moreover, positive changes of price will have positive effect on the increase of transactions' volume. Having estimated the long run model, the pertinent error correction pattern is also represented.

Table 7. The Dynamic Short-Term Structure

Error Correction Representation for the Selected Assessment Logarithmic Model
Assessment Logarithmic Model (3,0,0) selected based on Schwarz Bayesian Criterion
Dependent variable is dLOGV
1027 observations used for estimation from 6 to 1032

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>dLOGV1</td>
<td>-.34507</td>
<td>.036847</td>
<td>-9.3648[.000]</td>
</tr>
<tr>
<td>dLOGV2</td>
<td>-.15083</td>
<td>.030229</td>
<td>-4.9897[.000]</td>
</tr>
<tr>
<td>dDPLOGP</td>
<td>15.0411</td>
<td>2.3610</td>
<td>6.3705[.000]</td>
</tr>
<tr>
<td>dDNLOGP</td>
<td>-6.5935</td>
<td>1.7215</td>
<td>-3.8300[.000]</td>
</tr>
<tr>
<td>dINTERCEPT</td>
<td>1.8574</td>
<td>.16096</td>
<td>11.5393[.000]</td>
</tr>
<tr>
<td>ecm(-1)</td>
<td>-.44567</td>
<td>.036965</td>
<td>-12.0567[.000]</td>
</tr>
</tbody>
</table>

In the table 7, d is indicative of first rank difference. As can be observed, the coefficients of the first and second rank differences of the variable transactions' volume and the first rank difference of the variables positive and negative changes of price have a high t statistic and are statistically significant. What is fundamentally important concerning the short term transaction (ECM) is the coefficient of ECM (-1) which is indicative of the speed at which short term disequilibrium is modified toward long term equilibrium. As it is obvious in the above table, the estimated coefficient of ECM (-1) is about -0.44, which is indicative of the appropriate speed at which short term disequilibrium is removed and consequently moves toward long term equilibrium. In fact, the coefficient indicates that in each period 44% of the disequilibrium of transactions' volume is removed.

5. Analysis
The model for testing the welding industry of Yazd (Bekab)

Estimation Equation:

LOGV = C(1) + C(2)*LOGV(-1) + C(3)*LOGV(-2) + C(4)*LOGV(-3) + C(5)*DPLOGP + C(6)*DNLOGP + [AR(1)=C(7)]
5.1 Testing the first hypothesis
H0: The increase of shares' prices does not go along with the increase of shares' transaction volume.
H1: The increase of shares' prices goes along with the increase of shares' transaction volume.
With respect to the probability of 0.000 which is less than 5%, H0 is rejected and the first hypothesis (H1) is approved. Thus, it can be concluded that positive change in the price of shares is effective on the increase in the volume of transactions (table8).

Table 8. Testing the first hypothesis (Wald test)

<table>
<thead>
<tr>
<th>Wald Test:</th>
<th>Equation: EQ01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Statistic</td>
<td>Value</td>
</tr>
<tr>
<td>t-statistic</td>
<td>6.382057</td>
</tr>
<tr>
<td>F-statistic</td>
<td>40.73065</td>
</tr>
<tr>
<td>Chi-square</td>
<td>40.73065</td>
</tr>
</tbody>
</table>

Null Hypothesis: C(5)=0
Null Hypothesis Summary:

<table>
<thead>
<tr>
<th>Normalized Restriction (= 0)</th>
<th>Value</th>
<th>Std. Err.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(5)</td>
<td>13.22790</td>
<td>2.072671</td>
</tr>
</tbody>
</table>

Restrictions are linear in coefficients.

5.2 Testing the second hypothesis
H0: The decrease of shares' prices does not go along with the decrease of shares' transaction volume.
H1: The decrease of shares' prices goes along with the decrease of shares' transaction volume.
The second hypothesis wants to determine whether or not negative changes occurring in the price of shares (C(6)*DNLOGP) is effective on the volume of transactions. Concerning the probability of 0.000 which is less than 5%, H0 is rejected. Thus, it can be concluded that negative change in the price of shares is effective on the decrease in the volume of transactions in this firm (welding industry of Yazd) (table9).

Table 9. Testing the second hypothesis (Wald test)

<table>
<thead>
<tr>
<th>Wald Test:</th>
<th>Equation: EQ01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Statistic</td>
<td>Value</td>
</tr>
<tr>
<td>t-statistic</td>
<td>-3.484614</td>
</tr>
<tr>
<td>F-statistic</td>
<td>12.14253</td>
</tr>
<tr>
<td>Chi-square</td>
<td>12.14253</td>
</tr>
</tbody>
</table>

Null Hypothesis: C(6)=0
Null Hypothesis Summary:

<table>
<thead>
<tr>
<th>Normalized Restriction (= 0)</th>
<th>Value</th>
<th>Std. Err.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(6)</td>
<td>-5.455509</td>
<td>1.565599</td>
</tr>
</tbody>
</table>

Restrictions are linear in coefficients.
5.3 Testing the third hypothesis

H0: The amount of increase occurred in the volume of transactions as a result of increase in the price of shares is equal to the amount decrease occurred in the volume transactions due to the decrease of shares' prices.

H1: The amount of increase occurred in the volume of transactions as a result of increase in the price of shares is not equal to the amount decrease occurred in the volume transactions due to the decrease of shares' prices.

The above hypothesis wants to determine whether or not negative and positive changes in the price of shares are equally affecting the volume of transactions.

\[(C(5)\times DNLOGP) - (C(6)\times DNLOGP) = 0\]

Regarding the probability of 0.000 which is less than 5%, H1 is approved and H0 is rejected. Thus, the third hypothesis is also accepted.

| Table 10. Testing the third hypothesis (Wald test) |
| Wald Test: |
| Equation: EQ01 |
| Test Statistic | Value | df | Probability |
| t-statistic | 6.408574 | 1021 | 0.0000 |
| F-statistic | 41.06983 | (1, 1021) | 0.0000 |
| Chi-square | 41.06983 | 1 | 0.0000 |

Null Hypothesis: \( C(5) - C(6) = 0 \)
Null Hypothesis Summary:

<table>
<thead>
<tr>
<th>Normalized Restriction (- 0)</th>
<th>Value</th>
<th>Std. Err.</th>
</tr>
</thead>
<tbody>
<tr>
<td>( C(5) - C(6) )</td>
<td>18.68341</td>
<td>2.915377</td>
</tr>
</tbody>
</table>

Restrictions are linear in coefficients.

6. Conclusion

Considering the tests done on 45 firms selected in the stock exchange of Iran, the results are as follows: 1- With respect to the coefficients acquired in the first hypothesis, the coefficient of positive changes in shares' price was significant in 42 firms at the significance level of 5% (P-value = 5%). This means that positive changes occurring in the price of shares will lead to the increase of transactions' volume. The results acquired from testing the first hypothesis are consistent with the result of the research done by Talla al-dihani (2007). This hypothesis was also approved in his research in the stock exchanges of Paris, Madrid, Tokyo, Hong Kong, Seoul, Toronto, and America, but was rejected only in London. 2- With respect to the second hypothesis, from the 45 firms investigated, in 20 firms negative changes in the price of shares had no effect on the volume of transactions, but in the remaining 25 firms, like the study of Talla Mohammad Al-dihani which was done in the stock markets of Madrid, Tokyo, Hong Kong, South Korea, and Toronto, the hypothesis was approved. 3- Doing analysis on the third hypothesis showed that in neither of the firms investigated negative and positive changes of shares' price had equal effects on the volume of transactions. Accordingly, this hypothesis is also approved in the stock exchange of Iran like the stock exchanges of London, Hong Kong and Toronto. In Iran most of the economic activities are at government's disposal (i.e. are ruled by the government).

In fact, such activities are performed through the ownership of government on the economic firms and enterprises. The shares of a noticeable number of firms accepted in the stock exchange of the country is either directly or indirectly owned by government, and thus the activities performed by such firms are precisely observed and put under analysis. Although the government is trying not to differentiate between private and public firms, i.e. to be completely unbiased and neutral in this regard, it is usually observed that in practice the pertinent authorities unintentionally have a biotic behavior in this issue. What is more is that in critical and serious situations they are forced to intrude instead of to supervise. Supervision along with intrusion causes the price of bonds not to
be determined on the basis of supply and demand and as a result to distance from their real value and it is clearly apparent that the price of shares will undoubtedly affect the volume of transactions. Sometimes the high intensity of policies adopted cause transactions to stop and it is in some cases observed that the extensive lines of buyers suddenly change into extensively long lines of sellers.

Government's intrusion and interference can thereby affect the price and volume of transactions and if this occurs, supply and demand will lose their effect. A firm is both a stockholder and at the same time the subset (a part) of several other firms accepted in stock exchange. This in the first instance will help main stockholders to get access to principal and important information much sooner than small stockholders, and then will be followed by uncertainty in market information. All these factors are representative of inefficiency, or the week effectiveness, of the stock exchange of Iran, which is accepted in a great many of studies. As there is no basis volume in the stock exchange of other countries, it is so difficult to examine the results of this study and to compare them with the results of other studies done in this field. This may cause the results of this study to be different from similar studies.

References


