

## The Impact of Official Publication of Information in Tehran Stock Exchange on Shares Prices: A GMM Approach

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Released information in stock markets plays an important role in making decisions by agents like brokers, investors and other market activists. Rational decision-making in these markets will be possible if relevant and significant information is being released on-time. Otherwise, transparency and equality in the market is compromised. This study aims to respond to the question of whether officially released information about major increase in Predicted Earnings per Share (PEPS) in Tehran Stock Exchange (TSE) is significant and affects the growth of shares prices. For this purpose, we selected 30 official announcements of significant increases in PEPS for 30 companies from early 2012 to early 2015. This sample gathered from a set of over 2000 announcements. Findings of a Dynamic Panel Data model based on Arbitrage Pricing Theory (APT) and Generalized Method of Moments (GMM) estimation method show that official release of information has no significant effect on shares prices. It means that the information maybe has affected the prices before its official publication, so, it is needed to prepare good conditions for information to be released on time and effectively in TSE.

**Keywords:** Official Publication of Information, Tehran Stock Exchange, APT, Dynamic Panel Data Model, GMM.

**JEL Classification:** C23, G14

### 1 Introduction

Participants in securities markets make decisions on the basis of information provided by active agents in these markets such as stock exchange companies, brokers and issuers of shares and other securities. This information must be on time, relevant, significant and understandable, to be useful for the agents and enable them to make rational decisions. Otherwise the pricing mechanism would not be efficient, and consequently, correct prediction of price trends,

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and, in general, transparency and competitiveness of the market would be compromised.

Many studies have demonstrated that availability and reliability of financial information in securities markets are two important factors affecting investors' behavior. Because of the importance of accessing to relevant information presented according to standard guidelines, is often considered as a legal right for investors in democratic societies. Moreover, this is a criterion cited by the World Bank in assessing doing business conditions in different countries.

Undoubtedly, accessing of relevant information is an essential characteristic of a fair market. Therefore a numerous number of regulations have been adopted by regulators of stock markets to make sure that the markets are transparent and fair enough. According to these regulations all securities issuers and intermediary agents are required to disclose significant and relevant information apace, so other active agents, market analysts and investors be able to use information earlier in order to make optimal decisions.

There is a doubt that relevant and significant information is not disclosed promptly in the Tehran Stock Exchange (TSE) and when the information is released officially, it has no effect on the stock prices, since the information is feedforwarded. This research aims to test this hypothesis using a Dynamic Panel Data Model. If the hypothesis is not rejected, we will have a policy implication that TSE needs to be monitored about weakness of regulations or miss-operating them.

This article is planned in six parts. After this introduction, we will outline the basic conceptual framework of information and its effects on economic optimal decision-making. This section is continued by discussing the role of various factors, such as the exchange rate and stock index, in the stock market. The next section will review existing studies on information release in stock markets. It is followed by presentation of the model used for TSE and its results. Finally there will be a conclusion based on the empirical outcome of the study.

## **2 Basic Literature**

In humanities, information is defined as the medium of communication, an objective, useful and functional entity often equated with knowledge (Hasanzadeh and Fattahi, 2004).

In another definition, information denotes on data with a particular theme, which can be collected, classified and summarized for use, if necessary after analysis and interpretation. In Other words, information includes visual and

textual documents, oral and written evidence, organized in a semantic structure and is used in decision makings (Mahdavi, 2000).

All voluntary actions are the results of decisions by individuals or groups. Some believe that management is synonymous with decision-making, and rational practical judgment requires correct and up-to-date information. Thus it can be said that information and decisions are inextricably linked, so, the latter being impossible without the former. Indeed, information and its producers constitute a major determinant of social development, alongside energy and other natural resources (Mohammadi, 2007).

Capital market is an important market in an economy's financial sector whose function is extremely sensitive to information transparency. Inadequacy in this respect leads to higher transaction costs and sub-optimal use of resources. Easier availability of relevant information can promote allocative efficiency, the ultimate aim of the capital market.

Normally, after new information about firms is released, market analysts, investors, traders and other stock market agents, make new decisions based on new facts. Hence new information and the reaction of its users affect demand and supply of stocks and their prices. Depending on complexity of market relations and the prevalent obligations, these consequences can become manifest rapidly or gradually. In any case it is expected that reports of important changes in a firm's situation influences its share price quickly and significantly.

There is plenty of various information from joint stock companies especially from public companies in the list of stock exchanges that is important to stock holders. Companies' financial statements, including balance sheets, profit and loss statements, cash flow statements, reports on products and sales and other statements that are published periodically, contain many financial and non-financial points and indexes, whose information is important in decision making process for buying, holding or selling stocks.

One of the most important pieces of information which appears in profit and loss statements, is earnings per share (EPS) and its prediction (i.e. predicted earnings per share, PEPS). EPS shows the company's profit from business operations or non-operations activities that is payable to each share. EPS is often used for assessment of company's profitability and is a good guide for determining stock prices in models.

Based on experimental studies in many countries, EPS is used in many cases (Rahmani and Bakhtaki, 2006, 10-12) including:

- 1) Financial analysts, investors and stock exchange authorities often use EPS and the ratio of price to EPS (P/E) to determine, assess and judge stock prices.
- 2) PEP and its growth rate affect shares prices. Analysts and investors use current and previous EPSs to estimate future profitability of the company.
- 3) EPS is the main determinant of Dividend per Share (DPS). Although many factors affect a company's policy for dividends, without EPS there will not be any DPS.
- 4) EPS is a more acceptable criterion to assess a company's management and performance. Investigating cash flow statements gives us important information, but it is believed that EPS is a better index to compare a company's performance during different financial years and with competitors.
- 5) The ratio P/E is one of the most important financial briefs that is calculated based on EPS. This ratio shows expected periods for returning initial investment. Its reverse (i.e. E/P) shows the expected accounting return rate.

Thus, two pieces of the most important financial information among several financial and non-financial indexes and criteria are EPS and PEPS that are expected to have significant effects on shares prices upon publication. Due to this importance, many writers have investigated the relationship between EPS and shares prices. Kim and Verrecchia (1991) shows that within a time range around EPS publication, shares prices and trade volumes change significantly. Beaver, et.al. (1989) study the relationship between EPS and shares prices. Penman (1980) shows significant reaction of share prices to publication of information on PEPS. Patell (1976) studies the effect of PEPS disclosure on changes in shares prices.

## **2.1 Other Determinants of Stock Prices**

There are several models for pricing capital assets in the literature. A famous model is Capital Assets Pricing Model (CAPM) that is based on Markowitz (1959) Portfolio Model (MPM). MPM (1959) focuses on risk and return of risky assets and uses variance and mean of returns to calculate them. Reilly and Keith (1997) discuss that the portfolio model moved toward CAPM by considering Risk Free (RF) assets. CAPM is a financial model to show relationship between capital assets Beta and expected returns on assets.

Ross (1976) developed capital assets pricing by Arbitrage Pricing Theory (APT). Unlike CAPM, APT assumes that return on assets is a function of several factors. This theory was tested in many studies. Among first and most

important ones, is Roll and Ross (1980) that considered four factors as: Industrial products growth rate, inflation, deference between short and long term interest rate and difference between returns on different bonds to explain systematic risk in New York Stock Exchange (NYSE). Marjorie and Burmeistr (1988) added two other factors as: Growth rate of sales in the economy and growth rate of return on S&P500 index.

Despite many experimental studies on APT, it seems that there is no way to determine explanatory factors for returns on shares and other assets explicitly. So, many writers have used many factors to explain returns on shares in different economies. For instance, in Iran, Namazi and Mohammadtabar Kassgari (2007) considered four factors as determinants for returns on shares in Tehran Stock Exchange: growth rate of money supply, gold coin prices, exchange rate (US Dollar versus Iranian Rials) and Tehran Stock Exchange Price Index (TEPIX). Khani and Ebrahimzadeh (2012) used a multi factors CAPM to study returns on shares in Tehran Stock Exchange. Indeed, they added some factors like ratio of book value to market value and leverage variables to CAPM. Tayebnia and Sourani (2013) studied the effects of six macro-economic variables on stock prices in Tehran Stock Exchange and provided some testifiers for APT. They considered consumer price index, gold coin price, exchange rate, money supply, imports and oil revenues. Finally they verified that APT is applicable in TSE.

In this paper, based on data frequency we use two other main determinant factors among several factors in addition to official publication of information on EPS to explain returns on shares: Exchange rate as an explanatory factor for returns on substitute markets or opportunity cost for holding shares, and growth rate of Tehran Stock Exchange Price Index (TEPIX) as an explanatory factor for systematic risk.

Bessler and Yang (2003) state that spillover effects exist between markets influential decisions on resource allocation in different markets, portfolio management and investment strategies. Shares are a kind of financial assets and are more influenced by the return on other financial assets than that of non-financial assets. One of the most important financial assets, with respect to the structure of financial sector of the Iranian economy, is foreign exchanges. Thus the exchange rate is considered as a major determinant of shares prices in this study.

There are different approaches to understand the relation between the exchange rate and equity prices. Dornbusch and Fischer (1980) propose a flow-oriented model which analyses how exchange rate fluctuations affect international competitiveness and balance of payments and firms' cash flow,

consequently their share prices. According to this model, national currency devaluation renders domestic firms more competitive by making exports cheaper. Thus, equity prices depend positively on the exchange rate (here an increase in the exchange rate means a devaluation in national currency).

On the other hand, stock-oriented models assume that the capital account determines the exchange rate. These include portfolio equilibrium and monetary models. In the former, Branson (1983) conceives a negative relationship between the exchange rate and shares prices; a reduction in the shares prices leads to less wealth for domestic shareholders and hence decreases demand for money and interest rate. The lower interest rate increases outflow of capital hence higher exchange rate. In the monetary model considered by Gavin (1989) the linkage between the exchange rate and equity prices is understood in terms of common factors affecting both variables.

The effects of exchange rate on shares prices can also be investigated within the framework of portfolio theory. Variation in each asset in the portfolio, for instance cash or shares or bank deposits, changes the demand for shares and thus their prices (Nieha and Leeb, 2001).

Another factor involved in the demand for equity, and consequently its value, is risk (Fama, 1968 and Markowitz, 1952). Simply, risk is defined as a likelihood of incurring financial loss. Risk can be associated with a single asset or a portfolio. Generally two sources for risk are distinguished as systematic (market) risks and unsystematic (individual) risks.

Unsystematic risk depends on factors such as commercial and financial risk. This implies that unsystematic risk is reduced by diversifying assets in the portfolio. Systematic risk measures the unpredictability across the range of shares in response to changing conditions in the market and wider economy. Some systematic risk is involved in nearly all equities. Since it is directly influenced by fluctuations in the interest rate, inflation and market activity, systematic risk is unavoidable and independent of the behavior of the individual investor and diversity of equities. To take into account the effect of systematic risk on share prices, the stock market index is often used.

### **3 Review of Previous Studies**

Several studies have treated the problem of information releasing and its effects on stock markets. This section reviews the most related studies, beginning with more recent studies.

Asif et al. (2016) examined the relationship between accounting information and shares prices in Pakistan Securities Exchange during 2006 to

2013. They provided a model contained some accounting ratios and indexes, like earnings per share, book value per share and market values. Using ordinary least squares approach, they concluded that accounting information has significant joint explanatory power in determining stock prices.

Diem and Binh (2015) investigated the relationship between accounting information and returns on shares in Ho Chi Minh's stock market. Their results showed that the relationship exists but it is considerably weak. This implies that released accounting information does not play a prominent part in investment decisions in Vietnam. Omokhudu and Ibadin (2015) investigated contents value of accounting information in Nigeria stock exchange. Using a model of Panel Data, they concluded that accounting information should be released on-time with high quality to inform public investors and shareholders and make them capable enough to decide optimally.

Shehzad and Ismail (2014) considered the relationship between accounting information and share prices of banks in the Karachi stock market. They concluded that EPS is more strongly linked to shares prices than other accounting data.

Wang, Fu and Luo (2013) examined the relation between financial information and stock prices. Their study was based on 60 companies were listed in the Shanghai Stock Exchange during 2011. They found that accounting information, not only had significant effects on the stock prices, but also affects investors' behavior in the market. Findings of this study, also showed that there is a significant relationship between earnings per share and returns on stocks.

Hsiu (2006) investigated investors' behaviors in the Taiwanese stock market and inquired the role of transparency of financial information in increasing investment in equities. The results of the research demonstrated a significant positive dependence of investment activity on assessment of information transparency, in particular the dimension of ownership structure. Su (2003) studied how stock prices in Chinese markets react to profit announcements. Su concluded that Chinese investors in average do not correctly predict changes in EPSs and new information about profitability do not influence the markets quickly.

In the model proposed by Kim and Verrecchia (1994) certain agents, for instance some big investors, impede general availability of information (such as profitability data) and use their confidential information access.

Beaver (1968) showed that in the New York Stock Exchange, a change in the volume traded is correlated with fluctuations in profits officially

announced. Beaver considered 506 profit reports and concluded that significant variation in trading level in the week of publication is an indicator of the report content. That is, profit reports contain important information for investors.

There has also been a number of studies on TSE in Iran. Using statistical techniques, Jahankhaning and Saffarian (2003) analyzed the information content of released PEPS. Their results showed that this information affects volume and prices of traded shares in TSE. Nobakht (2004) considered the theoretical basics of an efficient capital market and the role of information in the market, as well as common contraventions of regulations. Using descriptive data and questionnaires, and applying statistical methods, she concluded that the officially released information by companies is not desirable. Ghaemi and Vatanparast (2005) examined how accounting data is involved in reducing information asymmetry in TSE. They showed the existence of such an asymmetry using a two-sample t-test. Mehrazin et al. (2012) studied the relation between information content of PEPS and the level of transparency of financial information in TSE. Their results implied that PEPSs contain more information content in companies with poorer transparency, and vice versa.

The main advantage of our research is focusing on released PEPS with special conditions among over 2000 PEPS reports and using a Dynamic Panel Data model.

#### **4 Methodology**

The main aim of this study is to investigate how official release of information about PEPS in the TSE affects shares prices. The hypothesis to be tested is that there is no significant relationship between the two mentioned variables.

As described above, it is clear that information of PEPS is vital for investors and stock market agents to decide correctly. So, if the hypothesis is not rejected, it can be concluded that this kind of important information has affected share prices before releasing officially.

Statistical population in this study covers all the companies listed in TSE during early 2013 to early 2015. The statistical sample contains about 30 PEPS reports collected in the way to satisfy following constraints.

- 1) The companies in the sample have to be active in the stock market throughout the period under consideration. To investigate the hypothesis, 10 trading days prior and after the statement of PEPS are taken into account. So it is necessary that the selected companies are active, at least within these days.

- 2) The volume of the company's floated shares is below 25%, because this indicates lower liquidity. In this case, it is more probable that official release of information has significant effect on prices.
- 3) Selected companies have to make annual, seasonal or monthly announcements of PEPS.
- 4) The selected PEPS announcements have to contain a numerous change, for instance at least +15%, related to the last report.
- 5) The selected companies represent, as much as possible, a diverse range of activities and industries.
- 6) There has to be no other official significant news for the company during the study period except for selected PEPS reports.

Regarding the above restrictions, a sample of 30 announcements of PEPS in TSE has been chosen from a set of 2000 reports.

To evaluate the effect of official releasing of information on stock returns as an indicator of growth rate of stock prices, a Dynamic Panel Data Model based on APT is used. As mentioned before, based on daily data frequency, we use two other main determinant factors in addition to official publication of information on EPS to explain returns on shares: growth rate of Tehran Stock Exchange Price Index (TEPIX) as an explanatory factor for systematic risk and Exchange Rate as an explanatory factor for returns on substitute markets or opportunity cost for holding shares. Also, first lag of dependent variable is used to emphasize the reality that returns on stocks contains of important information itself. So, the specified Model is:

$$P_{it} = \alpha P_{it-1} + \beta D_{it} + \delta X_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Where  $P_{it}$  is the growth rate of the shares prices. It is measured over the time span of 10 days before information release to 10 days following it.

$D$  is a dummy variable that takes values of 0 for 10 trading days before releasing the announcement, and 1 for 10 trading days afterwards.

$X_{it}$  is a vector of control variables, contains the growth rate of TSE price index during the 20 trading days before and after publishing information on EPS ( $TEPIX_{it}$ ), and growth rate of exchange rate (a U.S dollar in Iranian Rials,  $EX_{it}$ ) during the same period. This variable is to consider returns in competitor markets. Since during the period under consideration there have been multiple exchange rates, the free (informal) exchange rate has been adopted.

$i$  and  $t$  are subscripts denote cross companies and time in terms of days.  $\alpha$ ,  $\beta$  and  $\delta$  are parameters to be estimated.  $\mu_i$  is disturbance for crosses and  $\varepsilon_{it}$  is disturbance of the model.

## 5 Findings

Before estimating the model, data stationary is tested. Results of unit root tests are shown in Table 1. Based on Levin, Lin and Chu (LLC) common unit root test, all variables are stationary.

Arellano and Bond (1991) show that when the lag of dependent variable is appeared on the right hand of the specified equation as determinant variable, Ordinary Least Square (OLS) method is not consistent anymore. In this case, they suggest a Generalized Method of Moments (GMM) estimator and propose a Sargan-type test for over-identifying restrictions.

Table 2 shows the results of model estimation using Arellano and Bond's estimation method.

The estimated coefficient of dummy variable in both specifications is not significant, although positive. It means that official release of information about major increases in PEPS in a company has no significant positive effect on growth of shares prices. Its implication is that the announced information has influenced shares prices before official publication.

The estimated coefficient of the first lag of dependent variable as a regressor is negative in both specifications, as is expected, although it is significant only in 10 percent level.

The estimated coefficients of control variables correspond with our expectations. The estimated coefficient of TSE index growth is positive and significant at 1% level. It means that reducing systematic risk can help shares prices to rise. Also, the estimated coefficient of exchange rate growth is negative significant in 1% level, which indicates that foreign exchange market is a competitor for stock market.

Table 1

### *Results of Unit Root Test*

Variable	LLC Statistic	P-Value	Result
P	-17.16	0.000	Stationary
TEPIX	-16.07	0.000	Stationary
EX	-17.8	0.000	Stationary

*Source:* research findings.

Table 2

*Estimation Results by GMM*

	Specification 1	Specification 2
P <sub>t-1</sub>	-0.35* (0.074)	-0.32* (0.092)
D	0.002 (0.67)	0.002 (0.75)
TEPIX	1.5*** (0.000)	1.4*** (0.000)
EX		-0.47*** (0.000)
n	540	540
Sargan Test	179 (0.3)	173 (0.4)

Notes: The dependent variable is Pit. The numbers in brackets are P-Values. \*\*\* and \* denote significance level at 1% and 10%. *Source*: research findings.

## 6 Conclusion

Relevant and on-time information is one of the most important determinants of decision making in stock markets. Normally when new information about firms in the stock market is released, investors, analysts and other market agents respond by processing the new data and making new decisions. Thus new information and agents' reaction to it can affect shares prices.

This paper studied the effect of official publications of major increases in PEPS on the growth of shares prices in Tehran Stock Exchange. We selected 30 announcements of significant increases in PEPS for 30 companies from early 2012 to early 2015. This sample gathered under special restrictions among a set of over 2000 announcements. Findings of a Dynamic Panel Data model based on APT showed that official release of information about PEPS has no significant effect on the growth of shares prices. This means that the information maybe has affected share prices before its official release. In other words, it is highly possible that some active agents in the market have advantage to access information before its official publication in TSE. One important implication of this finding is that the official publication of PEPS information needs to be timelier.

The estimated coefficients of control variables, TSE index and exchange rate, correspond with our expectations.

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