

## Tobin's Q Model and Cash Flows from Operating and Investing Activities in Listed Companies in Iran

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**Abstract:** Tobin's Q model is one of the economic models for evaluation of companies, proposed by Tobin in 1968 and represents the ratio of the market value of the companies' shares plus the book value of its debts to the book value of its assets. It seems that one reason for the difference in abilities of the above said companies to produce cash from operating and investing activities. Therefore this research intends to find out a relationship between Tobin's Q and cash flows from operating and investing activities so that market participants can gain necessary knowledge about market efficiency and choosing investment basket with the aid of it. The results obtained from the research shows that there is no relationship between Tobin's Q ratios and cash flows from operating activities in the companies listed in TSE.

**Keywords:** Tobin's Q, cash flows from operating activities, cash flows from investing activities

**JEL Classification:** G100

### Introduction

In financial literature the relative efficiency of the capital markets is always mentioned which imply that the markets are reasonably efficient and quickly reflect the significant financial issues on the share prices without mistake and the share prices of the companies are quickly adjusted by receiving financial information and this information is included in the share prices of the companies. These concepts are discussed as the efficient market hypothesis.

The efficient market hypothesis refers to the rate of the reaction of the capital market securities to the announcement of the new information. This information is valuable to the investors if there is some evidence of its influence on the securities prices. If that is the case, we can say that the above said prices have informational content. There are three types of efficient market hypothesis, in the weak type, it is

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stated that the securities prices reflect the past information relating to the past price sequences. The semi-strong type speaks of the reflection of all available information belonging to the past and present on the securities prices. The strong type of the hypothesis also argues for the reflection of all information (published or internal information) on the securities prices. However, what is important is that, firstly prices are quickly adjusted in the markets due to receiving new information and reflect the influence of this information and secondly, the markets interpret the information correctly and do not make mistakes in interpretation of it.

For example, there is some evidence that markets do not respond to the accounting profit changes resulting from changes in depreciation methods having no effect on cash flows and markets know this fact well and are not be seduced (the same reference).

In the other word, markets react only to that group of information and changes which have actual influence on the current and expected cash flows input and output of a company.

Considering the function and importance of the cash flows from operating and investing activities to the investors in evaluating companies and also with respect to the relative efficiency of the capital and securities markets, this paper seeks to find that if the market understands the relative difference in the cash flow amounts from operating and investing activities of the companies with respect to their capital amount and adjusts Tobin's Q ratio according to it. And if that is the case then Tobin's Q model can be used as a reliable criterion in the field of the evaluation of companies.

### **Description of the Problem**

Tobin's Q model is one of the economic models for evaluating companies, proposed by Tobin in 1968 and represents the ratio of the market value of the company shares plus the book value of its debts to the book value of its assets. This ratio is usually more than one and the larger is this ratio the better financial situation, the higher profitability and the higher ability to produce cash the company will have.

In contrast, the less is this ratio, the worse financial situation, the weaker profitability and the more difficulty in cash production from the investing and operating activities the company will have. Also, several other factors influence the above mentioned ratio such as the companies.

Future growth opportunity; the level of competition in the industry; the company activity; and the relative ability of the company to continue its activity in the future and to keep its market share.

It seems that one reason for the difference between companies Tobin's Q ratio is their different abilities to produce cash from investing and operating activities. So this research seeks to find the relationship between Tobin's Q and the cash flows from investing and operating activities in order to help market becomes aware of these differences and includes them in Tobin's Q ratio so that it provides the capital market participants with necessary information on the efficiency of these findings.

### **Research background**

After the occurrence of the industrial revolution and other events led to creation of a gap between management and ownership, owners and share holders have always been worry about management negligence and in order to encourage it to work better and gain more profit for the company leading to distribution of more dividend among the share holders, part of the fees of managers was set as some percent of the profit and also on the basis of some other performance criteria.

In this stage, financial theorists began to devise criteria for evaluation of the management performance in companies growing in number. They proposed a wide range of criteria from the after – tax net profit, Earning Per Share (EPS) and Return on Investment and Return on Equity (ROI & ROE) to the complex models using complex economic concepts such lost opportunity cost, Economic Value Added (EVA) and Market Value Added (MVA) for performance measurement.

However, the common feature of all these performance evaluation criteria was that the above – said criteria were mainly dependent on accounting data for their measuring and calculating purposes which this data was provided by the companies accounting system which itself was under the management control and the management, considering this fact, tried to influence these amounts and numbers in favor of itself which was not necessarily along with the shareholders benefit.

Because of this, there was much worry about it and even raising issues such as profit management and profit smoothing was in this respect so , presence of some criterion was necessary for more accurate performance evaluation in which less accounting data is used. One of the most important criteria proposed at that time was Tobin's Q model which replaced the evaluation by individuals with the evaluation by the market.

The original Tobin's Q version which was an economic model and was proposed by James Tobin in 1997 brought about a great revolution in the performance evaluation arena. then other common versions of Tobin's Q such as standard Tobin's Q , Ross & Linderberg Tobin's Q , Average and marginal Tobin's Q , etc , were derived from the original version and offered.

Tobin's Q version proposed by James Tobin was later called simple Tobin's Q which its mathematical relation is as follows (Salehi, 2001):

$$\text{Simple Tobin's Q} = \frac{\text{Market value of Common stock at the end of the year} + \text{market value of preferred stock at the end of the year} + \text{market value of long term debts year} + \text{book value of debts with maturities less than one year}}{\text{book value of companies' assets at the end of the year}}$$

divided to: book value of companies' assets at the end of the year.

Tobin's Q which was a new model for evaluating performance is mostly a performance evaluation criterion on the basis of using influence of market reaction and information on management performance, instead of relying on accounting calculations such as ROE & ROI for performance evaluation. In its standardized form, Tobin's Q has also exploited from assets replacement cost instead of the book value of assets in order to reflect the companies' property correctly which is proposed as follows:

$$\text{Simple Tobin's Q} = \frac{\text{Market value of Common stock at the end of the year} + \text{market value of preferred stock at the end of the year} + \text{market value of long term debts year} + \text{book value of debts with maturities less than one year}}{\text{companies assets replacement cost at the end of the year}}$$

divided to: companies assets replacement cost at the end of the year.

Tobin's Q can be useful for companies to help them to choose whether use their investments in capital machinery or other activities. If  $Q=1$  then the company exploits from all investment opportunities favorably. If  $Q > 1$  then the company is very motivated for investment, because the capital return is more than the capital cost rate and the investment process continues up to the point that the companies Q decreases to 1 Linderberg and Ross (1981) calculated and investigated Tobin's Q model during a research on 257 American companies having complete capital structure (long-term debt, short term debt and equity).

March, Randall et al., (1990) used Tobin's Q as an index for evaluation and for analysis of the influence of its amount on different share classes in a research.

In a study by Lang et al., (1991) this result obtained that the shareholders of companies with lower Tobin's Q ratios had greater increase in their share values than the shareholders of companies with higher Tobin's Q ratios.

Mc Williams and Victoria (1993) tested the relationship between the share price reaction and Tobin's Q ratio of the companies. The results obtained from this study

argued for a negative and inversed relationship between the share price reaction and Tobin's Q ratio.

In one research performed by Chung & Pruitt (1994) they concluded that Tobin's Q can be used in explaining the following phenomena in companies:

1. Superficial disputes about investment and diversification decisions;
2. The relationship between equity management and company value;
3. The relationship between management performance and increase in asset values; and
4. Financing, profit appropriation and payroll policies.

Badrinath & Kini (1994) concluded based on their research that there is a significant relation between Tobin's Q, companies' size and share return. The results also indicated that the influence of companies' size on share return is greater than that of Tobin's Q and P/E.

Chen and Lee (1995) applied the Tobin's Q theory to evaluating the quality of traditional accounting measurement of firms' performance and measurements of cash flows coverage rate.

The results showed that there is a great correlation between ROI as an accounting criterion for performance measurement and Tobin's Q which this argues for the usefulness of accounting measurements.

Landsman & Shapiro (1995) stated that the relationship between accounting information and economic reality has always been a disputable issue, one appearance of this dispute, is the belief in the equality of the ROI and the economic return rate. They tested the relation between ROI and Tobin's Q in the research they performed statistical analysis of data showed a high correlation between ROI and Tobin's Q because Tobin's Q reflects the investors' expectation relating to the future economic return of the company. So they found out that accounting information includes high quality economic information. Various studies have been performed on Tobin's Q and its relation to different accounting variables during the previous years. Below some of these studies are addressed.

In a research, Bond and Klemm (2005) concluded that company's cash flows are of a very higher informational load for future investment decisions than measurements such as Tobin's Q resulted from share price evaluations and Tobin's Q solely has not the sufficient informational load for future investing decisions.

In Iran, also, Salehi (2001) examined the relation between Linderberg and Ross's Tobin's Q and other versions of Tobin's Q model. The findings of the research showed that there is not a significant relation between them. Also Kawoosi (2002) studied the relationship between Tobin's Q and EVA for Iranian listed companies which again no significant relationship was reported.

However, Tobin's Q is currently a popular criterion because this index in addition to the above- said advantages is also an estimation of intangible assets of the company such as exclusive power, good will, efficient managers and growth opportunities which are assumed that these values are reflections of the actual performance results of the company.

Research purposes and the reason for choosing this subject considering the above – said discussions, the purpose of this research is to study the degree and the manner of reactions of companies Tobin's Q ratios to the differences in operating and investing cash flow amounts.

Also it studies that whether the market is efficient enough to include the difference in the abilities of the companies to produce cash from operating and investing activities in their Tobin's Q ratios and adjusts this ratio according it.

Also it aims at determining if one reason for difference between Tobin's Q ratios of the companies is the difference their cash flow amounts resulted from operating and investing activities. If that relation is true, then Tobin's Q ratio can be used as one criterion for evaluation of the studied companies.

Necessity for conducting the research today, capital markets in most countries have gained a wonderful expansion rate by absorbing citizens capital and applying it to production , commercial and service sectors and they are currently a determinative parameter in political and economic equations in most countries.

Perhaps it can be certainly said that the economic beating heart originates from the capital and securities market equations of countries. One of the development indices of each country is having efficient capital markets. Fall of stock markets in East Asia in 1990 s which disrupted 3rd the economy of this area shows the critical importance of optimal operation and management of these markets and the pervasive and extensive economic outcomes of the presence of faults in their performance. On the basis of this fact any research in this field needs support and help. Also, the current research seeking to solve the problems relating to the factors influencing the degree of difference between Tobin's Q's of the companies, is done in the same line.

A research main question is:

If there is a significant relationship between Tobin's Q ratio and cash flows from operating activities for pharmaceutical companies listed in Tehran securities market?

The hypotheses of this research are as follows:

1. there is a significant relationship between Tobin's Q ratio and cash flows from operating activities for pharmaceutical companies listed in Tehran securities market
  2. there is a significant relationship between Tobin's Q ratio and cash flows from investing activities for pharmaceutical companies listed in Tehran securities market
- research variables research variables include the independent variable of Tobin's Q

and dependent variables of cash flows from operating activities and cash flows from investing activities which they can be calculated as the following:

Tobin's Q is one of the economic models for evaluation of companies, obtained by dividing the market value of the company plus the book value of debts by the book value of assets as:

Although various versions of Tobin's Q, such as average Tobin's Q, adjusted Tobin's Q and marginal Tobin's Q have been proposed for various purposes but using standard Tobin's Q as explained above is sufficient for purposes of this research cash flows from operating activities of the company:

Input and output cash flows from operating activities are as the following:

- a. Cash receipts from sale of goods and service providing.
- b. Cash receipts from patents, fees, service charges and other operating incomes
- c. Cash payments to suppliers and service providers
- d. Cash payments to business employees or on behalf of them.
- e. Cash receipts and payments of an insurance company for premiums, compensations, pensions and other insurance payments.
- f. Receipts and payments relating to the contracts with operating and commercial purposes
- g. Cash payments for retirement compensation and reorganization costs.
- h. cash flows from investing activities of the company

Input and output cash flows from investing activities are as follows:

- a. input cash flows:
  - cash receipts from sale of other business shares or bond
  - cash receipts from sale of fixed tangible assets and intangible assets
  - cash receipts relating to principle bank long-term investment deposits
  - cash receipts from receipt of principle loans paid to other individuals including receipt of paid interest – free loans
- b. output cash flows
  - cash payments for investing in other businesses, shares or bond;
  - Cash payments for obtaining fixed tangible assets and intangible assets. These payments include payments relating to preparing development costs from assets and also producing fixed tangible assets by the business.
  - Investments in the form of bank long term deposits
  - Loans paid to other individuals including invest-free loans.

Statistical community, sampling method and the sample in order to test the hypotheses, a researcher should chose the statistical community in a way that the intended information can be collected more reliably and this community includes all assumed and real elements which researcher wants to generalize the research findings to them which may be limited or unlimited depending on the type of research.

The statistical community studied in this research, considering the purpose of the research that is generalizing the findings and using them in studying the securities, is listed companies in Tehran securities market.

In order to prevent from disruption of the research results by unwanted variables and in order to control them, it is better to select subjects of this research from one special industry which both provides enough subjects for research and most companies in that industry produce homogenous products.

Therefore, among the industries in TSE, Machine Industry was selected which both provides sufficient subjects and is according to the research criteria for measuring Tobin's Q and other research variables. On the basis of this fact, class sampling was used and respecting the limited number of subjects in this industry the researcher was used the convenient sampling method.

### **Research Methodology**

The spatial scope of this research includes Mechanical listed companies in TSE and the temporal scope of this research includes financial data of the Mechanical listed companies in Tehran securities market during 2005 – 2007.

Considering the type of the research, aims at finding a relationship between 2 variables and determining the manner of using it, so the present research is an applied research from scientific research group.

Also, since the present research seeks to find the relation between variables, so, the method of conducting this heuristic research is of correlation type. Therefore, in order to test the research hypothesis the correlation statistical methods are used. The statistical hypothesis and the research hypothesis for doing the tests are as follows:

$$H_0: r = 0 \qquad H_1: r \neq 0$$

The coefficient of correlation ( $r$ ) is always between 1 and 0.

Data about the variables used in this research has been collected through observing published annual reports of TES during 2005 – 2007.

In this research the library method has been used for compiling the research literature.

### **Data Analysis**

Since the correlation method has been used in this research and also all assumptions have been made on the same basis, so the statistical test used in this research was the correlation one way. In addition, the software SPSS was used for data analysis

For calculating the cash from operating and investing parts of the companies in the sample have been used and in order to negate the effect of company's size on the cash amounts from operating and investing activities, these amounts for each company in the sample have been calculated per share.

$$\text{Operating cash per share} = \frac{\text{cash from operating activities}}{\text{total number of the shares of the company}}$$

$$\text{Investing cash per share} = \frac{\text{cash from investing activities}}{\text{total number of the shares of the company}}$$

In order to test research hypothesis, correlation statistical test is used. The results from statistical tests are as follows:

First hypothesis:

There is a significant relationship between Tobin's Q ratio and cash flows from operating activities for pharmaceutical companies listed in Tehran securities market.

Table 1 shows the results of testing the relationship between Tobin's Q and operating cash flows per share.

Table 1: Results of the first hypothesis

	Q Tobin	CFO
Q Tobin Pearson correlation	1	0.009
Sig. (2tailed)	0	0.949
N	53	49
CFO Pearson correlation	0.009	1
Sig. (2 tailed)	0.949	0
N	49	49

Table 2: Model summary of Table 1

Model	R	R square	Adjusted R square	Std. Error of the estimate
1	0.009a	0.000	-0.21	1.23185148

a. predictors: (constant), CFO

The result of the above table show that Pearson correlation coefficient for 2 variables of Tobin's Q and cash flows from operating activities is 0.09 and  $r = 0$ . The results show that there is too weak correlation between these 2 variables.

Regarding the significance level at 0.949, results of the test show that at confidence level 0.95 the statistical hypothesis (H0) is confirmed and the research hypothesis is rejected.

Second hypothesis:

There is a significant relationship between Tobin's Q ratio and cash flows from investing activities for pharmaceutical companies listed in Tehran securities market.

Table 3 shows the results of testing the relationship between Tobin Q and cash flows from investment per share.

Table 3: Results of the second hypothesis

		Q Tobin	CFO
Q Tobin	Pearson correlation	1	0.237
	Sig. (2tailed)	0	0.101
	N	53	49
CF]	Pearson correlation	0.237	1
	Sig. (2 tailed)	0.101	0
	N	49	49

Table 4: Model summary of the Table 3

Model	R	R square	Adjusted R square	Std. Error of The estimate
1	0.237a	0.056	0.036	1.196855033

a. predictors: (constant),CFO

The results of the above table show that Pearson correlation coefficient for 2 variables of Tobin's Q and cash flows from investing activities is 0.237 and  $r = 0.056$ .

The result show that there is too weak correlation between these 2 variables .regarding the significant level at 0.101 , the results of test show that at confidence level 95% , the statistical hypothesis (H0) is confirmed and in contrast, the research hypothesis is (H1) is rejected.

## Conclusions and Recommendations

Considering the fact that H1 is rejected in the first hypothesis, statistical hypothesis 0 (H0) which argues for lack of any significant relationships between 2 variables, i.e. cash flows from operating activities and Tobin's Q of companies, is accepted.

According to this fact it seems that Tobin's Q ratio can not be used as a good indicator and guide in informing the market about ability of companies in producing enough cash from their operating activities in the industry being studied.

In the second hypothesis, also H1 is rejected at significance level of 5% and H0 is accepted on the basis of this fact it can be stated that there is no significant relationship between 2 variables of Tobin's Q and cash flows from investing activities for the companies. So, it can be said that Tobin's Q ratio is not a good indicator in informing the market about ability of companies in producing enough cash from their investing activities.

In contrast to studies by Lang et al., (1991), Mc William and Victoria (1993) and Landsman and Shapiro (1995) which confirmed the presence of a relationship between Tobin's Q and various accounting variables, in this research, presence of relationship between Tobin's Q and cash flows from investing and operating activities was rejected and no significant relationship was found between them. Of course, the conclusion of this research is along with the research by Kawoos (2003) conducted in Iran. Among the reasons for difference between the results of this research and those of the studies performed in other countries, we can refer to difference in research environments and the reliability and relevance of the information for investors in the process of decision making.

Finally, it can be said that regarding the results of present study, the difference in cash flows from operating and investing activities of the companies, has not led to a difference between Tobin's Q ratios of the studied companies. So it can be said that the capital market has not been efficient in relation to this issue.

The results obtained from this study should be considered conservatively because in this research listed companies in all industries have not been studied. The effect of industrial variables should be considered. In addition, considering the cross-sectional focus of the study, the effects of the rate of information disclosure on the share prices and Tobin's Q ratios are not still completely known.

Recommendations for future research:

1. Conducting this research in other industries and comparing the obtained results with those of the present study
2. Studying the relationship between Tobin's Q and other accounting and financial variables.

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