SURVEYING THE RELATIONSHIP BETWEEN STOCK MARKET MAKER AND LIQUIDITY IN TEHRAN STOCK EXCHANGE COMPANIES

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Abstract
The main purpose of this study is surveying the relationship between stock market maker and liquidity. The population of this study are the companies that accepted at Tehran stock exchange during the resent six years from 2007 to 2012. They were includes 520 companies in 37 industry groups. To observe comparability their financial period was end of March. We have chosen data from available company in Tehran Stock Exchange. To collecting data with considering companies situation, 98 companies were selected as sample from 19 industry groups. In order to analyze the data resulted from collected questionnaires deductive and descriptive statistical methods are used. The results K-S Test shows the test distribution is Normal. So we can use Multi Regression (Chow Test, Hausman Test, Panel data, ..) to test the hypothesis of the research. In order to determine the relationship between the variables of the study, the SPSS tool has been used. Findings show that there is a coalification relationship between Stock market maker and liquidity in Tehran Stock Exchange accepted companies.
Keywords: Stock market maker, liquidity, number of Stock traded, stock buyers count, number of shares traded

INTRODUCTION

Empirical studies linking liquidity provision to asset prices follow naturally from inventory models. Liquidity suppliers and market markers profit from providing immediacy to less patient investors, but have limited inventory-carrying and risk-bearing capacity. Similarly, limits to arbitrage arguments rely on certain market participants accommodating buying or selling pressure. These liquidity suppliers/arbitrageurs are willing to accommodate trades—and, therefore, hold suboptimal portfolios—only if they are able to buy (sell) at a discount (premium) relative to future prices. Thus, large liquidity-supplier inventories should coincide with large buying or selling pressure, which causes price movements that subsequently reverse themselves (Chordia et al, 2002).

Most foreign exchange trading firms are market makers and so are many banks. The market maker sells to and buys from its clients and is compensated by means of price differentials for the service of providing liquidity, reducing transaction costs and facilitating trade. A market maker or liquidity provider is a company, or an individual, that quotes both a buy and a sell price in a financial instrument or commodity held in inventory, hoping to make a profit on the *bid-offer spread*, or *turn* (Radcliffe, 1997: 134).

In other words; a market maker is a firm, individual or trading strategy that always or often quotes both a buy and a sell price for a financial instrument or commodity, hoping to make a

profit by exploiting the difference between the two prices, known as the spread. Intuitively, a market maker wishes to buy and sell equal volumes of the instrument (or commodity), and thus rarely or never accumulate a large net position, and profit from the difference between the selling and buying prices.

Market-making has been studied extensively in the theoretical market microstructure literature (Glosten and Milgrom 1985; Grossman and Miller, 1988) for example], but only recently has the dynamic multi-period problem gained attention (Darley et al, 2000; Das, 2005). Since we are interested in the problem of how a market-maker learns a value for an asset, we follow the general model of Glosten and Milgrom which abstracts away from the problem of quantities by restricting attention to situations where the market-maker places bid and ask quotes for one unit of the asset at each time step. Das (2005) has extended this model to consider the market-maker's learning problem with competitive pricing, while Darley et al (2000) have used similar modeling for simulations of the NASDAQ. The Glosten and Milgrom model has become a standard model in this area.

Liquidity, which is not easy to quantify, is the prime social concern. In practice, it is a function of the depth of the limit order book. In our models, we measure liquidity using the bid-ask spread, or alternatively the probability that a trade will occur. This gives a good indication of the level of informational heterogeneity in the market, and of execution costs. The dynamic behavior of the spread gives insight into the price discovery process.

The main purpose of this study is surveying the relationship between stock market maker and liquidity. To achieve this purposes we find answer to this questions:

1. Is there relationship between Stock market maker and transaction count?
2. Is there relationship between Stock market maker and stock buyers count?
3. Is there relationship between Stock market maker and number of shares traded?

METHOD

The population of this study are the companies that accepted at Tehran stock exchange during the resent six years from 2007 to 2012. They were includes 520 companies in 37 industry groups. To observe comparability their financial period was end of March. We have chosen data from available company in Tehran Stock Exchange. To collecting data with considering companies situation, 98 companies were selected as sample from 19 industry groups.

In order to analyze the data resulted from collected questionnaires deductive and descriptive statistical methods are used. The results K-S Test shows the test distribution is Normal. So we can use Multi Regression (Chow Test, Hausman Test, Panel data, ..) to test the hypothesis of the research. In order to determine the relationship between the variables of the study, the SPSS tool has been used.

General analytical framework model is estimated as follows.

$$AFE = \alpha_0 + \beta i * Independen\ tVariable + \varepsilon$$

$$H_0 : \beta i = 0$$

Model is not significant

$$H_1 : \beta i \neq 0$$

Model is significant

And the models used in this study is formulated as follows:

The first model corresponds to the first hypothesis:

$$SLiq_{i,t} * NT_{i,t} = \alpha_0 + \beta_1 MM_{i,t} + \beta_2 BA_{i,t} + \beta_3 R_{i,t} + \beta_4 Period_{i,t} + \beta_5 diff_{i,t} + \varepsilon_{i,t}$$

The second model corresponds to the second hypothesis:

$$SLiq_{i,t} * NAS_{i,t} = \alpha_0 + \beta_1 MM_{i,t} + \beta_2 BA_{i,t} + \beta_3 R_{i,t} + \beta_4 Period_{i,t} + \beta_5 diff_{i,t} + \varepsilon_{i,t}$$

The third model corresponds to the third hypothesis:

$$SLiq_{i,t} * NST_{i,t} = \alpha_0 + \beta_1 MM_{i,t} + \beta_2 BA_{i,t} + \beta_3 R_{i,t} + \beta_4 Period_{i,t} + \beta_5 diff_{i,t} + \varepsilon_{i,t}$$

RESULTS AND CONCLUSION

1- Descriptive Results

Table 1 shows the Descriptive Results of variables.

Variable	No. of Observation	Mean	SD
Liquidity due to the number of Stock traded	588	1.2224	0.4086
Liquidity due to stock buyers count	588	- 0.0085	1.1539
Liquidity due to the number of shares traded	588	0.2881	2.1765
Stock Market making	588	- 0.0114	0.6556
Difference between the proposed price and Stock	588	0.0918	0.4471
Systemic risk	588	0.3840	0.8855
Stock trade boom period	588	0.9115	0.2841
Balanced equilibrium price differences	588	1.1452	0.5184

According to table 1 the Liquidity due to the number of Stock traded with 1.2224, Liquidity due to stock buyers count with - 0.0085, Liquidity due to the number of shares traded 0.2881 have mean. The highest mean has shown in liquidity due to number of Stock traded and lowest mean has shown Liquidity due to stock buyers count.

2- Hypotheses results

A) Hypothesis 1 results

The main purpose of first hypothesis test was; there is a direct relationship between stock market maker and transaction count. The statistical way of analysis this hypothesis is two ways, H_1 is acceptance of hypothesis and H_0 is rejecting of hypothesis.

We have used the model (1) to estimate this hypothesis according to the panel data and if the β_1 coefficient was significant at a confidence level of 95% will be approved.

$$SLiq_{i,t} * NT_{i,t} = \alpha_0 + \beta_1 MM_{i,t} + \beta_2 BA_{i,t} + \beta_3 R_{i,t} + \beta_4 Period_{i,t} + \beta_5 diff_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases}$$

To confirm the suitability of panel data method, we have used Chow Test and to determining fixed effects or random effects in order to better estimate, we have used Hausman Test. The results of these tests are presented in.

Table 2 Chow Test and Hausman Test results

Test	N	Statistic	Statistic	df	P-Value
Chow	588	f	28.2146	485.97	0.000
Hausman	588	χ^2	39.5797	5	0.000

According to Chow test result P-Value in 95% confidence level is 0.000, and H_0 has rejected, it means that we can be used panel data method. Also, according to Hausman test results P-Value

was less than 0.05 and accepted H_1.Therefore, it is necessary to estimate the model using fixed effects.

According to table 3 Jarque-Bera, Breusch-Pagan, Durbin-Watson and Ramsey test results show that model's linearity has confirmed and the model is not specified error.

Table 3: Test results concerning the statistical assumptions of the model (1)

Ramsey		Durbin-Watson	Breusch-Pagan		Jarque-Bera	
$P-Value$	F	D	$P-Value$	F	$P-Value$	χ^2
0.1159	5.1724	1.54	0.0439	2.2975	0.312	1.8152

Table 4: The first hypothesis results of the study with using of fixed-effects.

Dependent variable: Liquidity due to the number of Stock traded				
Variable	Coefficient	T-Test	P-Value	Relation
Fixed component	1.3375	54.0605	0.0000	Positive
Stock Market making	1.0059	1.4783	0.0026	Positive
Difference between the proposed price and Stock	0.0015	0.1197	0.9047	Meaningless
Systemic risk	-0.0189	-2.7581	0.0060	Negative
Stock trade boom period	-0.0720	-3.1168	0.0019	Negative
Balanced equilibrium price differences	-0.0368	-3.0960	0.0021	Negative
R^2 = 0.8651	F=30.4957		p-value= 0.000	

According to table 4 considering the significant whole model, the p-value (0.000) was smaller than 0.05 and the model is confirmed. Determination of coefficient model also indicate that 86.51 percent of the liquidity due to the number of Stock traded variable are debated by the variables in the model.

B) Hypothesis 2 results

The main purpose of second hypothesis test was; there is a direct relationship between Stock market maker and stock buyers count. The statistical way of analysis this hypothesis is two ways, H_1 is acceptance of hypothesis and H_0 is rejecting of hypothesis.

We have used the model (2) to estimate this hypothesis according to the panel data and if the β_1 coefficient was significant at a confidence level of 95% will be approved.

$$SLiq_{i,t} * NAS_{i,t} = \alpha_0 + \beta_1 MM_{i,t} + \beta_2 BA_{i,t} + \beta_3 R_{i,t} + \beta_4 Period_{i,t} + \beta_5 diff_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases}$$

To confirm the suitability of panel data method, we have used Chow Test and to determining fixed effects or random effects in order to better estimate, we have used Hausman Test. The results of these tests are presented in.

Table 5 Chow Test and Hausman Test results

Test	Statistic	Statistic	df	P-Value
Chow	f	26.5444	485.97	0.0092
Hausman	χ^2	7.5203	5	0.0347

According to Chow test result P-Value in 95% confidence level is 0.0092, and H_0 has rejected, it means that we can be used panel data method. Also, according to Hausman test results P-Value

was less than 0.05 and accepted H_1.Therefore, it is necessary to estimate the model using fixed effects.

According to table 6 Jarque-Bera, Breusch-Pagan, Durbin-Watson and Ramsey test results show that model's linearity has confirmed and the model is not specified error.

Table 6: Test results concerning the statistical assumptions of the model (2)

Ramsey		Durbin-Watson	Breusch-Pagan		Jarque-Bera	
$P-Value$	F	D	$P-Value$	F	$P-Value$	χ^2
0.9104	1.1938	1.61	0.0323	2.1061	0.3844	1.9984

Table 7: The first hypothesis results of the study with using of fixed-effects.

Dependent variable: Liquidity due to the stock buyers count				
Variable	Coefficient	T-Test	P-Value	Relation
Fixed component	0.1855	22.48	0.0000	Positive
Stock Market making	1.2462	1.40	0.0407	Positive
Difference between the proposed price and Stock	0.0100	2.17	0.0301	Positive
Systemic risk	0.0030	1.01	0.2957	Meaningless
Stock trade boom period	0.0293	4.11	0.000	Positive
Balanced equilibrium price differences	-0.0043	-1.01	0.2971	Meaningless
R^2 = 0.8723	F=27.4242		P-value= 0.000	

According to table 7 considering the significant whole model, the p-value (0.000) was smaller than 0.05 and the model is confirmed. Determination of coefficient model also indicate that 87.23 percent of the liquidity due to the stock buyers count variable are debated by the variables in the model.

C) Hypothesis 3 results

The main purpose of third hypothesis test was; there is a direct relationship between stock market maker and number of shares traded. The statistical way of analysis this hypothesis is two ways, H_1 is acceptance of hypothesis and H_0 is rejecting of hypothesis.

We have used the model (3) to estimate this hypothesis according to the panel data and if the β_1 coefficient was significant at a confidence level of 95% will be approved. The third model corresponds to the third hypothesis:

$$SLiq_{i,t} * NST_{i,t} = \alpha_0 + \beta_1 MM_{i,t} + \beta_2 BA_{i,t} + \beta_3 R_{i,t} + \beta_4 Period_{i,t} + \beta_5 diff_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$\begin{cases} H_0 : \beta_1 = 0 \\ H_1 : \beta_1 \neq 0 \end{cases}$$

To confirm the suitability of panel data method, we have used Chow Test and to determining fixed effects or random effects in order to better estimate, we have used Hausman Test. The results of these tests are presented in.

Table 5 Chow Test and Hausman Test results

Test	Statistic	Statistic	df	P-Value
Chow	f	17.9966	485.97	0.0014
Hausman	χ^2	13.6466	5	0.0180

According to Chow test result P-Value in 95% confidence level is 0.0014, and H_0 has rejected, it means that we can be used panel data method. Also, according to Hausman test results p-value

was less than 0.05 and accepted H_1.Therefore, it is necessary to estimate the model using fixed effects.

According to table 6 Jarque-Bera, Breusch-Pagan, Durbin-Watson and Ramsey test results show that model's linearity has confirmed and the model is not specified error.

Table 6: Test results concerning the statistical assumptions of the model (3)

Ramsey		Durbin-Watson	Breusch-Pagan		Jarque-Bera	
P−Value	*F*	D	*P−Value*	*F*	*P−Value*	χ^2
0.0824	13.8934	1.74	0.0070	3.2238	0.2841	1.7244

Table 7: The first hypothesis results of the study with using of fixed-effects.

Dependent variable: Liquidity due to the number of shares traded				
Variable	Coefficient	T-Test	P-Value	Relation
Fixed component	-1.5966	-1.502	0.0000	Negative
Stock Market making	1.0277	1.375	0.0179	Positive
Difference between the proposed price and Stock	0.0130	1.139	0.2550	Meaningless
Systemic risk	0.0380	5.529	0.000	Positive
Stock trade boom period	-0.0428	-2.346	0.0194	Negative
Balanced equilibrium price differences	-0.0290	-2.640	0.0085	Negative
R^2 = 0.7828	F=17.1713		P-value= 0.000	

According to table 7 considering the significant whole model, the p-value (0.000) was smaller than 0.05 and the model is confirmed. Determination of coefficient model also indicate that 78.13 percent of the liquidity due to the number of shares traded variable are debated by the variables in the model.

Findings show that there is a coalification relationship between Stock market maker and liquidity in Tehran Stock Exchange accepted companies. Other results are:

- There is relationship between Stock market maker and transaction count in Tehran Stock Exchange accepted companies.
- There is relationship between Stock market maker and stock buyers count in Tehran Stock Exchange accepted companies.
- There is relationship between Stock market maker and number of shares traded in Tehran Stock Exchange accepted companies.

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