

Reviewing the Relationship between Institutional Ownership and Outside Members of Board of Directors, and Liquidity of Common Stocks of Companies Quoted in Tehran Stock Exchange

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Abstract *Since some investors may need their investing financial sources immediately, in every financial market, the level of assets liquidity is considered as a basic issue in investment. By considering the effect of liquidity in discovering the assets` prices, distributing the financial risk, decreasing the costs of transactions, and determining the factors which affect it, is very important. This research reviews the effect of outside members of board of directors and institutional ownership, as the most important criteria of corporate governance, on liquidity of stocks. To do so, a number of 69 companies were chosen from Tehran stock exchange through screening method, in 2008-2011 time periods. In this research 7 different standards were defined for liquidity. We reached to evidences that show the number of outside members of board of directors has no effect on liquidity and institutional ownership is not that effective on liquidity. The results indicate that, since among 7 standards of liquidity, 4 standards have a negative and significant relationship with institutional ownership, we can say that: there is a negative and significant relationship between institutional ownership and liquidity of stocks.*

Key words Liquidity, outside members, institutional ownership, corporate governance, Tehran stock exchange

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1. Introduction

By forming the agency relationship, conflict is made between the interests of managers and interests of stock holders. It means that managers perform opportunistic behaviors and make decisions which are against the interests of stock holders. Berle & Means (1932) expressed that lack of corporate governance mechanisms, enables the managers to act according to their own interests instead of stockholders` interests. Appearance of institutional stockholders as an external solution for this issue is very important. Moreover, outside members of board of directors as an interior controlling factor can play a determinant role in corporate governance system. One of the main assumptions of agency theory is that employee and employer has conflict in their interests. There is a basic assumption in financial theories, which is the primary goal of companies, is to increase the wealth of stockholders, but it is not always correct in practice. It is possible that managers follow their own interests such as gaining the highest level of profit. Managers may intend to increase their own interests and it causes that they focus and invest on projects with short-term interests (especially when salary and rewards of managers are dependent to profit), and they do not care about long-term interests of stock holders. In big companies which are controlled directly by managers and indirectly by institutional investors, managers are under pressure for short-term interests; it may be against the interests of other stock holders. In such circumstances, managers are induced to obtain miscellaneous earnings, which again lead to decrease the value of interest of stock holders. Agency problem indicates the necessity of company management by stock holders.

For years, liquidity has been introduced as most important fields in creating financial innovations. Bankruptcy of financial funds, such as Askin investment management in 1994, and long-term investment management in 1998, has intensified the concentration of financial industry on liquidity in investment management process. Liquidity is a very important factor, and investors pay special attention to it when purchasing securities. Investors want a stock that they can easily sell it, so the liquidity of stocks is a factor which is effective when purchasing stocks. According to a theoretical opinion, it may be argued that we can leave transactions costs and other signs of liquidity in pricing the financial assets, because investors can choose to only make transactions in assets which their liquidity costs are low. So, when it is possible to amortize these costs in maintenance period, they are not that important. These arguments are made on assumptions such as liquidity costs are fixed and investors are sure about the trade time. New texts mention that these assumptions are not happened in reality. In other words, recent texts have experimentally proved that liquidity changes through time.

The purpose of this research is to review the relationship between the level of institutional ownership and outside members of board of directors, and liquidity of stocks of companies. In other words, we are looking to find out how institutional owners as controlling mechanism outside the organization and the number of outside members of board of directors as a controlling mechanism inside the organization, as key elements in agency theory, can affect on liquidity of stocks? It means if owners include different groups such as government, financial institutes, investment organizations, banks, and insurance companies, how will they act? And presence of which one of this combination is more effective in improvement of liquidity of stocks? Through answering to these questions, we can perform better actions in order to increase the liquidity.

2. Theoretical basics and history of research

One of the main performances of financial markets is to facilitate and accelerate the process of changing the assets to cash. This feature which is called liquidity is considered as vital artery of financial markets. Not having such a feature, decreases the attractions of financial markets. Accessing this goal is possible through participation of a broad spectrum of owners and applicants of financial assets with different levels of risk acceptance, utility and investing horizons in one side, and diversity of financial tools and presence of analysts, market makers and different types of financial intermediaries in another side. Therefore, operators of financial markets always try to increase the attractions of market and develop the participation of mentioned groups through improving mechanisms and rules, disclosure of information, and creating the atmosphere of asymmetric information, so that stock holders can obtain profits.

Liquidity is one of the main characteristics of stocks, which plays a significant role in decision-making of investors for buy or sell their stocks. The significance of liquidity is because investors demand more efficiency for accepting the risk of non-liquidity. They need a certain level of liquidity in order to sell or buy their stocks easily and without tolerating any additional costs. It is a long time that financial scholars believe that securities which have lower liquidity, should provide higher anticipated efficiency, so the prices of such securities should be lower.

Therefore, one of the main factors in making decisions about investing in securities is the liquidity of these securities. Sensible significance of this factor makes it so important to measure it. The intention of reviewing this issue is because the liquidity of stocks in stock exchange is one of the main concerns of investors. Researchers hope that reviewing the liquidity, which is sometimes determined as third dimension of decision-making, helps the appearance of future researches in this subject.

According to Gillan & Starcks (2003), institutional stock holders play a basic role in forming many changes in corporate governance systems. Since this group of investors owns a considerable portion of company stocks, they have a significant influence in these companies, and they can affect their procedures. Since institutional owners compose the largest group of owners, their role in observing decisions made by managers is very important.

Outside members of independent managers are professional and specialist. Their responsibility is to act in the environment where there is a representation problem between bound members and stock holders. Tasks such as specifying the rewards of executive managers, and supervising the replacement of senior managers, are some of their activities. Moreover, research texts indicate that outside members preserve the

interests of stock holders better, and they are a better representative for them. So, independent members control the agency issue.

Rubin (2007) concluded that liquidity decreases when the level of ownership and ownership concentration are increased. Chung et al. (2009) indicated that better corporate governance systems lead to decrease in price spread, and price changes are affected less by trade amount, and subsequently it has decreased the possibility of trades which are based on information.

Cueto (2009) indicated that those who possess large blocks of stocks cause that accessibility to floating stocks in market decreases and subsequently, liquidity of market decreases.

Eslami Bidgoli & Sarang (2008) found out that liquidity is one of the main factors in choosing portfolio in Tehran stock exchange. Izadinia & Resaeian (2010) concluded that there is no significant relationship between the difference of bid price of stocks and ownership dispersion.

Rahmani *et al.* (2010) in a research concluded that there is a positive and significant relationship between institutional ownership and liquidity of stocks, and concentration of institutional ownership causes decrease in liquidity of companies' stocks. These relationships have been reported both for trade factors such as amount of trades, percentage of floating stocks, and information factors such as price spread between supply and demand for stocks.

Moradzade *et al.* (2010) in a research found out that management of accruals has a negative and significant effect on liquidity of stocks, so that management of more profit leads to information asymmetry and transaction costs, and liquidity decreases.

Fartook Zade *et al.* found out that amount of trades and fluctuations of prices, are the main factors which affect the spread between the bid prices of trades. Moreover, it is indicated that time period of trades has a considerable effect on price spread.

3. Research Hypotheses

1. There is a significant relationship between the ownership percentage of institutional stock holders from company stocks and liquidity of common stocks.

2. There is a significant relationship between the percentage of outside members of board of directors and liquidity of common stocks.

4. Research variables

4.1. Independent variables

Institutional investors: it is called to natural and legal persons who possess a considerable portion of company stocks.

According to the act of board of directors of Tehran stock exchange approved in 19.09.2007, institutional investors include:

1. Banks and insurance companies;
2. Holdings, investment companies, pension funds, and funds registered in stock exchange;
4. State organizations, institutions, and companies,
5. The members of board of directors.

Percentage of institutional investors/owners criteria has been used as a standard for measuring the amount of institutional ownership

Outside members of board of directors: it is called to members who have no official responsibility in company, and act as representatives of total stock holders in board of directors. This criterion is used to review if corporate governance is weak or strong.

Percentage of outside members of board of directors to total members of board of directors is used as a standard to measure this variable

4.2. Dependent variables

Liquidity issue was introduced in the middle of 2001 as a very important issue in financial management.

Liquidity reflects the order flow on price. This effect can be shown in the form of a discount to a seller or a reward which a customer receives when performing market order. In other words, liquidity can be

defined as the speed of changing assets to cash. The liquidity speed of securities, which are favored by people in Tehran stock exchange, is high. In fact, lack of liquidity can affect the value of stocks negatively.

Liquidity of common stocks: the most common liquidity criteria which are used in the researches of Cueto (2009), Agarwal (2008), Rubin (2007), Gerald (2006), Wyss (2004), Izadinoa & Resaeian (2010), include:

- *The amount of transactions:* it is the number of transactions of a stock which has been calculated annually.

- *Value of transactions:* to obtain this criterion, first the daily price of each stock is multiplied in the amount of transactions of that day, and then annual mean is calculated from the value of daily transactions. (Wyss, 2004)

- *Turnover of the stocks:* this criteria show the number of turnover of stocks, and it is calculated using below equation, then the annual mean of this value is calculated (Badavar Nahandi & Molki Nezhad, 2010), (Saranj, 2008). By studying the above mentioned researches, it was specified that high level of this criteria shows the high level of liquidity.

$$\text{TURNOVER} = \frac{\text{NST}}{\text{NSO}} \times 100 \quad (1)$$

In which:

NST: the number of exchanged stocks;

NSO: the number of distributed stocks of company;

Turnover: the number of turn overs of stocks.

- *Criteria of non-liquidity of relative spread of stocks` prices:* since the bid prices can be changed any time, and since detailed information are not available in Tehran stock exchange, so just like the researches of Badavar Nahandi & Molki Nezhad (2010), Ghadiri Tlaghian (2010), Rahmani *et al.* (2010), Izadinia & Rasaeian (2010), in this research the best daily bid price is used for transactions. According to below equation, first this criteria is calculated daily, and then its annual mean has been calculated.

iSPREAD: the total number of relative price spreads for company i in period t;

AP (ask price): the best asked price of customer in period t;

BP (bid price): the best bid price of seller in t period.

- *Non-liquidity criteria of Amihud:* Amihud (2002) introduced a criterion for calculating liquidity power, which can be evaluated through using daily data regarding efficiency and amount of transactions.

The bigger amount of this criterion indicates that its liquidity is lower. Stocks which the ratio of their Amihud non-liquidity is high, have high level of price fluctuations. This criterion is calculated in the form of annual mean, and it has been used in the researches of Wyss (2004) and Kashani poor *et al.* (2010).

$$\text{ILLIQ}_t^i = \frac{1}{\text{Days}_t^i} \sum_{d=1}^{\text{Days}_t^i} \frac{|R_{td}^i|}{V_{td}^i} \quad (2)$$

R: is the efficiency of stock and it is calculated on this way:

$$R = (P_t - P_{t-1}) / P_{t-1}$$

P: daily price of stock

V_{td}: the amount of transactions in day d of the month t;

Days: the number of transaction days of stocks i in month t.

- *Amivest liquidity criteria:* efficiency of stock is calculated just like Amihud criteria. For each year, this criterion is obtained through below equation (Rahmani *et al.*, 2010).

Amivest= (stock efficiency/the value of transactions)

- *F-ratio:* This criterion is calculated through dividing transactions value to waiting time. Waiting time of transactions is the average waiting time between two consecutive transactions in a day. Waiting time is calculated through dividing the number of transaction days of stock exchange (in the research of Rahmani *et al.* (2010) the number of transaction days of stock exchange is considered to be 240 days a year), to the number of days of transactions of each company`s stocks in a year.

4.3. Control variables

In order to determine other factors which in research analysis affect the dependent variable, and by considering the review of research texts, the following control variables have been considered.

- *Stock price*: just like the researches of Izadi niz & Resaeian (2010), and Ahmad poor & Resaeian (2006), the average of daily prices of stocks in annual periods has been used to calculate this criterion.

- *Fluctuation of efficiency*: This criterion is used as risk controlling index. Standard deviation of efficiency in annual period has been used to measure this criterion. Efficiency fluctuation of stock is calculated using below equation. In which p_t is the price of stock in day t (Mehrani *et al.*, 2003).

$$R = (P_t - P_{t-1}) / P_{t-1} \quad (3)$$

- *Company size*: the daily value of stocks market is calculated through multiplying daily price of stocks to the number of company stocks, and then annual average of natural logarithm of market value has been entered to model as company size criteria. (Izadi nia & Resaeian, 2010) and (Morad Zade *et al.* 2010).

- *The amount of stocks*: annual average of natural logarithm of daily transactions amount, is a criteria to calculate the amount of stocks which are sold or bought. (Rahimian *et al.*, 2009).

- *The percentage of transactions days*: it is calculated through dividing the number of days that desired stock is sold or bought; to the number of days that stock exchange is active in a year. This criterion has been used in the researches of Izadinia & Resaeian (2010), and Ahmad poor & Resaeian (2006) as control criteria.

- *The number of stockholders*: according to suggestion of Izadinia & Resaian (2010), the number of stock holders of a company may be a factor which affect the liquidity of that company's stocks. So, this criterion is used as control variable.

4.4. Research method

This research is a descriptive research and since it is based on generalizing the information of small portion of society as sample, and since variables are studied without manipulation, it is an inductive research. Survey method is used in this research through using historical information.

4.5. Data collection method

The required information of this research are historical information and are collected through different sources such as CD's of Tehran stock exchange.

4.6. Research domain

Subject domain of this research is limited to companies which have been active in Tehran stock exchange since 2008 until the end of 2011. The number of these companies is 350, and they are classified in 39 industries. (Economic world newsletter), and time period of this research is considered 2008-2011.

4.7. Research population

Population of this research includes all quoted companies in Tehran stock exchange since 2008 until the end of 2011.

4.8. Statistical sample

In order to test the assumptions, sample was chosen among the companies which had following qualifications:

1. They have been quoted in Tehran stock exchange before 2008, in order to homogenize the statistical sample.
2. In order to increase comparability, their financial year is ended in April 18, and they are not changed in research time period.
3. The research required data are totally available.
4. They are not banks, financial institutions (investment companies, financial intermediation, holding companies, and banks), because their financial disclosure, investment structure and leadership is different.

5. Their stocks are sold or bought minimum in 100 days of the year. This is a condition which Amihud (2002) emphasizes on it.

4.9. Model and method of data analysis:

Rubin`s adjusted regression model has been used to test the assumptions, that by considering the effective variables, there is a regression model for each liquidity criteria, so that in:

- Model 1; the variable of numbers of transactions (TRANS),
- Model 2, variable of transactions`s value (VALUE),
- Model 3, variable of transactions` turn over (TURN),
- Model 4, variable of price spread (SPREAD),
- Model 5, variable of Amihud non-liquidity (AMIHUD),
- Model 6, Amivest variable (AMIVEST),
- Model 7, variable of flow ratio (F-RATIO), are considered as dependent variables.

$$LIQUIDITY\ MEASURES_{i,t} = \alpha + \beta_1 OPER_{i,t} + \beta_2 OUTDIR_{i,t} + \beta_3 NINST_{i,t} +$$

$$\beta_4 SIZE_{i,t} + \beta_5 PRICE_{i,t} + \beta_6 DAY_{i,t} + \beta_7 VOLATIL_{i,t} + \beta_8 VOL_{i,t} + \epsilon_{i,t}$$

LIQUIDITY MEASURES_{i,t}= different criteria of liquidity (7 criteria) for company i in period t.

OPER_{i,t}= ownership percentage of institutional owners from stocks of company i in period t (independent variable).

OUTDIR_{i,t}= percentage of outside members from total members of board of directors (independent variable). NINST_{i,t}= the number of stock holders of company i in period t (control variable).

SIZE_{i,t}= the size of company i in period t (control variable).

PRICE_{i,t}= the stock prices of company i in period t (control variable).

VOLATIL_{i,t}= efficiency fluctuations of company i in period t (control variable).

VOL_{i,t}= the volume of traded stocks of company i in period t (control variable).

ε_{i,t}= error sentence ofr company i in period t.

a= fixed amount.

β_i= coefficient of variables in regression model.

Descriptive statistics, regression, solidarity, Kolmogorov-Smirnov test (K-S test), Durbin-Watson test, F-fisher test (F test), t test, and the linear test are used in this research.

4.10. Test results

Testing the normalization of variables

One of the conditions of fitting regression model is the normalization of variables distribution. So, before proceeding, normalization assumption should be tested. It can be done through several methods. Here, we test the normalization through K-S test and with assurance level of 95%. If in outlet board significant level of a variable is more than 5%, it indicates that distribution of variables is normal, unless it is not normal. In table 1, it is illustrated that variables that their significant level is less than 5%, does not have normal distribution.

Table 1. normal distribution of variables

Result: reject or approve the normalization	Significant level	The amount of t test	Variables	
Reject	0.00	2.46	TRANS	Dependent variables: liquidity criteria
Reject	0.00	2.13	VALUE	
Reject	0.003	1.81	TURN	
Approve	0.708	0.702	SPREAD	
Reject	0.00	2.42	AMIHUD	
Reject	0.00	2.64	AMIVEST	
Reject	0.00	2.32	FRATIO	
Approve	0.088	1.25	OPER	Independent variables
Approve	0.60	0.76	OUTDIR	
Reject	0.02	1.51	PRICE	Control variables
Approve	0.45	1.37	VOLITIL	
Approve	0.87	0.59	SIZE	
Approve	0.25	1.01	VOL	
Approve	0.29	0.97	DAY	

Reject	0.00	2.53	NINST
K-T test to see if variables are normal or not			

As mentioned above, using regression model is dependent to normalization of distribution of variables. It was shown that a number of variables are not normal. In the following we decided to solve the problem of not being normal.

Studying research texts relating to stock exchange, it was indicated that in many cases, natural logarithm function has been used to calculate the amounts of variables. Moreover, by drawing the plot of the possibility of lognormal distribution, which is known as p-p plot for abnormal variables, it was indicated that data are so close to lognormal line. In plot 1, as a sample of p-p plot, turnover of transactions are shown.

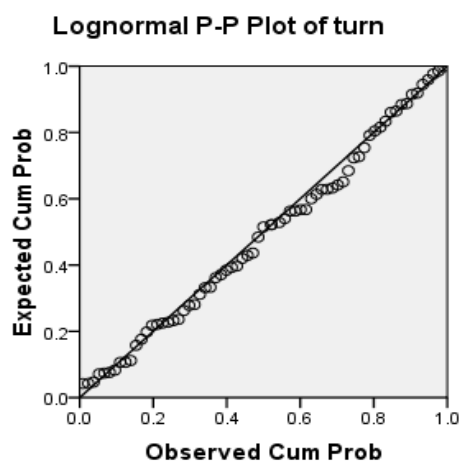


Figure 1. Plot 1 (p-p)

Table 2. Normal distribution of logarithm

Result: approve or reject normalization	Significant level	The amount of z test	Variables	
Approve	0.15	1.13	TRANS	Dependent variables: liquidity criteria
Approve	0.40	0.89	VALUE	
Approve	0.22	1.04	TURN	
Approve	0.17	1.10	AMIHU	
Approve	0.68	0.72	AMIVEST	
Approve	0.56	0.78	FRATIO	
Approve	0.51	0.81	PRICE	Control variables
Approve	0.75	0.67	NINST	
K-S test, which is obtained through logarithm conversion, to see if the variables are normal or not				

It is obvious that data distribution indicates the strong relationship with distribution line of lognormal. This line fits the collection of points well, and it is a proper conducting line for these points. So, this variable has lognormal distribution.

So, in this research natural logarithm conversion was used, and normalization of new form of variables was approved through K-S test, which is shown in table 2. This table shows that significant level of all variables is more than 5%. So, normalization of variables can be approved by assurance level of 95%. Since variables are normal, we can use regression.

Significance of regression models

By considering table 3, the amounts of F test, and significant level of models, which is less than 5% for all models, it is concluded that all of the models are significant.

Table 3. Significant level of models

LIQUIDITY MEASURES= $\alpha + \beta_1 \text{OPER}_{i,t} + \beta_2 \text{OUTDIR}_{i,t} + \beta_3 \text{NINST}_{i,t} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{PRICE}_{i,t} + \beta_6 \text{DAY}_{i,t} + \beta_7 \text{VOLATIL}_{i,t} + \beta_8 \text{VOL}_{i,t} + \epsilon_{i,t}$								
Model 7	Model 6	Model 5	Model 4	Model 3	Model 2	Model 1	Model no.	Regression models
85.25 0.00	59.65 0.00	33.08 0.00	13.02 0.003	5.71 0.00	86.22 0.00	267.64 0.00	F test Significance	Variance analysis
0.89 0.88	0.78 0.77	0.67 0.65	0.44 0.41	0.31 0.25	0.87 0.86	0.955 0.951	R ² (adj R ²)	Model explanation power

The amounts of R² indicate the high power of control and independent variables to explain variability in dependent variable. As you can see, the amount of R² in model 1 is 0.95, in model 2, 0.87, in model 6, 0.78, and in model 7, 0.89, which are very high, and they indicate the high power of this model in explanation of change in dependent variable. By considering the high solidarity and influence of dependent variables of this model from independent variables, such amounts are not inaccessible. Other models also show high explanatory power.

The results of regression models

By reviewing and comparing t values obtained from below charts with $t_{\alpha/2, n-1}$, or comparing significant level of 5% in models, the following results are obtained:

• The results of model 1

In this model, the number of transactions (TRANS) as one of the criteria of liquidity is dependent variable. For independent variables of OPER and OUTDIR, the significant level is more than 5%, so 0 numbers cannot be rejected. It indicates that there is no significant relationship between the percentage of institutional owners and number of outside members of board of directors, and liquidity of stocks. So, the coefficients of these variables are not significant and are not entered to model.

Significant levels of control variables of price of stocks (PRICE), transaction volume of stocks (VOL), and the number of stock holders of company (NINST) are less than 5%. So, the coefficients of these variables are significant and are entered to the model. Since other variables were not qualified to enter the model, they are not mentioned in the column related to model 1. By the way, Durbin-Watson test of this model is equal to 2.05, and it is placed in distance of 1.5 to 2.5

After performing the required adjustments in the main model and removing non-effective variables, model 1 has been rewritten with acceptable coefficients, which can be seen at the end of table 4.

• The results of model 2

In this model, the variable of transactions value as a liquidity criterion is dependent variable. According to the table related to independent variables of OPER and OUTDIR, it is indicated that significant level of OPER variable is less than 5%, and significant level of OUTDIR variable is more than 5%. So, the coefficient of the first variable is entered to the model and the coefficients of the second variable cannot be entered to the model. In this model, assumption number 1 is approved with assurance level of 95%. It means that there is a significant relationship between the percentage of institutional ownership and liquidity of stocks.

But the assumption number 2 is rejected. It means that there is no significant relationship between the number of non-bond members of board of directors and liquidity of stocks.

Significant levels of control variables of stock prices (PRICE), company size (SIZE), and transactions volume (VOL), are less than 5%. So, the coefficients of these variables are significant and are entered to the model. Since other variables were not qualified to enter to the model, they are not mentioned in the column relating to model 2. By the way, Durbin-Watson test in this model is equal to 1.68, and it is placed in the distance of 1.5 to 2.5. After performing the required adjustments in the main model and removing non-effective variables, model 2 was rewritten with significant coefficients, which can be seen at the end of table 4.

Table 4. The results of models 1 & 2

Result	Autocorrelation	Liquidity criteria		Dependent variable		
Approve or reject the hypothesis	Amount of total tolerance of models	VALUE Model 2	TRANS Model 1	Control and independent variable		
Rejecting the first assumption in model 1 and approving in model 2	0.92	-2.69	-7.47	Fixed amount	C	
		-0.007	0.0002	Coefficient	OPER	
		-2.2	0.12	T test		
		0.031	0.89	Significant		
Rejecting the second assumption in models 1 and 2	0.86	0.48	0.168	Coefficient	OUTDIR	
		1.38	0.93	T test		
		0.17	0.35	Significant		
	0.57	0.616	0.236	Coefficient	PRICE	
		6.1	5.32	T test		
		0.00	0.00	Significant		
	0.86	---	---	---	Coefficient	VOLITIL
					T test	
					Significant	
	0.43	0.43	6.22	---	Coefficient	SIZE
					T test	
					Significant	
	0.34	0.62	0.799	Coefficient	VOL	
		9.1	24.28	T test		
		0.00	0.00	Significant		
	0.60	---	---	---	Coefficient	DAY
					T test	
					Significant	
	0.51	---	---	0.069	Coefficient	NINST
				1.92	T test	
				0.051	significant	
Durbin-Watson test in model 2		Durbin-Watson test in model 1				
1.68		2.05				

• **The results of model 3**

In this model, the variable of transactions turn over as a liquidity criterion is dependent variable. According to table 5, significant levels of independent variables of OPER and OUTDIR are more than 5%, so the zero assumption cannot be rejected. It indicates that there is no significant relationship between the percentage of ownership of institutional owners and the number of outside members of board of directors with liquidity of stocks. So, the coefficients of these variables are not significant in this model, and they are not entered the model.

Significant levels of control variables of stock prices (PRICE), company size (SIZE), and stock transaction volume (VOL) are less than 5%. So, the coefficients of these variables are significant in this model and can enter the model. Since other variables were not qualified to enter the model, they are not mentioned in column related to model 3. By the way, Durbin-Watson test in this model is equal to 2.13, and it is placed in the distance of 1.5 to 2.5. After performing the required adjustments in the main model and removing non-effective variables, model 3 was rewritten with acceptable coefficients, which can be seen at the end of table 5.

• **The results of model 4**

In this model, price spread variable, as non-liquidity criteria, is dependent variable. For independent variable of OPER, significant level is less than 5%, so zero assumption cannot be accepted. It indicates that there is a positive and significant relationship between the ownership percentage of institutional owners and non-liquidity. Since price spread variable is a non-liquidity criterion, this relationship can be expressed in another way. We can say: there is a negative and significant relationship between the ownership percentage

of institutional owners and liquidity, and since the coefficient of this variable is significant, it enters to the model.

Significant levels of control variables of stock transaction volume (VOL), and percentage of transaction days (DAY), are less than 5%. So, the coefficients of these variables are significant in model, and are entered to the model. Since other variables were not qualified to enter to the model, they are not mentioned in the column related to model 4. By the way, Durbin-Watson test in this model is equal to 1.87 and it is placed in the distance of 1.5 to 2.5.

After performing the required adjustments in the main model and removing non-effective variable, model 4 was rewritten with acceptable coefficients, which can be seen at the end of table 5.

Table 5. The results of models 3 & 4

Result	Liquidity criteria		Dependent variable	
	SPREAD Model 4	TURN Model 3	Control and independent variable	
Rejecting the first assumption in models 3 and approving in model 4	0.313	-4.591	Fixed amount	C
	0.005	-0.005	Coefficient	OPER
	4.28	-0.92	T test	
0.028	0.36	Significant		
Rejecting the second assumption in models 3 and 4	-0.021	0.773	Coefficient	OUTDIR
	-0.17	1.28	T test	
	0.86	0.20	Significant	
	---	0.682	Coefficient	PRICE
		3.93	T test	
		0.00	Significant	
	---	---	Coefficient	VOLITIL
			T test	
			Significant	
	---	-0.524	Coefficient	SIZE
		-4.41	T test	
		0.00	Significant	
	-0.05	0.575	Coefficient	VOL
	-3.17	4.94	T test	
	0.002	0.00	Significant	
	-0.591	---	Coefficient	DAY
	-3.41		T test	
	0.001		Significant	
	---	---	Coefficient	NINST
			T test	
			significant	
	Durbin-Watson test in model 4	Durbin-Watson test in model 3		
	1.87	2.13		

• **The results of model 5**

In this model, Amihud variable as non-liquidity criteria is dependent variable. According to table 6, significant level of independent variable of OPER is less than 5%, so zero assumption is rejected. It indicates that there is a positive and significant relationship between the ownership percentage of institutional owners and non-liquidity. Since Amihud criteria is a non-liquidity criteria, so we can say that:

There is a negative and significant relationship between the ownership percentage of institutional owners and liquidity.

So, the coefficient of this variable is significant in this model and it is entered to the model. Since significant level of OUTDIR is more than 5%, the second assumption is rejected.

Significant levels of control variables of stock efficiency fluctuation (VOLITILE) and stock transaction volume (VOL) are less than 5%. So, the coefficients of these variables are significant in this model, and they are entered to the model. Since other variables were not qualified to enter to the model, they are not

mentioned in the column related to model 5. By the way, Durbin-Watson in this model is equal to 1.78, and it is placed in distance of 1.5 to 2.5.

After performing the required adjustments and removing non-effective variables, model 5 was rewritten with acceptable coefficients, which can be seen at the end of table 6.

• **The results of model 6**

In this model, Amivest variable as liquidity criteria is dependent variable. According to table 6, significant levels of independent variables of OPER and OUTDIR are more than 5%, so zero assumption cannot be rejected. Therefore, it can be said that there is no significant relationship between the ownership percentage of institutional owners and the number of outside members of board of directors with liquidity of stocks. So, the coefficients of these variables are not significant in this model and they cannot be entered to the model.

Significant levels of control variables of stock prices (PRICE), and company size (SIZE) is less than 5%. So, the coefficients of these variables are significant in this model and can be entered to the model. Since other variables were not qualified to enter the model, they are not mentioned in the column related to model 6. By the way, Durbin-Watson test in this model is equal to 1.88, and it is placed in the distance of 1.5 to 2.5.

After performing the required adjustments in the main model and removing non-effective variables, model 6 is rewritten with acceptable coefficients, which can be seen at the end of table 6.

Table 6. The results of models 5 & 6

Result	Liquidity criteria		Dependent variable	
Approve or reject the hypothesis	AMIVEST Model 6	AMIHUD Model 5	Control and independent variable	
Rejecting the first assumption in models 5 and 6	-13.7	-2.46	Fixed amount	C
	-0.004	0.002	Coefficient	OPER
	-0.67	1.77	T test	
	0.50	0.047	Significant	
Rejecting the second assumption in models 5 and 6	0.521	0.582	Coefficient	OUTDIR
	0.85	0.29	T test	
	0.39	0.77	Significant	
	0.277	---	Coefficient	PRICE
	2.18		T test	
	0.33		Significant	
	---	0.131	Coefficient	VOLITIL
	---	5.36	T test	
	---	0.00	Significant	
	1.203	---	Coefficient	SIZE
	14.001		T test	
	0.00		Significant	
	---	-1.1	Coefficient	VOL
	---	-10.53	T test	
	---	0.00	Significant	
	---	---	Coefficient	DAY
	---	---	T test	
	---	---	Significant	
	---	---	Coefficient	NINST
	---	---	T test	
	---	---	significant	
	Durbin-Watson test in model 6		Durbin-Watson test in model 5	
	1.88		1.78	

• **The results of model 7**

In this model, Amihud variable as non-liquidity criteria is dependent variable. According to table 7, it is indicated that significant level of independent variable of OPER is less than 5%, and significant level of

independent variable of OUTDIR, is more than 5%. So, the first variable is significant and it is entered to the model, and the second variable cannot be entered to the model. In this model, the first assumption is approved with assurance level of 95%. It means that there is a negative and significant relationship between the percentage of institutional ownership and liquidity of stock. But the second assumption is rejected. It means that there is no significant relationship between the number of outside members of board of directors and liquidity of stocks. Significant levels of control variables of stock prices (PRICE), company size (SIZE) and stock transaction volume (VOL) and percentage of transaction days (DAY) are less than 5%. So, the coefficients of these variables are significant in this model and they are entered to the model. Since other variables were not qualified to enter to the model, they are not mentioned in the column related to model 7. By the way, Durbin-Watson test in this model is equal to 1.85 and it is placed in the distance of 1.5 to 2.5

After performing the required adjustments in the main model and removing non-effective variables, model 7 were rewritten with significant coefficients, which can be seen in table 7.

Table 7. The results of model 7

Result	Liquidity criteria	Dependent variable	
Approve or reject the hypothesis	FRATIO Model 7	Control and independent variable	
Approving the first assumption in model 7	1.676	Fixed amount	C
	-0.007	Coefficient	OPER
	-2.06	T test	
	0.043	Significant	
Rejecting the second assumption in model 7	0.492	Coefficient	OUTDIR
	1.34	T test	
	0.85	Significant	
	0.624	Coefficient	PRICE
	5.93	T test	
	0.00	Significant	
	---	Coefficient	VOLITIL
		T test	
		Significant	
	0.482	Coefficient	SIZE
	6.58	T test	
	0.00	Significant	
	0.625	Coefficient	VOL
	8.28	T test	
	0.00	Significant	
	1.099	Coefficient	DAY
	2.18	T test	
	0.033	Significant	
	---	Coefficient	NINST
		T test	
		significant	
Durbin-Watson test in model 7 1.85			

5. Results

The results of testing the first hypothesis

by considering that among 7 criteria which are considered to measure the liquidity, 4 criteria including AMIHU, FRATIO, VALUE, SPREAD have a significant relationship with the level of institutional ownership, and since the criteria, which determine this relationship, are the most widely used criteria of liquidity in domestic and foreign texts, so that each one is used as dependent variable, it should be mentioned that two criteria including price spread (SPREAD), and Amihud are the criteria of non-liquidity, it means that its high level indicates the weakness of liquidity, and its low level indicates high liquidity. So, we can say that:

There is a negative and significant relationship between level of institutional ownership and liquidity of stocks. The results of this assumption are acceptable with assurance level of 95%. The results of this research are consistent with the results of the researches of Agarwal (2008), Agarwal (2009), Sarin & Shastri (1999), and Petrask (2011), and it is not consistent to the results of Rahmani *et al.* (2010) and Rahimian *et al.* (2009) researches. This inconsistency can be caused by the difference in calculation method of institutional ownership level, because in this research the instructions of stock exchange is used which is different from the definition presented by Rahmani.

The important point of this research is that the average of ownership level of institutional stock holders is equal to 68.1% of total distributed stocks of companies. According to the results of Agraval (2008), that by increasing the level of institutional ownership from 35%-40%, the relationship between institutional ownership and liquidity will be negative, we can explain the large amount of inconsistencies in texts related to the relationship between liquidity and institutional ownership level. As a very important result of this research we can say that:

In the levels below 35%-40%, the relationship between institutional ownership level and liquidity is positive, but by increasing this level higher than 35%-40%, this relationship will be negative.

This event may be related to this issue that in high levels of ownership, the level of ownership concentration increase and according to research texts it leads to decrease in liquidity. By studying the results of other related researches, it seems that increasing the level of institutional ownership to a certain level, will improve the liquidity of stocks, but if it exceeds from this level liquidity will be decreased. Moreover, Naseri (2010), obtained similar results about the level of institutional ownership and profit manipulation.

The results of testing the second hypothesis

There is no significant relationship between the number of outside members of board of directors and liquidity of stocks.

The results of this assumption are consistent with the researches of Rahimian *et al.* (2009), Ghanbari (2007), and generally no relationship was seen between the no. of outside members of board of directors and liquidity.

Research recommendations

According to the results of this research, below recommendations are presented:

1. By considering the importance of corporate governance and also considering that these researches are new in Iran, we recommend that stock exchange force the companies to report the members of their board of directors and stock holders, because in some cases lack of information was obvious.

2. The presence of outside members of board of directors has no effect on liquidity of stocks. This result may be resulted from this fact that in Iran, board of directors is controlled by company manager, and outside members have not power to observe the company procedures. So, by considering the necessity of these systems in other countries, Tehran stock exchange should make decisions in this regard.

3. Training the members of board of directors to make them familiar with the effects of corporate governance in improving the financial performance of companies, because Iranian companies have a considerable distance with the issues of modern corporate governance.

4. It seems that the ownership structure of companies is not optimized in Iran. So, we should do something to approach to this optimized structure. Institutional investors access to secret information that leads to asymmetry of information between institutional investors and other investors. It seems that in order to decrease this problem, the existing rules should be modified.

5. By considering the mentioned issues in the results of assumption number 1, stock holders should pay attention to the level of institutional ownership when choosing stocks. They should know that stocks which have an acceptable level of institutional ownership are good stocks.

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