

Evaluation of the Relationship between Investment and Stock Liquidity of Listed Companies in Tehran Stock Exchange

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Abstract: One of the most challenging issues of the current age is the issue of economic development, so that its realization has become one of the main economic and political goals of the countries. Investment is one of the factors influencing sustainable economic growth and development. In fact, investment is one of the most important economic variables, discussed as a major issue. Investment is an activity in the form of using funds, which can create a profitable future. In this study, the relationship between investment and stocks liquidity of listed companies in Tehran Stock Exchange was evaluated. In this regard, the effects of investment, company size, stocks price, daily profit volume, annual profit volume and the annual financial balance on the stocks liquidity was evaluated.

In order to answer the research questions, six hypotheses were developed and the statistical population included 75 listed companies in the Tehran Stock Exchange during the five-year period of 2011-2016. They were selected and tested using systematic elimination method. Data were collected using Excel software and analyzed using EVIEWS software. The results of the research indicate that the rate of investment, company size, stock price, daily profit volume, annual volume of profit and annual financial balance affect the stocks liquidity of companies.

Key words: Investment, stocks liquidity, company size, stocks price, profit volume, annual financial balance.

Introduction

Investments are among the factors influencing sustainable economic growth and development. In fact, investment is one of the most important economic variables, which have always been discussed as a major issue. Investment is an activity in the form of using funds, which can create a profitable flow in future. Based on this definition, each of the cases of commitment of funds of assets, physical assets, and manufacturing activities will mean investment. Financial assets include bank deposits, purchase of national bonds and corporate bonds, purchase of stocks for the aim of acquiring profits. In this study, the investment means change in the net fixed assets in a financial period. From the capital market perspective, as long as there is investment projects with returns exceed their required cost, the company will use its kept revenues to finance them. If the revenues of the institution remain after funding all investment opportunities, the revenues would be distributed among the shareholders. However, if the investment opportunities are more than the company's revenues, the company will have no way just issue new stocks or take loan. Nowadays, with the expansion of the quality level of activities and development of economic affairs, financial decisions of companies are

among the most complicated issues considered important for beneficiaries in line with gaining the highest returns and utility. In this regard, financial managers seek to find the relationship among these key factors in the companies (Aon & Huang, 2008). An economic unit should consider the level of investment with regard to restricted resources to invest in different projects, and the important point which has been investigated extensively in recent years is determining the optimal level of investment by companies so that they can define and calculate an effective investment and create value for the company (Verdi, 2006).

Liquidity is one of the important dimensions of the optimal allocation of resources. The liquidity capability refers to closeness of financial asset to cash. The liquidity capability of a financial asset is evaluated through its ability to convert that asset to cash at any time without loss of profit. Tradable securities can be converted into cash through sufficient sales in market at any time, but there is no guarantee against loss. One of the most important functions of financial markets, especially the capital market, is the conversion of assets into securities, and then increasing the liquidity capability and securities, and reducing liquidity risk. By optimal combination of capital and money tools, financial markets

facilitates access to cash and they make the securities market space an safe and interesting space for people through improving the mechanisms and setting the rules and regularities. Accordingly, people funds are introduced and used in manufacturing areas and they make profit from manufacturing activities. All of these would be feasible, if some conditions are provided and liquidity is high (Saeedi, 2010). Nowadays, given the economic conditions and fluctuations of the stock market index, appropriate performance of liquidity financial markets, as one of the important decision making components in the stock exchange, has more importance. Factors such as the number of stock purchasers, the number of days in which company's stocks are traded, and mean daily volume of trades to total stocks issues affect the level of liquidity. Liquidity plays an important role in micro and macro levels. The central bank has a set of monetary policy tools to manage the liquidity, including legal deposits ratio, re-discount rate, open market operations, and change in financial ratios, which change interest rates and money volume (Derakhshan, 2010). One of the most important factors considered highly by investors of capital markets is liquidity of stocks. Liquidity is one of the main functions of the stock market, and investors always want a stock which can be traded at the lowest possible cost (Saeedi and Dadar, 2009). Investors expect returns because of the inherent risk of investment. Thus, knowledge of risk and return on investment has particular importance for investors. The lack of liquidity of a financial asset is considered in fact a risk for it, which investors are expected to acquire in exchange for accepting the return risk (Ghaemi and Rahimpour, 2010). Therefore, the tendency to examine this issue is due to the fact that stocks liquidity in the stock market is one of the main concerns of investors. As a definition, it can be said that liquidity is the ability of investors to convert financial assets to cash at the same price with the last transaction (Bighdeli et al., 2005). However, the main issue of the research, considering the importance of investing in listed companies in stock exchange and stocks liquidity and the role of these two variables in stock exchange transactions, this research was conducted to provide a suitable model to examine the relationship between investment and stocks liquidity in listed companies in Tehran Stock Exchange. In fact, the paradigm of examining the relationship between investment and stocks liquidity in listed companies in the stock exchange is one of the management challenges in the securities stock market. This research attempts to evaluate the relationship of these variables and present a suitable model and suggestions for it.

Review of Literature

Liquidity

According to Gregorio and Engin (2010), liquidity of stocks is the ability to transact quickly, if it has low price effect. In his view, the importance of stocks liquidity is positively and

significantly associated with transactional costs and rewards of their investors' view. According to Robin (2007), the liquidity of an asset is the ability to purchase or sell that asset in the shortest possible time and expense. Although this term is largely perceivable and understandable, in many financial texts, liquidity is referred to as an easy and unobtrusive concept, which means that while understanding it is easy, measuring and calculating it is so complex. One of the most important functions of the capital market is liquidity. In fact, secondary markets decrease the cost of capital through discovery of price and ability to transfer risk while providing liquidity. Liquidity or marketability are vital aspects of the securities transaction and is one of the important factors in pricing assets, which has a strong impact on their prices. In fact, liquidity at the sense of rate of conversion of investments or assets has a strong impact on their prices. In fact, liquidity means the rate of conversion of investments or assets to cash at a minimum cost and in the shortest time, which plays an important role in the attractiveness of investment, investors' decision making, and the proper allocation of resources. The lack of liquidity means liquidity risk, which may have a negative impact on stocks prices, as risk-averse investors require return for the risk imposed on them and they prefer to invest in securities, which have higher liquidity. Thus, the liquidity risk is one of the main paradigms of the financial market, which maximization of shareholders' wealth depends on it (Safari, 2010). Amihud and Mendelssohn (1988) argue that an increase in stocks liquidity is positively associated with increased investment in market, as financial assets of the companies are reduced at a lower cost of capital when the liquidity of the capital market increases.

Liquidity and Investment

In an article on stocks market liquidity and macroeconomic shocks of liquidity, Flurakis et al. (2014) provided an evidence of financial crisis of 2007-2009 in an empirical framework, which associates micro liquidity, macro liquidity and stocks returns. They found evidence on a strong link between macro liquidity shocks and UK stock returns based on micro liquidity measures between 1999 and 2012. Markus and Deb (2014) examined the relationship between corporate governance and stock liquidity. The results of this study indicate that with increasing the corporate governance mechanisms, information asymmetry decreases and stocks liquidity increases. In an article entitled "monetary policy and its effect on stock market liquidity", Amador and Peter (2013) found that expansionary monetary policy by Central Bank of Europe has led to an increase in stocks market liquidity in the three euro area countries (France, Germany, and Italy). In a research entitled "Dividend Policy, a set of investment and financing opportunities for a company operating in the Malaysian Industrial Products Industry", Shah Teimuri et al. (2013)

concluded that a set of investment opportunities and debt deadline are factors, which can have significant effect on dividend payment of the selected companies. In addition, profitability and risk played an important role in determining the dividend policy in the sector of Malaysian Industrial Products. Lashowski and Voronka (2012) examined whether stock liquidity along with company size and value is one of the important factors affecting the stocks market. The results of their research indicate that, unlike what is expected, stock liquidity is not significantly affected by stock returns, compared to stock value and company size. Sadka (2011) examined the relationship between stock liquidity and accounting information in New York Stock Exchange. In this research, he showed that by reducing the risks related to accounting information, resulted by increasing the quality of accounting information, the company's stock would be reliable attractive, and leading to increased stock liquidity. Lam and Tom (2011) evaluated the impact of stock liquidity on capital asset pricing. Their results show that stock liquidity can be considered as another factor in asset pricing models. In their view, the best model to evaluate the risk associated with stock returns is market stock, company size, ratio of book value to stock market value, and stock liquidity. In a research entitled "a set of investment opportunities and decision-making policies, Perm (2011) examined the relationship between financial leverage, dividend, and growth opportunity and results showed a positive relationship between financial leverage and growth opportunity and a negative relationship between dividend and growth opportunity. He argued that a set of investment opportunities or the growth opportunities is related to organization's opportunities and opportunities available in the economy to create a the related value, and when managers have a better understanding of decision-making policies, the possibility for improvement or creation of the value for an organization increases. Jacobi and Zheng (2010) examined the relationship between the dispersion of ownership of block stock percentage in the hands of shareholders and stock liquidity. Their research results showed that more ownership dispersion leads to improved liquidity of the stock.

Hertz and Orays (2010) examined the time of investment, liquidity, and debt representation cost. They argue that the change in investment policy is due to conflict of interests between the creditor and the shareholder, which is related to the financial leverage of the company. In companies where there are nit cash benefits, investors tend to under invest due to lack of transfer of benefits to creditors, not due to financial restriction. In contrast, they invest more in companies which have high liquidity due to the advantages of substitution and the incentive to transfer risk. Heflin (2006) stated that information quality is important for market liquidity. Accounting disclosure as a means of reducing information asymmetry among exchangers increases the ability of exchangers for effective stock

trading, when needed, and at reasonable costs. Varan et al. (2006) indicated that by increasing the quality of financial reporting, the possibility of attracting more investors would be greater, since they would be more ensured on stock exchange equity at fair prices, and this factor increases the value of exchanges in the capital market, called as increased liquidity of the capital market. Baker et al. (2006) evaluated the relationship between stock liquidity and investment opportunities in the environment. They showed that an increase in stock liquidity and a reduction in capital costs as a result of the index adjustment led to an increase in investment opportunities, and their empirical findings show that increasing liquidity leads to a better prediction of the net present value of investment projects and investment opportunities. Emam Pour and Razdar (1396) examined the impact of liquidity on the level of investment in companies. The results of regression analysis revealed that cash flow, past operating income, operating profit, and the ratio of debt to tangible fixed assets have a positive and significant effect on the investment level of companies, but future operating income does not have a significant effect on investment of companies. Shahrian and Heydari (1395) examined the investments resulting from liquidity in investment funds. The results showed that the degree of return of emotions is positively related to proxy for demand shocks and it is related to the institutional owners of investment funds, their liquidity and the measurement of market uncertainty density.

Zaeri Amirani (2016) examined the effect of liquidity on dividend and level of investment in listed companies in Tehran Stock Exchange. The results of this research revealed a direct relationship between the company's liquidity and level of dividend and company investment. Abbaspur (1395) investigated the effect of capital structure on liquidity and investment growth opportunities in listed companies in Tehran Stock Exchange. The results of the hypothesis test showed that financial leverage has a significant effect on liquidity and growth opportunities. However, hypothesis 3 which suggests that the financial leverage has a significant effect on the ratio of cash flow to net profit is rejected. In this research, the variables of sales growth and company size were used as control variables. These variables are inversely correlated with the capital structure. Khosandam et al (2015) examined the relationship between investment and liquidity fluctuations. The results of the research revealed a negative and significant relationship between short term current investment and liquidity fluctuations in listed companies in Tehran Stock Exchange given three general states of financial restriction, negative liquidity growth, and positive liquidity growth. As the value of test statistic in the three above states was higher than the critical value and the probability level was less than 0.05, the null hypothesis was rejected and the opposite hypothesis (co-integration and long-term relationship between variables) was accepted. These results suggest a strong long-

term relationship between variables. Eslami Bidgoli et al (2014) examined Iran's capital market and factors affecting annual returns of joint investment funds. The results of data analysis through panel structure showed that the number of industries in the fund investment basket has no significant impact on the fund return. However, the variables such as the growth rate of fund assets, the number of issue of fund units, the cash held by the fund, the percentage of ownership by legal entities, the number of revocation of investment units and the growth of the market index had a significant effect on the return of joint investment funds in Tehran Stock Exchange. Saedi et al (2014) examined the effect of capital financing practice and company liquidity flow on investment decisions in capital assets. The results of the model testing showed that with increasing operating cash flow, the purchase of capital assets increases (the positive effect of operating cash flows on investment in capital assets), and with increasing the capital financing, the purchase of capital assets decreases. Sharif Gilani et al. (2013) examined the effect of investment opportunities, profit management, free cash flows and financial performance on listed companies in Tehran Stock Exchange. The results revealed a significant relationship between cash flow and financial performance impact on profit management in the years 2008-2009, while no significant relationship was found between cash flow and financial performance and the result of this relationship on investment opportunities.

Research hypotheses

1. The investment rate affects the liquidity of stock companies.
2. The factory size affects the liquidity of stock companies.
3. The stock price affects the liquidity of stock companies.
4. The daily profit volume affects the liquidity of stock companies.
5. The annual profit volume affects the liquidity of stock companies.
- 6-The annual financial balance affects the liquidity of stock companies.

Methodology

Using the historical data and multi-variable regression method, we tested the hypotheses. Statistical analysis was performed using Eviews software. The research population included listed companies in the Tehran Stock Exchange. The time domain of the study is a period of five year period from the beginning of 2011 to the end of 2016. In this research, given the nature of the research and some inconsistencies among the listed companies in the Tehran Stock Exchange, the systematic elimination sampling will

be used. The following inclusion criteria were used in this research:

1. They should not among the banks, financial, investment, holding and leasing institutions, since due to the nature of their particular activity, the relationship of the components studied in this research is different for such institutions and cannot be generalized to others.
2. The company should be listed in Stock Exchange by the end of 2011 and has not been excluded from the Stock Exchange during the years 2011-2016.
3. To observe the comparability, the company's fiscal year should be the last day of each year.
4. The company should not have financial year change from 2011 to 2016, and financial statements and information of companies should be available.
5. Information related to indices of stock liquidity, investment rate, and other research variables in the sample companies should be fully available.

According to the above mentioned criteria, 75 companies were selected as sample during the period from 2011 to 2016.

To test the hypotheses, the regression model will be used as follows:

$$AMH=\alpha+BINV+Y_1SIZE+Y_2PRC+Y_3TNV+Y_4REF+Y_5CB$$

Independent variable

INV: rate of investment

$$\sum \frac{(CapitalExpenditure+Acquisitions)}{(Depreciation)}$$

In the above equation, Capital Expenditure refers to expenditures imposed for acquisition of fixed and intangible assets, and Acquisitions represents a change in the sum of long-term investments over the period and depreciation of the stock depreciation.

SIZE: The size of the company calculated using the logarithm of the total cost in the last month of the fiscal year.

PRC: Stock price calculated by the stock price logarithm in the last month of the fiscal year.

TNV: The daily profit volume calculated by using the logarithm of the mean daily profit volume in the last month of the fiscal year.

REF: The annual profit volume calculated through the logarithm of the volume of dividends during the fiscal year.

CB: A financial balance of the stock companies during the fiscal year

Dependent variable:

AMH: Stock liquidity calculated through the daily cash flow logarithm of stock companies.

Data Analysis

In this section, using the regression analysis, the estimated model and hypotheses will be tested. If the value of the

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significant level is greater than 0.05, null hypothesis will be confirmed, and if it is less than zero, the null hypothesis will be rejected. The calculations are analyzed using the EViews statistical software. In order to use statistical methods and regression analysis, variables should have normal distribution. In Table 1, we examine the normalization of variables. The normality assumption is examined by Jarque-Bera test.

Table 1- Jarque-Bera tes

Variable name	Symbol	Jarque-Bera statistic	p-value
Financial balance	CB	4/23	0/12
Investment rate	INV	4/12	0/13
Stock price	PRC	4/32	0/12
Daily profit volume	TNV	6/79	0/03
Annual profit volume	REF	6/64	0/04
Stock liquidity	AMH	2/16	0/33
Company size	SIZE	1/30	0/52

P-value of the variables that is more than 0.05 indicates the normality of that variable, using the common methods for estimating the coefficients of the model is based on the assumption that the variables are stationary. Hence, before using these variables, it is necessary to ensure that they are stationary. If the variables are not stationary or they have a single root, T and Chi-square tests will not have required validity. In such a situation, the critical quantities provided by T and Chi-square would not be correct critical quantities for the test. In these tests, the null hypothesis indicates non-stationary and the opposite hypothesis indicates stationary. Many statistical tests are used for this purpose. In this research, the generalized Dickey Fuller unit root test is used to examine the stationary of the variables. The null hypothesis in the Dickey Fuller indicates the presence of unit root (non-stationary). Table 2 shows the results of this test.

Table 2: examining the stationary of variables

Variable name	Symbol	Test statistic	p-value	Result
Financial balance	CB	-10.34	0/000	stationary
Investment rate	INV	-9.12	0/000	stationary
Stock price	PRC	-9.03	0/000	stationary
Daily profit volume	TNV	-5.83	/000	stationary

Annual profit volume	REF	-8.35	0/000	stationary
Stock liquidity	AMH	-8.04	0/000	stationary
Company size	SIZE	-9.81	0/000	stationary

As the results of the unit root results suggest, as the significance level of all variables is less than 0.05, the null hypothesis on the presence of a unit root (non-stationary) is rejected, so all variables are stationary.

For design and estimation, we first performed the F Limmer, Hausman and VIF tests. Then, we examine Granger causality.

In the next step, the VAR regression vector is estimated to analyze the practical results of this model. In this model, to determine the optimal lag order of the VAR model, it is necessary to determine the number of co-integration vectors and also to determine the convergence rate of the studied variable.

To be able to determine if the use of panel data will be effective in estimating the model or not, F Limmer test is used, and to determine whether the panel data method requires a fixed effects or random effects, Hausman test is used. The VIF statistic is also used to examine the collinearity of variables. The results of the Limmer and Hausman tests are presented in Table 3.

Table 3: Results of the Limmer and Hausman and VIF tests

Test type	Test statistic value	p-value	Model type
<i>Limmer test</i>	1.256	0.001	Panel
<i>Hausman test</i>	2.347	0.022	Fixed effects
<i>VIF</i>	3.967	---	Lack of collinearity

The results of the Limmer and Hausman tests are presented in Table 3. Since the significance level of the two tests for all hypotheses is less than 0.05, the data are panel type at the level of 95%, and fixed effect method is used. In addition, as the value of VIF is less than 5, it is concluded that there is strong correlation between the variables.

Table 4 shows the results of the Granger causality test. This test only indicates if there is a long-term balanced relationship between the variables, but in the case of presence of such relationship, it does not say something on the exact number of long-term balanced relationships.

Table 4- Granger causality test

Variable name	Symbol	Test statistic	p-value
Financial balance	CB	1.716	0.635
Investment rate	INV	1.050	0.744
Stock price	PRC	1.517	0.574
Daily profit volume	TNV	1.955	0.092
Annual profit volume	REF	1.854	0.124
Stock liquidity	AMH	1.639	0.056
Company size	SIZE	1.770	0.089

According to Table 4, the significance level of all variables is greater than 0.05, so there is a relationship.

Table 5 relates to determining the optimal lag with the Schwartz-Bayesian criterion.

Table 5: Determining the optimal lag

Lag	Schwartz-Bayesian statistic
0	-1.234
1	-1.657
2	-0.728
3	0.498
4	1.865
5	1.685

According to Table 5, the optimal lag is 5. After determining the number of optimal lag and before using long-term modeling, we have to determine the number of co-integration vectors. For this purpose, we use the effect test and the maximum eigenvalue for determining the number of co-integration vectors, the result of which is given in the table below. The results of determining the co-integration vectors based on the maximum eigenvalue test the effect test are presented in Table 6.

Table 6: Convergence test results

	Effect test	Critical value	p-value	Maximum eigenvalue statistic	Critical value	p-value
r=0	60342	5.434	0.02 2	4.342	3.098	0.000
r<=1	5.124	3.451	0.17	3.765	2.043	0.006
r<=2	3.546	10.252	0.03 9	2.570	9.430	0.001
r<=3	1.714	8.487	0.00 0	1.362	7.554	0.000

According to Table 6, the presence of co-integration vector among the model variables is confirmed..

The null hypothesis of the KSS test indicates divergence, while its opposite hypothesis implies convergence. The results of this test are presented in Table 7.

Table 7: Determining the rate of convergence

Variable name	Symbol	T-KSS statistic	p-value
Financial balance	CB	1.267	0.000
Investment rate	INV	1.062	0.002
Stock price	PRC	1.163	0.001
Daily profit volume	TNV	1.664	0.018
Annual profit volume	REF	1.559	0.000
Stock liquidity	AMH	1.749	0.033
Company size	SIZE	1.620	0.016

As the significance level for all variables is less than 0.05, the null hypothesis is rejected, and the results show that the variables have a convergence property.

An analysis of the hypotheses of the regression model analysis

$$AMH = \beta_0 + \beta_1 INV + \beta_2 SIZE + \beta_3 PRC + \beta_4 TNV + \beta_5 REF + \beta_6 CB$$

Table 8- regression model fit

Variable	Symbol	Coefficient	T statistic	p-value
Constant coefficients	β_0	0.043	2.19	0.008
Investment rate	INV	0.24	2.64	0.019
Company size	SIZE	0.49	3.61	0.044
Stock price	PRC	0.69	2.11	0.001
Daily profit volume	TNV	0.15	3.42	0.003
Annual profit volume	REF	0.47	2.23	0.024
Financial balance	CB	0.37	4.13	0.000

Thus, the regression model is written as follows:

$$AMH = 0.43 + 0.24 INV + 0.49 SIZE + 0.69 PRC + 0.15 TNV + 0.47 REF + 0.37 CB$$

Results

Hypothesis 1:

Based on the Table 8, as the coefficient of rate of investment is 0.24 and as its significance level (p-value) is 0.019 and less than 0.05, we conclude that the rate of investment has an effect in the regression model. It means that the rate investment affects the liquidity of stock companies. Therefore, hypothesis 1 is confirmed.

Hypothesis 2:

Based on the Table 8, as the coefficient of company size is 0.49 and as its significance level (p-value) is 0.044 and less than 0.05, we conclude that the company size has an effect in the regression model. It means that the company size affects the liquidity of stock companies. Therefore, hypothesis 2 is confirmed

Hypothesis 3:

Based on the Table 8, as the coefficient of company stock price is 0.69 and as its significance level (p-value) is 0.001 and less than 0.05, we conclude that the company stock price has an effect in the regression model. It means that the company stock price affects the liquidity of stock companies. Therefore, hypothesis 3 is confirmed.

Hypothesis 4:

Based on the Table 8, as the coefficient of daily profit volume is 0.15 and as its significance level (p-value) is 0.003 and less than 0.05, we conclude that the daily profit volume has an effect in the regression model. It means that the daily profit volume affects the liquidity of stock companies. Therefore, hypothesis 4 is confirmed.

Hypothesis 5:

Based on the Table 8, as the coefficient of annual profit volume is 0.47 and as its significance level (p-value) is 0.024 and less than 0.05, we conclude that the annual profit volume has an effect in the regression model. It means that the annual profit volume affects the liquidity of stock companies. Therefore, hypothesis 5 is confirmed.

Hypothesis 6:

Based on the Table 8, as the coefficient of annual financial balance is 0.37 and as its significance level (p-value) is 0.000 and less than 0.05, we conclude that the annual financial balance has an effect in the regression model. It means that the annual financial balance affects the liquidity of stock companies. Therefore, hypothesis 6 is confirmed.

Conclusion

The high liquidity of stock companies is considered one of the important characteristics. Companies with good liquidity are interested by capital market applicants. Companies also have a special focus on capital markets in order to obtain their financial resources. Providing the financial resources (funding) needed to use investment opportunities is cost effective if there is high demand for company's stock. The objective of this study was to examine the relationship between investment and stock liquidity in listed companies in the Tehran Stock Exchange. The results of the data analysis show that the rate of investment, company size, stock price, daily profit volume, annual profit volume, and annual financial balance affect the liquidity of stock companies.

The results of this research are importance since:

- They simplify the investment and facilitate access to financial decisions.
- They facilitate customers' access to financial information through useful investing.
- They simplify the business processes of institutions and reduce costs through investment.
- They create a result-ordinated financial insight with regard to the variable of stock equity.
- They increase financial creativity through increased investment and attention to liquidity.

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