UTILIZATION OF BID-ASKED SPREAD MODEL AND LIQUIDITY IN EXPLANATION OF EXCESS STOCK RETURNS

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Abstract

Investment is vital for economy in the development path and collecting small and large capitals as well as constitution of appropriate capitals for economic activities are the requirements in this regard. Today, it is essential to emphasize on liquidity besides the risk and return due to the existing risks in financial markets and the investors and market activists' demand for cash. Therefore, the present study investigated the relationship between liquidity and three factors of Fama and French model with stock returns in Iran's capital market. To this end, the information of 72 companies listed in Tehran Stock Exchange during five years for the time period 2009-2013 was studied. The obtained results indicated a negative and significant relationship among risk premium, ratio of book value to stock market value and firm size with excess stock returns. Moreover, stock liquidity as risk premium factor has a negative and significant relationship in explaining the excess stock returns.

Key words: Stock Return, Liquidity, Risk Premium, Bid-asked Spread, Size, Ratio of Book Value to Stock Market Value

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1. Introduction

In the current world, investment is the basis of progress in each country and it should encourage the investors for investment especially in productive ones to create employment via more production and control the inflation. For a suitable investment, however, the risk should be controlled or decreased. One of the ways to control the investment risk is establishing a portfolio, because security analysis contains estimation of advantages of the individual investments while a composite analysis of investments and maintenance management includes a group of investments [3]. In measuring the portfolio performance, value of the obtained return in proportion to the incurred risk is evaluated and thus increasing of risk-adjusted return is the measure for superiority of portfolio performance. In this regard, models of risk explanation that show investors' expected returns for risky assets are used. Asset pricing models are the common tools to investigate risk-adjusted return.

Harry Markowitz in 1959 tried to help investors choose their optimum portfolio among the risky assets existing in the capital market. Sharpe (1964), Lintner (1965) and Black's capital assets pricing model (1972) has been a standard model until the recent years for comparison of capital assets in financial sciences [6]. Capital assets pricing model (CAPM) was established in 1952 on the basis of primary activities by Markowitz about the modern theory of portfolio and his hypotheses with regard to an efficient market. The major prediction of this model is that expected stock returns can be indicated on the basis of a linear function of its beta. The main advantage of asset beta is that it indicates all systematic risk of the stock as a variable.

CAPM model is a brief and helpful model for explanation of average stock returns [16]. Empirical validity of this model has been confirmed through studies conducted by Black et al (1972) and Fama and Macbeth (1973). It has been regarded as an acceptable model among the academic circles for capital assets pricing because of the experimental confirmation besides the fact that the model has been established based on financial theories. By means of this model the investors have practically obtained a simple tool through which they can evaluate their investment strategies. For instance, they compare the predicted return by the model with the obtained real return or they can calculate their cost of capital given to the risk level they have undertaken [10]. Other studies have been conducted about capital assets pricing which have been led to models with more advanced characteristics like the arbitrage model; however, CAPM model has maintained its dominant position in studies on stock market. The question proposed

for investors, shareholders and managers is that whether or not it is possible to identify all effective factors on stock returns of firms. Therefore, it is important to identify the effective factors on stock returns and stock price. Stock determinants are numerous and researchers have conducted various studies about recognizing the explaining factors of stock returns. Capital assets pricing model (CAPM) associates the expected return rate of securities to a suitable measure of risk of securities, i.e. its beta. However, the studies conducted on capital assets pricing model by different researchers since the beginning of the 1980's were led to some criticisms on performance of this model including that systematic risk cannot explain stock returns alone and other factors should be considered in this regard. In 1993, Fama and French added two other factors, i.e. size and ratio of book value to market value to CAPM model that was known as the Fama and French three factor model. They evaluated three explaining factors of stock returns given to the above model. Liu believes that CAPM model and the Fama and French three factor model cannot explain liquidity premiums on the stock returns despite that the above two models have a significant effect on stock returns explanation; but some evidences demonstrate that there is another factor known as liquidity that is effective on stock returns [21].

Risk and return have always been considered in investment evaluation. Investors are risk-aversive and demand the return rate proportional to risk. Exchange of shares with low liquidity increases the transaction cost. The expected return by investors should be adjusted due to liquidity risk [9]. Whatever liquidity of the stock is lower, that stock will have lower attractiveness for investors unless its holder earns more return. It means that the investor has expectation for stock liquidity, i.e. risk of stock liquidity. According to empirical evidences, illiquidity can play an important role in decision-makings. In other words, some investors might need financial resources of their investment rapidly and the liquidity power in such cases can be very important [14, 24]. Liquidity means the speed of converting the investments or assets into cash. Securities that are exchanged at a high level in the stock exchange can indicate their speed of liquidity. Indeed, illiquidity might have a negative effect on the stock value. Ratio of illiquidity shows sensitivity of the stock price against changes of any unit in transaction volume of that day. Illiquidity occurs when the stock price has high changes in reaction to low volume of transactions. For instance, Vali and Stone (1983) considered stock issuance costs when securities are valuated in their studies and concluded that such costs can explain higher return rate of smaller firms which have a lower liquidity [4]. Secondary markets decrease cost of capital

through price detection and risk transfer ability besides providing the liquidity. Liquidity or market acceptance is one of the vital aspects of stock exchange and is one of the important factors of assets pricing that has a strong effect on their price. Definitely, liquidity means the conversion speed of investments or assets into cash with minimum cost in the shortest time that has a considerable effect on attractiveness of investment, investors' decision-making and proper allocation of resources [1]. Illiquidity, i.e. liquidity risk may have a negative effect on stock value, because risk-aversive investors need excess returns known as risk premium to compensate for the risk they incur. Also they prefer to invest in securities which have a higher liquidity. Hence, liquidity risk is one of the major paradigms of financial market and maximization of shareholders' wealth depends on it [13].

Given to limitation of resources and capital rationing, if investors invest all their capital in a special asset, they might be faced with a considerable risk and lose both the principal and interest and this is not desirable for them [2]. The conducted studies confirm that the systematic risk proposed in CAPM model cannot explain stock returns alone. Fama and French (1963-1990) indicated that in considering beta with other variables, beta has no relationship with the average stock returns and the two effective and dominant variables are size and ratio of book value to market value. They believe that in the three factor model, utilization of two especial types of stock, i.e. value stocks that its book value to market value is high and stock with small size can explain the relationship between investment risk and return better than the total individual factor. Other financial characteristics may be important for investors too. For instance, liquidity is one of such important characteristics. It means rapid exchange of securities with low price. In addition, it seems reasonable to assume that many investors find out that increased liquidity of securities enhances their attractiveness if other conditions remain stable [1, 11]. Thus, the problem proposed here is that CAPM models cannot alone explain stock returns and thus the following question is considered: Is it possible to investigate the explanatory power of stock returns of companies listed in Tehran Stock Exchange by means of market risk, firm size, ratio of book value to market value and liquidity through the variables proposed in financial researches and factors of Fama and French three factor model?

2. Relationship between bid-asked spread and stock liquidity in the conducted studies

Pastor and Stambaugh (2003) used liquidity measures such as order flow, changes of bid price and asked price and the proposed measures by Amihud in a study on liquidity risk and stock returns. They concluded that the proposed measures by Amihud give a better result than other measures [23]. Acharya and Pedersen (2005) proposed capital assets pricing model and showed that there is a relationship between the expected returns and stock liquidity. Their findings indicated low simultaneous effect of liquidity and stock returns in short-term and thus the effect in long-term is more [5]. Marshal (2006) studied the effect of illiquidity on capital assets pricing model that the statistical population included companies listed in Australia Stock Exchange during the time period 1991-2002. In this study, illiquidity was utilized with different measures. The results disclosed that liquidity is an important factor in stock returns although some findings were inconsistent with previous studies. Size and ratio of book value to market value were inserted in the model as control variables and size factor had a negative effect on assets pricing model [22]. Using a new measure for liquidity, Liu (2006) showed that liquidity premium in capital assets pricing model and the Fama and French three factor model is an important resource of risk. Also risk premium of the market and market liquidity explain stock returns well while ratio of book value to market value in Fama and French model does not explain return well [21]. Recently, Lam and Lewis (2011) have conducted studies regarding return and liquidity. They investigated the role of liquidity in stock pricing in Hong Kong Stock Market by means of comparing factor models and concluded that the four-factor model (excess market return, firm size, ratio of book value to market value and nine utilized measures for liquidity) is the best model that explains stock returns in Hong Kong Stock Market [20]. Results of the conducted studies are shown briefly in the following table.

Table 1. Summary of the conducted studies

Researcher	Description
Pastor & Stambough(2003)	Liquidity risk and stock returns as liquidity measures such as order flow, changes of bid price and asked price and the proposed measures
Acharya & Pedersen(2005)	The expected return and liquidity and time effect
Marshal(2006)	The effect of illiquidity of capital assets pricing model
Liu(2006)	Liquidity premium in CAPM model and the Fama and

	French three factor model
Lam & Lewis(2011)	Role of liquidity in stock pricing and the four-factor model (excess market return, firm size, ratio of book value to market value and nine utilized measures for liquidity)

3. Hypotheses

The ability of the firm to provide cheap, low-interest and timely financing for investment and preparing a suitable plan is one of the major factors for progress of any corporation. Stock liquidity has a special significance in this regard. Liquidity has become especially important after occurrence of the global crisis and collapse of financial markets and it is important for Iran's capital market too. The aim of the current study is to investigate and test power of factors such as market risk premium, firm size, ratio of book value to market value and liquidity to explain stock returns, so investors will be able to make proper decisions for investment through recognition of the effective factors on stock returns explanation and thus provide progress of the stock exchange. Today, given to conditions of the competitive market, suitable and low-cost financing is vital for development of firms, increasing of profitability and survival of companies. Many companies increase their capital through the issued stocks due to the limitations and problems of borrowing for financing. This will be effective when the company's stock has the essential attractiveness. One of the effective factors on attractiveness of the stock is its liquidity capability. The stock with high liquidity is one of the factors that makes its issuance easy. Therefore, determining the significance of liquidity risk and its effect on the expected returns by shareholders is one of the aims of this study.

The following two hypotheses were proposed in order to find the primary research questions:

Hypothesis 1: Fama and French model is significant in explanation of excess stock returns in Tehran Stock Exchange.

Hypothesis 2: Stock liquidity as risk premium factor is significant in explanation of excess stock returns in Tehran Stock Exchange.

4. Methodology

This is an ex-post facto research in which the past information has been used and it is applied in terms of purpose. Historical study was used to collect the research literature and also

the required information was obtained through various resources of Tehran Stock Exchange Services Company such as financial statements of firms that are published in the stock exchange website and the published information in Tehran Stock Exchange Technological Company[1]. Also information banks like Rah Avard Novin and Tadbir pardaz software were used for data collection. The survey was conducted using descriptive-correlation method and multiple-variable regression method was applied to investigate the relationship among the independent and dependent variables. Similarly, data analysis was based on time-series regression. The statistical population included all public companies listed in Tehran Stock Exchange. Tehran Stock Exchange was selected because these companies offer the information publicly with an acceptable quality due to the current legal obligations. Moreover, the historical background and importance of this stock exchange encouraged the researcher to use the above data.

The statistical sample was selected through elimination method given to time and spatial domains. Thus, the statistical sample contains companies listed in Tehran Stock Exchange which have the following conditions:

1- They should be listed in Tehran Stock Exchange until March 21, 2009.

2- They should not have more than three months of trading halt during the year in order to calculate monthly return of their stock properly.

3- Their required data should be accessible.

4- Research is conducted about non-financial companies, thus banks and all investment and leasing companies and financial institutions were omitted, because [18, 19]:

A) High leverage ratios of non-financial companies show their financial risk, while this is totally common for financial companies. Thus, if financial companies are investigated in this analysis too, wrong conclusions will be obtained about significance of some variables.

B) Accounting techniques used in financial companies are different from the utilized techniques in non-financial companies. Therefore, the interpretations utilized for basic factors of these two groups are very different.

5- Book value of their return on equity should be positive.

6- They should not have changed their fiscal year during the research period.

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7- Their fiscal year should end March 20. Other companies which have a different fiscal year will be omitted too. Given to above issues, the sample was equal to 72 companies.

5. Measuring the variables

5.1. Calculation of SMB and HML

In order to calculate SMB and HML variables following Fama and French (1992, 1993), six portfolios should be calculated. It was performed as below.

1- All sample companies are arranged based on size (stock market value) at the end of each year.

2- Median of companies' size is calculated and those above the median in terms of size are regarded as big and those below the median are regarded as small.

3- All sample companies are arranged based on ratio of book value to market value at the end of each year.

4- Companies arranged in stage 3 are separated into three classes based on 30% of companies in the highest rank, 30% in the lowest rank and 40% in the middle. In order to calculate boundary points of classes at the time of establishing the portfolios based on size, companies whose ratio of book value to market value is negative are not considered. This classification is led to establishing three portfolios based on ratio of book value to market value: companies with high B/M ratio- companies with moderate B/M ratio- companies with low B/M ratio.

5- Six portfolios[1] are created based on commonality of two portfolios on the basis of size and three portfolios on the basis of ratio of book value to market value through combination of the calculated portfolios.

6- Then monthly return of six portfolios are calculated and it is acted as below to obtain SMB and HML variables:

SMB^{t2}= risk factor of returns on stock that is related to firm size and is mean difference of returns of three small portfolios (S/H, S/M, S/L) and simple mean of three big portfolios (/H, B/M, B/L). SMB factor is calculated monthly. Therefore, it is obtained through the difference between stock returns of small and big portfolios that relatively have a similar weight in

1. S/H, S/M, S/L, B/H, B/M, B/L
2. Small Minus Big

terms of ratio of book value to market value. Thus, it is mainly independent of the effect of this ratio [18, 19].

HML_t[1]= risk factor in returns on stock that is related to firms' ratio of book value to market value and is defined as mean difference of returns of two portfolios with the highest ratio of book value to market value (B/H, S/H) and simple mean of two portfolios with the lowest ratio (B/L, S/L). HML factor is calculated monthly. Both elements of HML are returns of portfolios which have the highest (lowest) ratio of book value to market value that relatively have similar mean size. Therefore, difference of returns of two portfolios is generally independent of the effect of size factor [18, 19].

5.2. Calculation of stock liquidity LIQ_t

In order to calculate liquidity (LIQ_t), the following stages are performed:

1- Liquidity is calculated based on Brennan's model for all sample companies at the end of each year and then its absolute value is calculated [12].

2- All companies are arranged based on liquidity measure (absolute value) and are divided into ten deciles. Three deciles have the lowest liquidity and three deciles have the highest liquidity.

3- Finally, weighted mean of monthly return of low liquidity portfolio (three deciles) will be subtracted from mean of monthly return of high liquidity portfolio (three deciles).

6. Results of testing the hypotheses

6.1. Result of testing hypothesis 1

Hypothesis 1: Fama and French model is significant in explanation of excess stock returns in Tehran Stock Exchange.

Results of testing this hypothesis (Fama and French model) are shown in the below table.

Table 2. Results of testing Fama and French model

Dependent variable: $R_{i,t} - R_{f,t}$		
$R_{i,t} - R_{f,t} = \alpha_1 + \beta_1(R_{m.t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t}$ Model 1		
Explanatory variable	Coefficient	t-statistic	P-value
Constant	.012	9.525	.000

3.High Minus Low

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R_{mt}-R_{ft}	-.018	-1.212	.226
SMB_t	-.114	-7.869	.000
HML_t	-.010	-.675	.499
Coefficient of determination: 0.014		Adjusted coefficient of determination: 0.014	
F-statistic: 24.72		P-value: 0.000	
Durbin-Watson: 1.82		Number: 5184	
$(R_i - R_f)_t$= difference between firm return and risk free rate of interest in month t			
$(R_m - R_f)_t$= difference between market return and risk free rate of interest in month t			
SMB_t= risk factor in returns on stock related to firms' size in month t			
HML= risk factor in returns on stock related to B/M ratio in month t			

As the above table shows, coefficient of risk premium variable, i.e. SMB_t is less than 0.05 and thus it is negative and significant. T-statistic of risk premium is equal to -7.87 and is significant.

6.2. Result of testing hypothesis 2

Hypothesis 2: Stock liquidity as risk premium factor is significant in explanation of excess stock returns in Tehran Stock Exchange.

Results of testing this hypothesis (Fama and French model) are shown in the below table.

Table 3. Results of testing the second hypothesis

Dependent variable: $R_{i,t} - R_{f,t}$			
$R_{i,t} - R_{f,t} = \alpha_1 + \beta_1(R_{m.t} - R_{f,t}) + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t}$			
Model (2-3)			
Explanatory variable	Coefficient	t-statistic	P-value
Constant	0.012	9.414	.000
R_{mt}-R_{ft}	-.015	-.996	.319
SMB_t	-.105	-7.138	.000
HML_t	-.007	-.488	.626
Coefficient of determination: 0.018		Adjusted coefficient of determination: 0.017	
F-statistic: 23.74		P-value: 0.000	
Durbin-Watson: 1.831		Number: 5184	
$(R_i - R_f)_t$= difference between firm return and risk free rate of interest in month t			
$(R_m - R_f)_t$= difference between market return and risk free rate of interest in month t			

SMB_t = risk factor in returns on stock related to firms' size in month t
HML = risk factor in returns on stock related to B/M ratio in month t
LIQ_t = risk factor in returns on stock that is related to liquidity of firms' stock in month t

As the above table shows, coefficient of risk premium is less than 0.05 and thus it is negative and significant like hypothesis one. Market factor variable and ratio of book value to market value are not significant like the previous models. Moreover, the findings show that risk premium has a negative and significant relationship with stock liquidity.

7. Conclusion

In the current study, utilization of bid-ask spread model and liquidity in order to explain excess stock returns was investigated. Efficient financial markets facilitate fluent money transfer from those who have saving to those who have profitable investment opportunities. Such markets indicate a high level of volume of transaction and high market participation. Because investors have been convinced that price of securities in such markets is efficient reasonably, they enter into transaction and thus volume of transactions in the market is increased due to lack of information risk and information asymmetry that is referred to as increased liquidity. Significance of Fama and French model was tested in the first hypothesis. Results of testing this model according to the related table show a negative and significant relationship between firm size and excess stock returns with risk free rate of return. F-statistic of this model at error level 5% is significant and shows a linear relationship among the independent and dependent variables and Fama and French model is significant. Also Durbin-Watson statistic is in the range 1.5-2.5 and shows nonexistence of autocorrelation in error terms. Tests of basic assumptions of regression show normality of errors as well as lack of co-linearity among the independent variables. Results of this test like those of Fama and French test (1993) indicate a negative and significant relationship between stock returns and firm size. The second hypothesis demonstrated that stock liquidity as risk premium factor is significant in explanation of excess stock returns in Tehran Stock Exchange. Results of testing this hypothesis according to the related table like previous models show a negative and significant relationship between firm size and excess stock returns with risk free rate of return. Besides, risk premium variable related to stock liquidity has a negative and significant relationship and the second hypothesis is confirmed. F-statistic of this

model at error level 5% is significant and shows that there is a linear relationship among the independent and dependent variables. Durbin-Watson statistic is in the range 1.5-2.5 and demonstrates nonexistence of autocorrelation in error terms. Tests of basic assumptions of regression show normality of errors as well as lack of co-linearity among the independent variables. Results of this test are consistent with research results of Lam and Lewis (2011). They also studied the role of liquidity in capital assets pricing using the Fama and French three factor model. Their findings via market information of Hong Kong Stock Market demonstrate that liquidity is an effective factor on stock returns explanation and their four-factor model is better than the three-factor model. Similarly, their findings show that the Fama and French three factor model is significant.

8. Suggestions based on the results of hypotheses

1) Considering the result of hypothesis one regarding significance of Fama and French model in explanation of excess stock returns in Tehran Stock Exchange that shows a negative and significant relationship exists between firm size and excess stock returns, it is suggested to investors to pay attention to firm size for investment and create a portfolio which has this characteristic.

2) Results of the second hypothesis reveal that stock liquidity is effective on excess stock returns. Given that this hypothesis has been confirmed, it is suggested to investors to pay attention to firm size for investment and create a portfolio that high liquidity is one of its characteristics. Also, considering the test results, it is suggested to propose essential mechanisms for increasing of stock liquidity. In other words, it is possible to encourage the investors for more transactions through arranging the essential mechanisms for ticker symbol and stock prices. Moreover, it is possible to decrease information asymmetry through on-time, perfect and clear information; reduce bid-asked spread and increase liquidity.

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References

1- Ahmadpour, A; Rahmani Firouzjaee, M. (2008). Studying the effect of firm size and ratio of book value to market value on stock returns. *Journal of Economic Studies*, 79, pp. 19-37

2- Mojtahedizade, V; Taremi, M. (2006). Testing the Fama and French three factor model in Tehran Stock Exchange to predict stock returns. *Management Message*, 17 & 18, pp. 109-132

3- Yahyazadefar, M; Khoramdin, J. (2009). Role of liquidity and illiquidity risk factors in excess stock returns in Tehran Stock Exchange. *Accounting and Auditing Studies*, 15 (53), pp. 101-118

4- Yahyazadefar, M; Shams, SH; Larimi, S. J. (2011). Studying the relationship between liquidity and stock returns in Tehran Stock Exchange. *Financial Research*, 12 (29), pp. 111-128.

5- Acharya, V.V., L.H., Pedersen. (2005). Asset pricing with liquidity risk, *Journal of Financial Economics* 77, 375–410.

6- Amihud, Y.(2002). Illiquidity and stock returns: cross-section and time-series Effects, *Journal of Financial Markets* 5, 31–56.

7- Amihud, Y., H., Mendelson.(1986). Asset pricing and the bid-ask spread, *Journal of Financial Economics* 17, 223–249.

8- Andrew W., p., Constantin and M.,Wierzbicki. (2003). It is 11 PM- Do you know your liquidity is? The mean-variance liquidity frontier, *Journal of investment management*,Vol.1,No. 1,pp. 55-93.

9- Baker M and J., Stein. (2003). Market Liquidity as a Sentiment Indicator, *Journal of Financial Markets*, 7 (3).

10- Bortolotti B, F., De Jong, G., Nicodanoand S., Ibolya. (2006). Privatization and Stock Market Liquidity, *Journal of Banking and Finance*, Social Scien Electronic Publishing.

11- Brennan, M.J., T., Chordia and A., Subrahmanyam.(1998). Alternative factor specifications, security characteristics and the cross-section of expected stock returns, *Journal of Financial Economics* 49, 345–373.

12- Brennan, M.J and A.,Subrahmanyam.(1996). Market microstructure and asset pricing: on the compensation for illiquidity in stock returns, *Journal of Financial Economics* 41, 441–464.

13- Chordia, T., A., Subrahmanyam and V.R., Anshuman.(2001). Trading activity and expected stock returns, *Journal of Financial Economics* 59, 3–32.

14- Chordia Tarun et al. (2000). "Commonality in Liquidity", *Journal of Financial Economics*, 56(1).

15- Datar, V.T., N.Y., Naik, R., Radcliffe.(1998). Liquidity and stock returns: an alternative Test, *Journal of Financial Markets* 1, 203–219.

16-   Dey, M., (2005). Liquidity, Turnover, and Return in Global Stock Markets, *Emerging Markets Review*, 6 (1), 45-67.

17-   Eleswarapu, V.R. , M., Reinganum.(1993). The seasonal behavior of liquidity premiumin asset pricing, *Journal of Financial Economics* 34, 373–386.

18-   Fama, E.F., K.R., French.(1992). The cross-section of expected stock returns, *Journal of Finance* 47, 427–465.

19-   Fama, E.F., K.R., French.(1993). Common risk factors in the returns on stocks and

Bonds,*Journal of Financial Economics* 33, 3–56.

20-   Lam, L., T., Lewis. (2011). Liquidity and asset pricing: Evidence from the Hong Kong stock market, *Journal of Banking & Finance* 35 (2011) 2217–2230.

21-   Liu, W., (2006). A liquidity-augmented capital asset pricing model, *Journal of*

Financial Economics 82, 631–671.

22-   Marshal, B.R., (200). Liquidity and stock returns: Evidence from a pure order-driven market using a new liquidity proxy, *International Review of Financial Analysis* 15 (2006) 21– 38.

23-   Pastor, L., R.F., Stambaugh. (2003). Liquidity ri

sk and expected stock returns, *Journal of Political Economy* 111, 642–685.

24-   Weimin, Liu.,(2005). A liquidity-augmented capital asset pricing model, *Journal of Financial Economics*.,Vol. 1,No. 1,pp. 1-41.