EMPIRICAL TEST OF FAMA FRENCH THREE FACTOR MODEL AND ILLIQUIDITY PREMIUM IN INDONESIA

Citra Amanda, Zaäfri Ananto Husodo**

Abstract

This study, using more than 10 years of monthly time-series data and controlling for the non-crisis as well as crisis period, investigates the existence of Fama-French three factors and liquidity to the excess return of stock portfolio in Indonesia. The results show that market beta is consistently positive and significant in each portfolios, when sorted by size-illiquidity and book-to-market (BM)-illiquidity. SMB could explain ILLIQ and vice versa, and in general the hypothesis in this research are accepted, also there are consistency in SMB when sorted by size-illiquidity and also BM-illiquidity which are two out of six are not significant. Subprime mortgage crisis statistically has no effect in all portfolios. The results supported Fama and French (1992, 1993) and the results of Lam and Tam (2011).

Keywords: Crisis, Illiquidity, Fama French Three Factor Model

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**Universitas Indonesia, Graduate School of Management*

1 Introduction

Since the introduction of the Capital Asset Pricing Model (CAPM) by Sharpe (1964), Lintner (1965), and Black (1972), CAPM has been the main paradigm in finance and shaping the mindset of academics and practitioners about the relationship of risk and return. In CAPM, the return of an asset is determined only by the systematic risk, beta (β). Using CAPM, the expected return on risky assets is directly proportional to the beta, or in other words, cross-sectional differences in average returns are determined only by the beta. CAPM is very useful in explaining and predicting the relationship of risk and expected return. This concept explains high risk high return. The risk is a function of the overall response to the movement of the stock market as measured by the beta. The primary objective of the CAPM is to determine the required return from an investment. The market equilibrium according to the criteria of Markowitz confirms two things: the positive relationship between expected return and beta, and beta as the sole measure of risk. CAPM is widely used in estimating the cost of capital for the company, measuring abnormal returns, and evaluate the performance of the portfolio (Kim et al, 2012).

Previously, the empirical tests generally support the argument that the beta was the only predictor of the cross-sectional differences over stock portfolio return (Fama and MacBeth, 1973). However, various empirical findings stated that not only beta can explain the stock returns, but there are other explanatory factors which can explain the stock returns and finally develop the asset pricing models. The empirical research have found number of anomalies which can not be explained by CAPM such as firm size (Banz, 1981; Reinganum, 1981), book-to-market (Fama and French, 1992), momentum (Jegadeesh and Titman, 1993), price reversal (DeBondt and Thaler, 1985), liquidity (Amihud and Mendelson, 1986), and assets growth (Cochrane, 1996).

Stock return is a value or level of a particular benefit in stocks. When choosing the stock to invest, investors need to know what factors that can affect stock returns so that investors can form an optimal portfolio. These factors are contained in the three-factor model proposed by Fama and French (1992). The factors are beta, size, and value. Three-factor model of Fama and French is formed to test the CAPM. The failure of the capital asset pricing model (CAPM) is derived from the inability to explain the cross section of excess return portfolios sorted by firm characteristics such as size and book-to-market ratio. The relationship between size and average return in the portfolio shows the opposite direction. Small stocks tend to have higher returns than large stocks. Fama and French also found that the book-to-market value can capture cross-sectional variation in average returns associated with the beta. Further empirical findings regarding multifactor of Fama and French (1992) supported by Ruwenhorst (1999) which states that global factors do not significantly influence the local expected return and beta, size, momentum, and value in cross-section was positively correlated with turnover in emerging markets.

The current empirical research about asset pricing has identified some variables that explain the cross sectional differences in stock returns in addition to the market risk. Drew and Veerarachavan (2003) tested a model of Fama and French on the markets of

Hong Kong, South Korea, Malaysia and the Philippines. They found that the size and value effect can be identified on the market in these countries using cross-section. Kim (2006) shows two factors model, market factor and earnings information uncertainty risk factor. The research shows that the two-factor model can explain the effect of firm size and January effect. Shum and Tang (2006) examined the common risk factors in assessing the return on the Asian stock markets using sample of assets listed on the stock exchange of Hong Kong, Singapore, and Taiwan. Their results support the research of Fama and French (1993). Chen et al (2010) shows the model which consist of three factors: market factors, investment factors, and return on assets (ROA). They argue that their model is better than traditional asset pricing models in explaining anomalies associated with short-term price continuation, accruals, and stock valuation ratios. Hammami and Jilani (2011) tested the fundamental factors versus macroeconomic factors. They stated that macroeconomic models should be considered in the empirical asset pricing literature in addition to, or instead of, fundamental models.

There have been so many studies examined the effectiveness of the CAPM. Many studies have added additional factors in order to obtain cross-sectional explanation of average returns more reliable. In addition to these factors, the liquidity effect is also important in explaining stock returns. Investors concern about the liquidity of stocks when making an investment decision. Liquidity refers to the ability of investors to buy and sell assets quickly, low cost, and without the large price concessions. Liquidity is a measure of the quality of market. It is directly linked to the return on investment (Amihud and Mendelson, 1986). Liquidity plays a central role in hedging and risk management (Das and Hanouna, 2009).

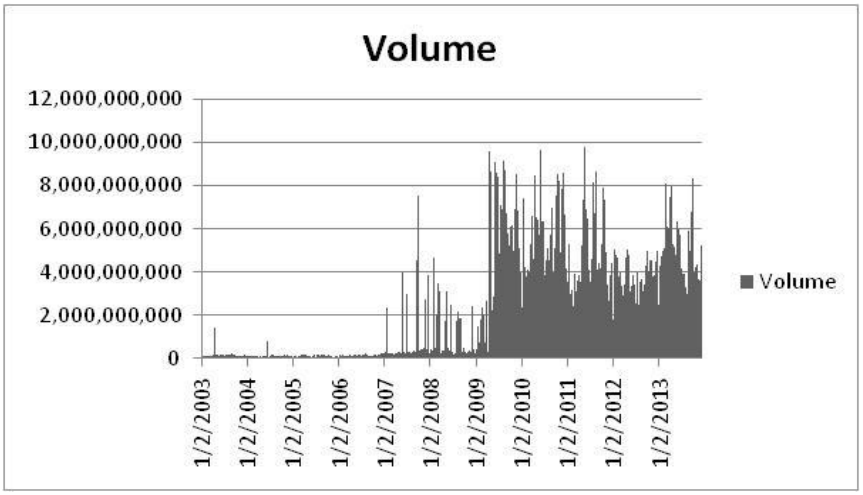
Amihud and Mendelson (1986) found a relationship between illiquidity and return is positive. Since that study, many researchers investigate the problem of liquidity, but the results are generally inconsistent and varies. Research on liquidity have been carried out with several approaches such as by the volume of stock transactions, stock trading frequency, and bid-ask spreads. Wang (1994) conducted a study with competitive model. The result is that the volume is positively correlated with the absolute value of price changes and dividends. Amihud (2002) shows that there is a significant relationship between liquidity and expected stock returns. Amihud (2002) proposed the ratio of absolute return to dollar trading volume as a measure of illiquidity. Brennanand Subrahmanyam (1996) suggest illiquidity with the relationship between price changes and order flows (order flows). Pastor and Stambaugh (2003) measured an illiquidity as the reversal return after high trading volume. Spiegel and Wang (2005) found no significant relationship between the expected return with both the bid-ask spread or Amihud illiquidity (2002) after controlling trading volume and turnover. Tam and Lam (2011) says that a lot of research develop an investigation about relationship between return and illiquidity or liquidity, but the results are generally inconsistent and mixed. Tissaoui (2012) conducted a study to investigate the pattern of intraday trading activity, liquidity and volatility in Tunisia. The results of this study lead to the conclusion that trading volume, volatility and liquidity returns to follow the letter U. These studies provided evidence that liquidity is an important determinant of expected return.

Indonesia is an emerging country that has growing stock market. The IDX Composite (formerly: JSX Composite, Indonesian: *Indeks Harga Saham Gabungan*, *IHSG*) from year to year showed a positive trend as well as stock trading volume is greater. (see Figure 1 and 2).

Figure 1. JSX Composite (IHSG) 2003-2013

Source: Datastream

Figure 2. Trading Volume IHSG 2003-2013



Source: Datastream

It is interesting to conduct the study in Indonesian stock market because although the overall trade volume increased from 2003 to 2013, there are stil number of illiquid stocks. This will be further investigate whether the level of liquidity affecting the returns of a portfolio. In this study, we empirically study the market premium, size premium, value premium and illiquidity premium in Indonesia.

This study is structured as follows, Section 2 describes the theoretical review, Chapter 3 describes the data and research method, Chapter 4 is discussion, and Section 5 is conclusion.

2 Literature review

2.1 Capital asset pricing model (CAPM)

The studies about CAPM are quite large, both support CAPM and do not support CAPM. Studies that support the CAPM include studies conducted by Graham and Harvey (2001) which stated that 73.5 % CFO used CAPM to estimate the cost of equity. Brounen, Abe de Jong and Koedijik (2004) using a similar survey of the 313 companies in Europe and about 45% also use CAPM. Black Jensen and Scholes (1972) studied the CAPM using cross-sectional and time series returns. They concluded that the intercept value is close to zero. This study uses stocks listed on the NYSE (New York Stock Exchange) in the period 1931-1995. The conclusion of this study was the relationship between the average return of portfolio and beta is approximately linear. In the next year, 1973, Fama and Macbeth did a research on the New York stock exchange in the period 1926-1968. Fama and MacBeth claimed that their study supports the CAPM. They found that there is a linear relationship between the average returns and beta.

The studies that challenged CAPM starts from Roll's critiques (1977) who argued that the CAPM can not be tested except if the market portfolio of all assets used in the empirical test. Basu (1977) also showed an interesting anomaly of CAPM, he was the first to test the notion that value-related variables might explain violations of the CAPM. He found a significant positive relation between E/P ratios and average returns for U.S. stocks that could not be explained by the CAPM. Banz (1981) tested the CAPM to examine whether firm size may explain the residual variation in average return that is not explained by the market beta. Banz found that the coefficient on size has more explanatory power than the coefficient on beta in describing the cross section of returns. Bhandari (1988) also found an anomaly in stock returns with leverage. Bhandari (1988) examined the relationship between beta and debt to equity ratio. The results showed that the debt-to- quity ratio have a positive relationship to the expected return and can be used as an additional variable to explain the expected return. From these studies it can be said that theoretically, CAPM used as a basic model but some studies find anomalies that market beta is not the only single factor affecting stock returns.

2.2 Fama French three factor model

Fama and French Three Factor Model was formed to test the CAPM model. The study found that there are factors other than beta can affect stock returns. Fama and French (1992) stated that two variables, firm size and the market to book ratio gave the better explanation regarding the value of the average stock returns across sectors than the traditional CAPM. The three factor model introduced by Fama and French state that that return is determined by the market risk premium, size premium and value premium. It is formulated in an equation as follows:

$$R_i - Rf_t = \alpha_i + \beta_i\left(Rm_t - Rf_t\right) + s_i SMB_t + h_i HML_t + e_{it} \quad (1)$$

Where R_i = Stock return

Rf_t = Risk free rate

Rm_t = Market portfolio return

SMB_t = Small Minus Big

HML_t = High book to market minus low book to market

It can be seen that the Fama and French three-factor model is more like an extension of the CAPM. Fama and French stated that stocks with small market capitalization and stocks with a high book-to-market value have performed better since these stocks yield higher returns.

2.3 Liquidity

Liquidity of an asset is important because the liquidity of assets is said to be liquid if it can be traded in large quantities, in a short time, with low transaction cost and without affecting the price (Amihud and Mendelson, 1991). Liquidity has dimensions which can be measured. Kyle (1985) devided the dimension of liquidity into three dimensions:

1. *Tightness* is measured with the bid-ask spread of assets.
2. *Depth* is measured with the size of transaction required to change the price of asset.
3. *Resiliency* shows the speed of the prices to return to their equilibrium after a shock in the market.

Amihud (2002) conducted a study about liquidity and used ILLIQ, the measure of stock illiquidity, is the daily ratio of absolute stock return to its dollar volume, averaged over some period. It can be interpreted as the daily price response associated with one dollar of trading volume, thus means a measure of price impact. The formula of Amihud Illiquidiy (2002):

$$ILLIQ = \frac{R_i}{dVOL} \quad (1)$$

Where R_i = absolute stock return

DVOL = daily volume in dollar

2.4 Previous studies

A study by Fama and French (1997) gave an evidence about value premium and size premium in 12 of 13 major international stock exchanges over the period 1987-1995. This study stated that distressed stock (high BTM ratio) gives a higher return than healthy stock (low BTM ratio). Evidence from emerging markets generally confirms these size and book to market effects. Drew and Veeraraghavan (2003) also supports Fama French (1993). They use the stocks listed in Hong Kong, Korea, Malaysia and Philippines. They concluded that the size and value premium is compensation for the risk that is not covered by the CAPM. Groot et al (2012) examined the cross-section of stock returns in the 24 liquid frontier emerging markets, the period 1997 to 2008. They investigate whether return factors that have been documented in developed countries also exist in these markets. The results indicate that the value and momentum effects still exist when incorporating conservative assumptions of transaction costs. The different results conducted by Rouwenhorst (1999) on emerging equity markets. This study did not find that stocks with high beta outperform stocks with low beta. La Porta (1996) also showed that there was no evidence that the low expected growth stock is more risky than the expected high growth stock. Kothari et.al. (1995) examined the cross-section of expected return. The results of this study also contradict Fama and French (1992).

Amihud (2002), Brennan and Subrahmanyam (1996), Datar et al. (1998), and Liu (2006) provided empirical evidences which consistent with Amihud and Mendelson (1986) that liquidity is one of the determinants of expected returns. Recent studies that combine the three factors of Fama and French (1993) with the liquidity are conducted by Lam and Tam (2011), Kim et al (2012), Fabozzi et al (2013), and Nguyen and Lo (2013). In Lam and Tam (2011) , they use time series regression to see the effect of the Fama French three factors and liquidity of the excess return in Hong Kong in the period 1981 to 2004. They used nine different liquidity proxies. They stated that liquidity is an important factor for pricing returns in Hong Kong after taking well-documented asset pricing factors into consideration. Study in emerging market countries conducted by Fabozzi et al (2013) They tested the 18 countries that are divided into Asia, Latin America, and Eastern Europe in the period 1990 to 2011 by using the CAPM, the Fama French Three Factor Model and the Carhart model. They find significant value effect. Nguyen and Lo (2013) conducted market research with a sample of New Zealand from 1996 to 2011. Their results showed that there is a significant illiquidity discount and that liquidity risk does not seem to be a priced factor.

3 Data and methodology

3.1 Data

We collect data used in this study from the Thomson Reuters Datastream. The length of the data is ten

years, from 2003 to 2013. Data includes closing stock price, market capitalization, book value, number of outstanding stocks, risk free rate and trading volume. For the risk-free rate, we use the one-month *Sertifikat Bank Indonesia* (short term securities denominated in Rupiah issued by Central Bank of Indonesia).

There is sampling criteria in this study. We follow Fama and French (1992,1993), Amihud (2002), and Lam and Tam (2011). We include only monthly return data on non-financial companies, we do not include firms with negative book equity, the stock has return and volume data for more than 200 days during year y-1.

3.2 Variables

3.2.1 Market factor (R_m-R_f)

The market factor is the value weighted return with dividends of all Indonesia Stock Exchange in excess of the risk-free.

$$R_{m,t} - R_f = \frac{M_t - M_{t-1}}{M_{t-1}} - R_f \quad (3)$$

Where $R_{m,t}$: Market Return in month t
M_t : Market price in month t
M_{t-1} : Market price in month t-1
R_f : Risk free rate

3.2.2 Size-related factor (SMB)

Small minus big is constructed from a two-by-three sort on size as in Fama and French (1993). SMB is the difference, each month, between the simple average of the average of the returns on the three small portfolios (S/L, S/M, S/H) and the simple average of the returns on the three big stocks (B/L, B/M, B/H). At the end of June of each year t all stocks are ranked based on market capitalization.

3.2.3 Book to market related factor (HML)

High minus low is constructed from a two-by-three sort on book-to-market as in Fama and French (1993). HML is the difference, each month, between the simple average of the returns on the two high BM portfolios (S/H and B/H) and the simple average of the returns on the two low BM portfolios (S/L and B/L).

3.2.4 Illiquidity (Amihud measure)

At the end of June of each year, we sort all stocks according to Amihud measure of illiquidity (2002). ILLIQ is constructed as the return on a portfolio by buying long the top 30% (poor liquidity) firms and selling short the 30% bottom 30% (good liquidity) firms. We just included one illiquidity proxy (Amihud illiquidity) into the model, because based on Lesmond (2005), the best proxy for illiquidity in emerging market is Amihud illiquidity.

3.3 Empirical model and methodology

We constructed the model based on three factor model (Fama French, 1993) and added the illiquidity proxy based on (Lam and Tam, 2011) using Amihud illiquidity. The model in this study as follow:

$$R_{pt} - R_{f(t)} = a_p + b_p\left[R_{m(t)} - R_{f(t)}\right] + s_p(SMB)_t + h_p(HML)_t + \phi_p(ILLIQ)_t + d(DUMMY)_t + e_{pt} \quad (4)$$

Where $R_{pt} - R_{f(t)}$ is portfolio excess *return*; $R_{m(t)} - R_{f(t)}$ is *market excess return*, $(SMB)_t$ is *size factor*, $(HML)_t$ is *book to market factor*, $(ILLIQ)_t$ is *illiquidity factor*, and e_{pt} is an *error term*. We used dummy variable to make a difference the crisis period. The period of *subprime mortgages* crisis is based on Bank of International Settlement, Q1 2007 until Q4 2009.

After the data are collected, the data are processed to find the value of Rm, Rf, SMB, HML, and ILLIQ. First, the observation period should be determined, July of t-1 until June of year t. Portfolio will be rebalanced each year at the end of June each year t. The entire sample was divided into two sub-samples of each end of June of year t, and sorted on size (Big and Small categories) based on the median value. Then the sample sorted on the book to market ratio, which is calculated as the ratio of book equity at the end of fiscal year t-1 to market equity at the end of fiscal year t-1, into three sub-samples, namely High (top 30% of the sample), Medium (40 % of the sample), and Low (bottom 30% of the sample). Then the samples were taken intersection between sample size and book-to-market value. This intersection produces 6 sub-samples:

- B/H : Big *size* firm with high book to *market value*
- B/M : Big *size* firm with medium book to *marketvalue*
- B/L : Big *size* firm with low book to *market value*
- S/H : Small size firm with high book to *market value*
- S/M : Small size firm with medium book to *market value*
- S/L : Small size firm with low book to *market value*

By the sub-samples above, we calculate the SMB and HML:

$$SMB = \frac{(SH + SM + SL) - (BH + BM + BL)}{3} \quad (5)$$

$$HML = \frac{(BH + SH) - (BL + SL)}{2} \quad (6)$$

The illiquidity factor (ILLIQ) is constructed based on Lam and Tam (2011). At the end of each June, firms are sorted by size and included in Small (S) and Big (B) portfolios. Then, the stocks are sorted into three portfolios according to their liquidity, (HL (most illiquid), ML, and LL (most liquid)). Six portfolios (S/HL, S/ML, S/LL, B/HL, B/ML, and B/LL) are formed. The equally-weighted monthly returnson the six portfolios are calculated each month over 12 months. The formula for ILLIQ as follow:

$$ILLIQ = \frac{(S/HL - S/LL) + (B/HL - B/LL)}{2} \qquad (7)$$

We regres the factors using ordinary least square (OLS).

4 Analysis and discussion

4.1 The portfolios construction

Table 1 presents the number of stocks each year, Table 2 and 3 present the number of stocks in each portfolio sorted by size and book-to-market ratio.

Table 1. The number of firms (sample) each year

Year of constructing portfolios	Number of firms (sample)
2003	46
2004	70
2005	75
2006	71
2007	85
2008	107
2009	85
2010	123
2011	149
2012	180

Table 2. S/H is portfolio with *small size* and *high illiquidity*, **S/L** is portfolio with *small size* and *low illiquidity*, **M/H** is portfolio with *medium size* and *high illiquidity*, **M/L** is portfolio with *medium size* and *low illiquidity*, **B/H** is portfolio with *big size* and *high illiquidity*, **B/L** is portfolio with *big size* and *low illiquidity*

Year	S/H	S/L	M/H	M/L	B/H	B/L
2003	4	4	6	6	4	4
2004	6	6	9	9	6	6
2005	7	7	9	9	7	7
2006	6	6	9	9	6	6
2007	7	7	10	10	7	7
2008	10	10	13	13	10	10
2009	8	8	10	10	8	8
2010	11	11	15	15	11	11
2011	14	14	18	18	14	14
2012	16	16	22	22	16	16

Table 3. H/H is portfolio with *high BM* and *high illiquidity*, **H/L** is portfolio with *high BM* and *low illiquidity*, **M/H** is portfolio with *medium BM* and *high illiquidity*, **M/L** is portfolio with *medium BM* and *low illiquidity*, **L/H** is portfolio with *low BM* and *high illiquidity*, **L/L** is portfolio with *low BM* and *low illiquidity*

Year	H/H	H/L	M/H	M/L	L/H	L/L
2003	4	4	5	5	4	4
2004	6	6	8	8	6	6
2005	7	7	9	9	7	7
2006	6	6	9	9	6	6
2007	8	8	10	10	8	8
2008	10	10	13	13	10	10
2009	8	8	10	10	8	8
2010	11	11	15	15	11	11
2011	14	14	18	18	14	14
2012	16	16	22	22	16	16

4.2 Descriptive statistics and stationarity

The descriptive statistics for each dependent variable in the period of July 2003 to June 2013 (120 observations) can be seen in the Table 4.

Table 4. Descriptive statistics of explanatory variables

Variable	Mean	Std. dev.	Median	Minimum	Maximum
RM_RF	0.011539	0.064177	0.019415	-0.323366	0.172241
SMB	0.005241	0.050673	0.007458	-0.216770	0.178802
HML	0.006429	0.052499	0.010091	-0.180922	0.292807
ILLIQ	0.006448	0.063329	0.002074	-0.212790	0.260256

The average value of the market excess return is (RM_RF) is 1,15% per month, the average monthly size premium (SMB) is 0.52%, the average monthly *book-to-market factor* (HML) is 0.64%, the average monthly ILLIQ factor is 0.64%. All the average value in all factors shows positive value, this could be an indication that the market factor, size, value, and illiquidity has a value premium to compensate risk.

Stationary test is performed to determine whether the study variables have a unit root. Table 5 presents the result of the stationarity using Augmented Dickey-Fuller (ADF).

Table 5. Unit root test

Variable	Differenced	ADF test
RM_RF	I(0)	-8.633544
SMB	I(0)	-9.226371
HML	I(0)	-11.77873
ILLIQ	I(0)	-10.08105
RP_B/H_RF	I(0)	-7.797288
RP_B/L_RF	I(0)	-7.551462
RP_M/H_RF	I(0)	-9.584557
RP_M/L_RF	I(0)	-9.394821
RP_S/H_RF	I(0)	-8.801421
RP_S/L_RF	I(0)	-9.979928
RP_H/H_RF	I(0)	-9.684522
RP_H/L_RF	I(0)	-9.855052
RP_M/H_RF	I(0)	-9.269205
RP_M/L_RF	I(0)	-8.824721
RP_L/H_RF	I(0)	-9.482407
RP_L/L_RF	I(0)	-7.693091
Critical *Value*s		
α=1%	-3.486064	
α=5%	-2.885863	
α=10%	-2.579818	

The results show that each variables has no unit root.

4.3 Correlation

Table 6 reports the correlations between the explanatory variables.

Table 6. Correlation of the factor monthly returns July 2003-June 2013 and p-value

	RM_RF	SMB	HML	ILLIQ
RM_RF	1.000000			

SMB	-0.170301	1.000000		
	(0.0629)	-----		
HML	-0.128589	0.437969	1.000000	
	(0.1616)	(0.0000)	-----	
ILLIQ	-0.205226	0.557116	0.420118	1.000000
	(0.0245)	(0.0000)	(0.0000)	-----

We can see in Table 4.6, all factors are significantly correlated with ILLIQ in α=1% for SMB and HML, and serta α=5% for RM_RF, this result is consistent with Lam and Tam (2011). However, the magnitudes of the correlations are small in general, except for the correlation between SMB and ILLIQ which is 55,71%. The results is consistent with Lam and Tam (2011), *market risk premium* (RM_RF) has negative correlation with all factors, the value is -17,03% (p-*value* 0.0629) with SMB, and -12,86% with HML (but not significant) and -20,52% (p-*value* 0.0245) with ILLIQ.

As in the Table 4.6, the correlation is not more than 80%, so we do the regression between dependent variables to look whether there is a multicolinearity or not. The regression is presented in Table 7.

Table 7. Regression of variables

	RM_RF	SMB	HML	ILLIQ	R^2
RM_RF	-	-0.090112	-0.041358	-0.153400	0.047533
		(0.5132)	(0.7899)	(0.1903)	
SMB	-0.037570	-	0.236642	0.355546	0.363036
	(0.4883)		(0.4883)	(0.0008)	
HML	-0.022156	0.304071	-	0.208118	0.237494
	(0.7782)	(0.0668)		(0.0773)	
ILLIQ	-0.100558	0.559024	0.254659	-	0.358804
	(0.1352)	(0.0006)	(0.1089)		

As presented above, in Table 7, the SMB can explain ILLIQ, and vice versa. We employ regression with *Newey–West* standard errors (as in Fama and French, 1993). The estimator is used to try to overcome autocorrelation, or correlation, and heteroskedasticity in the error terms in the models.

4.5 Regression analysis

Table 8 reports regression results based on size-illiquidity and Table 9 reports regression results based on BM-illiquidity. The total portfolios constructed each year are 12 portfolios.

In Table 8 it can be seen that the total market premium is significant at α=1 % and all the coefficients are positive and and the value is above 1. This value means that the market beta can explain stock returns in Indonesia, and has a positive market premium. So it can be said that stock price movements are influenced by the movement of the market. Small and illiquid stocks generally have a positive intercept higher than big stocks and liquid stocks. (consistent with Lam and Tam, 2011). Almost all coefficients of RM_RF (market), SMB, HML and ILLIQ are significant. The coefficient of SMB decreases when the size increases, and also when the illiquidity decreases (more liquid) the coefficient decreases. It can be seen that when the size is smaller, the coefficient of SMB is bigger, and vice versa. This confirmed that stocks with small size outperformed stocks with big size. The liquidity also has a role where a portfolio with small size stocks and high illiquidity has a bigger coefficient than a portfolio with big size stocks and low illiquidity.

The adjusted R^2 significantly increased from the portfolio with high illiquidity to low illiquidity by 68.2% to 83.02%. It concludes that the value of adjusted R^2 increases when the liquidity increases for all sizes of companies. It could be argued that there is an information potential for liquidity in Indonesia. The dummy coefficient is generally close to zero and the value is not significant, which means that the subprime mortgage crisis has no effect on excess return in Indonesia.

Table 8. *a* is a constant, *b* is a coefficient for excess market return (Rm-Rf), *s* is a coefficient for SMB, *h* is a coefficient for HML, ϕ is a coefficient for ILLIQ, and *d* is a coefficient for dummy (crisis period), Adj R^2 is adjusted R^2

Illiquidity	***Size***		
	a		
	Small	**Medium**	**Big**
High	-0.006764 (0.3287)	0.006328 (0.2638)	0.004253 (0.3161)
Low	-0.012876 (0.0157)	-0.012585 (0.0126)	-0.003154 (0.3974)
	b		
	Small	**Medium**	**Big**
High	1.056133 (0.0000)	1.268904 (0.0000)	0.991599 (0.0000)
Low	1.002323 (0.0000)	1.327454 (0.0000)	1.149077 (0.0000)
	s		
	Small	**Medium**	**Big**
High	0.852865 (0.0010)	0.314396 (0.0830)	-0.256877 (0.0313)
Low	0.863564 (0.0000)	0.089097 (0.5792)	0.012854 (0.9194)
	h		
	Small	**Medium**	**Big**
High	-0.012334 (0.9347)	-0.193871 (0.3651)	0.000382 (0.9976)
Low	0.409802 (0.0050)	0.251175 (0.0536)	-0.151425 (0.2178)
	ϕ		
	Small	**Medium**	**Big**
High	0.451999 (0.0060)	0.888676 (0.0001)	0.224478 (0.0557)
Low	-0.397537 (0.0041)	-0.132977 (0.0971)	-0.239338 (0.0057)
	d		
	Small	**Medium**	**Big**
High	0.027898 (0.1500)	-0.015048 (0.2886)	0.000806 (0.9462)
Low	-0.000377 (0.9705)	0.004839 (0.5955)	0.009600 (0.3554)
	$Adj\ R^2$		
	Small	**Medium**	**Big**
High	0.633495	0.722392	0.682027
Low	0.667501	0.763365	0.830274

If portfolios sorted on BM and illiquidity in Table 8, the results are almost identical, the coefficients of market premium risk are 1.0 for all portfolios and statistically significant (α=1%).We can conclude that the market is factor that has significant effect in stock returns, and can consistently explain stock returns in both types of portfolios, which are based on the size-illiquidity and BM-illiquidity. The same result can be seen in illiquid companies have positive intercept and the liquid companies have negative intercept. This may imply that liquidity is priced in Indonesia.

As predicted, the HML coefficient increases when the book-to-market increased (consistent with Lam and Tam, 2011) , whereas the SMB coefficient increases when liquidity decreases. This could be an indication that the small stock is more difficult to be traded (illiquid).

The adjusted R^2 in BM-illiquidity portfolios increases significantly in the big stocks, from the high illiquidity to the low illiquidity, which is 72.44 % to 82.17 %. We concludes that the value adjusted R^2 increases when liquidity increases for all sizes of company except on stocks with high value where the more liquid the value of Adjusted R^2 is getting smaller. However, it can be said also that the information potential for liquidity exists. The coefficient of dummy is also generally worth close to zero and not significant, which means that the subprime mortgage crisis has no effect on excess return in Indonesia.

Table 9. a is a constant, b is a coefficient for excess market return (Rm-Rf), s is a coefficient for SMB, h is a coefficient for HML, ϕ is a coefficient for ILLIQ, and d is a coefficient for dummy (crisis period), Adj R^2 is adjusted R^2

Illiquidity	**Book-to-*Market***		
	a		
	High	**Medium**	**Low**
High	-0.004829 (0.4502)	0.000634 (0.9174)	-0.000975 (0.8656)
Low	-0.006492 (0.2885)	-0.001007 (0.7516)	-0.004862 (0.1992)
	b		
	High	**Medium**	**Low**
High	1.258432 (0.0000)	1.025825 (0.0000)	1.179563 (0.0000)
Low	1.108636 (0.0000)	1.199897 (0.0000)	1.104603 (0.0000)
	s		
	High	**Medium**	**Low**
High	0.842920 (0.0004)	0.251097 (0.0854)	0.857636 (0.0000)
Low	0.305365 (0.0712)	-0.098610 (0.2021)	-0.104032 (0.4034)
	h		
	High	**Medium**	**Low**
High	0.154255 (0.1603)	0.023921 (0.8702)	-0.803659 (0.0001)
Low	0.782834 (0.0011)	0.147726 (0.0014)	-0.203470 (0.0924)
	ϕ		
	High	**Medium**	**Low**
High	0.873211 (0.0000)	0.104175 (0.5052)	0.632232 (0.0000)
Low	-0.155074 (0.3716)	-0.085033 (0.1410)	-0.232106 (0.0020)
	D		
	High	**Medium**	**Low**
High	0.022255 (0.2255)	0.001719 (0.8727)	0.002218 (0.8485)
Low	-0.001399 (0.9191)	0.007100 (0.2476)	0.009422 (0.3436)
	$Adj\ R^2$		
	High	**Medium**	**Low**
High	0.731259	0.585547	0.724438
Low	0.662261	0.852800	0.821712

Based on the regression results, the hypothesis developed in this study that market risk premium, size premium, value premium, and illiquidity risk premium has a positive influence on stock can generally acceptable, but the results are only consistent with the market factor, for three other factors (SMB, HML and ILLIQ) the results are not consistent. The values of adjusted R^2 are in the range of 0.58-0.88, and similar to the value of adjusted R^2 in Lam and Tam (2011), so it means that the value is quite big and the model can be used (applicable) on the stock market in Indonesia.

5 Conclusion

In this paper, we analyze the effects of market premium, size premium, value premium, and illiquidity premium in Indonesia. Indonesia is an emerging country that has growing stock market but the market seem to be illiquid (there are still many illiquid stocks). We use time-series regression with a monthly data.

We conclude that the excess market return (market factor) is consistently positive and significant in all portfolios, whether we sorted on size-illiquidiy and BM-illiquidity, so the investors should concern

about the market. SMB has explanatory power to explain ILLIQ and vice versa. It means that the small size stocks are not easy to be traded (illiquid). Subprime mortgage crisis statistically has no effect in all portfolios. In general, the hypotheses are accepted, there are *market risk premium*, *size premium*, *value premium* and *illiquidity risk premium* which can explain the *excess return* in Indonesia. The results supported Fama and French (1992, 1993) and the results of Lam and Tam (2011).

This study has limitation that we just included one illiquidity proxy (Amihud illiquidity) into the model, because based on Lesmond (2005), the best proxy for illiquidity in emerging market is Amihud illiquidity.

References

1. Acharya, Viral V., & Pedersen, Lasse H. (2005).Asset pricing with liquidity risk.*Journal of Financial Economics*, 77, 375–410.
2. Amihud, Yakov. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets*, 5, 31-56.
3. Amihud, Yakov.,& Mendelson, Haim. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17, 223-249.
4. Amihud, Yakov.,& Mendelson, Haim. (1986). Liquidity, maturity, and the yields on U.S. Treasury securities.*Journal of Finance*, 46, 1411-1425.
5. Banz, R.W. (1981). The relationship between return and *marketvalue* of common stocks.*Journal of Financial Economics*, 9, 3-18.
6. Baradarannia. M. R., & Peat, Maurice. (2013). Liquidity and expected returns-Evidence from 1926-2008. *International review of Financial Analysis*, 29, 10-23.
7. Basu, S. (1977).Investment performance of common stocks in relation to their price-earnings ratios: A Test of the Efficient *Market* Hypothesis. *Journal of Finance*, 32, 663-682.
8. Basu, S. (1983). The relationship between earnings yield, *marketvalue*, and return for NYSE common stocks: Further evidence. *Journal of Financial Economics*, 12, 129-156.
9. Bekaert, Geert.,& Ang, Andrew. (2007). Stock return predictability: Is it there?.*Review of Financial Studies*, 20, 651-707.
10. Bhandari, L. C. (1988). Debt/equity ratio and expected common stock returns: Empirical evidence. *Journal of Finance*, 43, 507-528.
11. Black, F., Jensen, M. C., &Scholes, M. (1972).The capital asset pricing model: some empirical tests.*Studies in the Theory of Capital Markets*.New York: Praeger, 79–121.
12. Bodie, Kane, Marcus. *Investment.* Buku Satu. Jakarta: Salemba Empat, 2002.
13. Brennan, M. J., & Subrahmanyam, Avanidhar. (1996). *Market* microstructure and asset pricing: On the compensation for illiquidity in stock returns. *Journal of Financial Economics*, 41, 441-464.
14. Brian D. Kluger., & Stephan, J.(1997).Alternative liquidity measures and stock returns. *Review of Quantitative Finance and Accounting*, 8, 19-36.
15. Brounen., Jong. A. D.,& Koedijik. (2004). Corporate finance in europe: confronting theory with practice.*Forthcoming In Financial Management, Erasmus University Rotterdam*. Jel Classification Numbers: G31, G32.
16. Chan, R. Faff. (2003). An investigation into the role of liquidity in asset pricing: Australian evidence.*Pacific-Basin Finance Journal*, 11, 555-572.
17. Chan, Louis K.C., Hamao. Y.,&Lakonishok. J. (1991).Fundamentals and stock returns in Japan.*Journal of Finance*, 46, 1739-1789.
18. Chang, Y. Y., Faff. R.,& Hwang. C. Y. (2010). Liquidity and stock returns in Japan: New evidence. *Pacific-Basin Finance Journal*, 18, 90-115.
19. Chen, L., Novy. M R., & Zhang, L. (2010).An alternative three-factor model.*Working Paper*, Washington University in St. Louis.
20. Chen, N., &Kan, R. (1995). Expected return and the bid ask spread. *Working Paper*.University of California.
21. Chordia, T., Roll, R., & Subrahmanyam, A. (2000).Commonality in liquidity.*Journal of Financial Economics*, 56, 3–28.
22. Chung, Shifei.,& Wei, Peihwang.(2005). The relationship between bid-ask spreads and holding periods: The case of Chinese A and B shares.*Global Finance Journal*, 15, 239-249.
23. Cochrane, J. H. (1996). A cross-sectional test of an investment-based asset pricing model.*Journal of Political Economy*, 104, 572-621.
24. Connor, Gregory.,& Sehgal, Sanjay. (2001). Tests of the Fama and French Model in India.*Working Paper*, 1-23.
25. Das, S. R., Hanouna, P. (2009).Hedging credit: Equity liquidity matters.*Journal of Financial Intermediation*, 18, 112-123.
26. Datar, V., Naik, N., & Radcliffe, R. (1998). Liquidity and asset returns: An alternative test. *Journal of Financial Markets*, 1, 203-219.
27. Davis, J. L., Fama, E. F., & French, K. R. (1999).Characteristics, covariances, and average returns: 1929-1997. *Center for Research in Security Prices (CRSP)* Working Paper No. 471.
28. DeBondt., Werner F.M., &Richard H. Thaler. (1985). Does the stock *market* overreact. *Journal of Finance*, 40, 557-581.
29. Drew, M.E.,&Veeraraghavan, M. (2003).Beta, firm *size*, book-to-*market* equity and stock return.*Journal of The Asia Pasific Economy*, 8.
30. Ekaputra, Irwan Adi. (2006). Determinan intraday bid-ask spread saham di Bursa Efek Jakarta. *Manajemen Usahawan Indonesia*, 35.
31. Elewarapu, V. R. (1997). Cost of transacting and expected returns in the Nasdaq*market*. *Journal of Finance*, 52, 2119-2127.
32. Fama, E. F., & MacBeth. J. D. (1973). Risk, return, and equilibrium: Empirical tests. *The Journal of Political Economy*, 81, 607-636.
33. Fama, E. F., &French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance*, 57, 427-465.
34. Fama, E. F., & French, K. R. (1993).Common risk factors in the returns on stocks and bonds.*Journal of Financial Economics*, 33, 3-56.
35. Fama, E. F., & French, K. R.(1996).Multifactor explanations of asset pricing anomalies.*Journal of Finance*, 51, 55-84.

36. Fama, E. F., & French, K. R. (2008).Dissecting anomalies.*The Journal of Finance*, 58, 1653-1678.
37. Fabozzi, Frank J., Cakici,Nusret.,& Tan, Sinan. (2013). *Size*, *value*, and momentum in emerging *market* stock returns.*Emerging Market Review*, 16, 46-65.
38. Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, 60, 187-243.
39. Groot, Wilma., Pang, Juang., & Swinkels, Laurens. (2012). The cross-section of stock returns in frontier emerging *market*s. *Journal of Empirical Finance*, 19, 796-818.
40. Hammami, Yacine.,& Jilani, Faouzi.(2011). Testingfactor pricing models in Tunisia: Macroeconomic factors vs. fundamental factors. *Review of Middle East Economics and Finance*, 7, 1-22.
41. Harris, L. (2003). Trading and exchanges. Oxford University Press, New York.
42. Hasbrouck, J, Seppi, D. J. (2001). Common factors in prices, order flows and liquidity.*Journal of Financial Economics*, 59, 383-411.
43. Huberman, D. Halka. (2001). Systematic liquidity.*Journal of Financial Research*, 24, 161-178.
44. Jegadeesh, Narasimhan.,&Titman, Sheridan. (1993). Returns to buying winners and selling losers: Implications for stock *market* efficiency. *Journal of Finance*, 48, 65-91.
45. Keene, Marvin.,& Peterson, David. (2007). The Importance of Liquidity as a Factor in Asset Pricing. *Journal of Financial Research*, 30.
46. Kim, Dongheol. (2006). Onthe information uncertainty risk and the January effect.Journal of Business, 79.
47. Kim, Soon-Ho., Kim, Dongcheol.,& Shin, Hyun-Soo. (2012). Evaluating asset pricing models in the Korean stock *market*. *Pacific-Basin Finance Journal*, 20, 198-227.
48. Kothari, S. P., Shanken, Jay.,& Sloan, R. G. (1995). Another look at the cross-section of expected stock returns. *The Journal of Finance*, 50, 185-224.
49. Kyle, A. (1985). Continuous auctions and insider trading.*Econometrica*, 53, 15-35.
50. La Porta, Rafael. (1996). Expectations and the cross-section of stock returns.*The Journal of Finance*, 51, 1715-1742.
51. Lam, Keith. S. K.,& Lewis H.K. Tam. (2011). Liquidity and asset pricing: Evidence from the Hong Kong stock *market*. *Journal of Banking and Finance*, 35, 2217-2230.
52. Lee, K.(2011). The world price of liquidity risk.*Journal of Financial Economics*, 99, 136-191.
53. Lesmond, D. A. (2005). The costs of equity trading in emerging *market*s. *Journal of Financial Economics*, 77, 411–52.
54. Limkriangkrai, Manapon.,Durand, Robert., & Watson, Iain. (2008). Is liquidity the missing link?.*Accounting & Finance*, 48, 829-845.
55. Lintner, J. (1965). The valuation of risk assets on the selection of risky investments in stock portfolios and capital budgets.*Review of Economics and Statistics*, 47, 13-37.
56. Liu, W. 2006.A Liquidity-augmented capital asset pricing model.*Journal of Financial Economics*, 82, 631-671.
57. Markowitz, Harry. 1952. Portfolio selection. *The Journal of Finance*, 7, 77-91.
58. Marshall, B.R., & Young, M. (2003). Liquidity and stock returns in pure order-driven *market*s: Evidence from the Australian stock *market*. *International Review of Financial Analysis*, 12, 173-188.
59. Marshall, Ben R. (2006). Liquidity and stock returns: Evidence from a pure order-driven *market* using a new liquidity proxy. *International Review of Financial Analysis*, 15, 21-38.
60. Newey, W. K., & West, K. D. (1987).A simple, positive semi-definite, heteroskedasticity and autocorrelation-consistent covariance matrix, *Econometrica*, 55, 703-708.
61. Nguyen, D., Mishra, S., Prakash, A., & Ghosh, D.(2007).Liquidity and asset pricing under the three-moment CAPM paradigm. *Journal of Financial Research*, 30, 379–398.
62. Nguyen, Nhut H., &Ka Hei Lo. 2013. Asset returns and liquidity effects: Evidence from a developed but *smallmarket*. *Pasific-Basin Finance Journal*, 21, 1175-1190.
63. Pastor, L., & Stambaugh, R.F. (2003). Liquidity risk and expected stock returns. *Journal of Political Economy*, 111, 642–685.
64. Reinganum, Marc R. (1981). Misspecification of capital asset pricing: Empirical anomalies based on earnings' yields and *marketvalue*s. *Journal of Financial Economics*, 9, 19-46.
65. Roll, Richard. (1977). A Critique of the asset pricing theory's tests.*Journal of Financial Economics*, 4, 129-176.
66. Rosenberg, B., Reid, K., & Lanstein, R. (1985).Persuasive evidence of *market* inefficiency.*The Journal of Portfolio Management*, 11, 9-17.
67. Ross, S. 1976. The arbitrage theory of capital assets pricing.The Journal of Economic Theory, 13, 341-360.
68. Rouwenhorst, K. Geert. (1999). Local return factors and turnover in emerging stock *market*s.*The Journal of Finance*, 54, 1439-1464.
69. Spiegel, Wang.(2005). Cross-sectional variation in stock returns: Liquidity and Idiosyncratic risk. Working Paper.Yale University.
70. Stattman, D. (1980). Book *value*s and stock returns. *The Chicago MBA: A Journal of Selected Papers*, 4, 25-45.
71. Tissaoui, Kais. 2012. The intraday pattern of trading activity, return volatility and liquidity: Evidence from the emerging Tunisian Stock Exchange. *International Journal of Economics and Finance*, 4, 156-176.
72. Wang, Jiang. (1994). A model of competitive stock trading volume.*Journal of Political Economy*, 102.
73. Wyss, Rico. (2004). Measuring and predicting liquidity in the stock *market*, Universität St. Gallen, Dissertation.