# LIQUIDITY AND RETURNS: EVIDENCES FROM STOCK INDEXES AROUND THE WORLD

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## ABSTRACT

*Using data from 16 developing countries and 10 developed countries between January 2000 and December 2013, this study examines the relationship between liquidity and stock index return. The empirical results show that the higher market liquidity (trading volume, turnover ratio, and turnover volatility), the higher stock index return in developing countries. Conversely, the market liquidity (trading volume, turnover ratio, turnover volatility) corresponds negatively with return in the developed countries. During the crisis, however, the relationship between market liquidity and return show mixed results. While trading volume and turnover stays positive, yet the other liquidity measures become insignificant. In particular, for developed countries, only Amihud significantly affects return. Our results are robust even after controlling dividend yield, exchange rate, and regional stock market beta.*

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**Keywords:** Market liquidity, Turnover, Trading volume, Amihud illiquidity, Market returns, Financial crisis.

**JEL Classification:** F20; F21; G12; G15.

## Contribution/ Originality

This study contributes to the literature of asset pricing by investigating the relationship between stock indexes return in the emerging countries as well as in the developed countries and market liquidity, as proxied by multiple types of measures such as (turnover, trading volume, turnover SD ratio, and Amihud (2002) Illiquidity).

## 1. INTRODUCTION

Liquidity of an asset refers to the ability of investor to trade significant amount of asset, quickly, at low cost, and without major price allowances (Harris, 2003; Brennan *et al.*, 2012)

Liquidity is an important attributes of financial assets because it influences investor's investment decisions. Investors care about holding period, returns, after excluding the trading costs and, for them, liquidity is part of transaction costs. As the implication of this notion, less liquid assets (more costly to trade) needs to provide higher gross returns compared to more liquid assets (Datar *et al.*, 1998).

The research concerning the relationship between asset liquidity and return provide an important link between market microstructure and asset pricing. A large amount of literature has been particularly devoted to the examination of factor that influence asset returns because the understanding of that particular aspect of asset pricing is essential to improve resource allocation within an economy. The importance of liquidity as a determinant of returns, dated back to Keynes (1930) who argues that "*an asset is more liquid than another if it is more certainly realizable at short notice without loss*". Because liquidity is an elusive concept, the empirical researches concerning liquidity do not develop rapidly until the last two decades.

Amihud and Mendelson (1986), is one the first theoretical paper that formalizes the relationship between asset liquidity and return. Amihud and Mendelson document that a longer holding period of an asset reduces the amortized transaction cost per unit of time. Thus, in equilibrium, investors with longer investment horizons tend to hold less liquid assets. As a result of this horizon clientele, they show that *ex-ante* asset return would be an increasing and concave function of the relative spread. Empirically, Amihud and Mendelson (1986) employ OLS and GLS regressions and quoted bid-ask spread as liquidity measures to test the relationship between asset liquidity and return of NYSE stock over the 1961-1980 period. The empirical test conducted by Amihud and Mendelson (1986) has provided evidence that is consistent with the "liquidity premium" hypothesis. Their study is supported by Brennan and Avanidhar (1996) who empirically examines the effects of both measures of illiquidity from intraday transactions data and Fama and French (1993) factors on asset returns. They find that the required rate of return is higher for securities that are relatively illiquid.

Theory concerning return-liquidity relationship is further supported by other studies. Baker and Stein (2004), provide alternative theory that help explain the reason that liquidity hikes of several variables, for instance lower bid-ask spreads and price impact of trade, may cause lower returns for both individual and aggregate data. They assume the existence of both a class of irrational investors, who under-react to the information of order flows, thereby enable liquidity to increase. In addition to that, Easley *et al.* (2002) develop theoretical models that describe how private information influence the process where prices become informational efficient and, thus, affect asset holding risk. This information leads to stocks with a higher probability of information have higher expected returns.

Despite the presence of large studies about liquidity premium, the question whether asset liquidity affect its return remains unsolved because the literatures show mixed conclusions. Several studies found that there exists a strong positive return-illiquidity relationship, but other found no significant relationship, and the other can only show that the relationship is unique to the month of

January, while other find negative relationship (Jun *et al.*, 2003; Marshall and Young, 2003). Furthermore, according to Eleswarapu (1997) and Eleswarapu and Reinganum (1993), the empirical findings of Amihud and Mendelson study become less relevant because of their restrictive data selection criterion and methodology. Eleswarapu and Reinganum (1993) only find statistically significant relationship between spread and return existed in January. In contrast, using Nasdaq data between 1973-1990, Eleswarapu (1997) showed that although the spread effect is stronger in January, a statistically significant effect also exists over other months. He argues that the stronger evidence on Nasdaq sample compared to NYSE sample occurs because dealer's inside spreads on the Nasdaq is a more relevant measure of transation cost than quoted spreads on the NYSE.

The inconclusive result on the return-spread relationship led to the development of other liquidity measures such as turnover rate. Turnover rate is defined as the total value trading in a stock over a given period divided by market capitalization of the stock. Haugen and Baker (1996), Datar *et al.* (1998) find that turnover rate-return has statistically significant negative relationship. Moreover, Brennan *et al.* (1998) also document a negative relationship between trading volume and return for both NYSE and Nasdaq stocks. In another study, however, Easley *et al.* (2002) find that a trade-based measure of information risk is positively related to return using NYSE data.

Different with other study, Jun *et al.* (2003) investigates the relationship of stock market liquidity to stock market return. Jun *et al.* (2003) finds that, the relationship of the market liquidity and market return in developing country is positive. This result is different with the previous study like Amihud (2002), Pastor and Stambaugh (2001) that find negative relationship between liquidity and return in single asset and in developed market. Jun et al explain that developing country liquidity can affect return positively because developing countries have lower level of global market integration, so lack of liquidity will not function as a risk factor. Based on that, this study intend to focus in the relationship of market liquidity and market return in developing country and as additional analysis this study also examine relationship of market liquidity to market return as comparison.

It is important to emphasize that liquidity of single asset is quite different with the market liquidity. According to Jun *et al.* (2003), the liquidity for the single asset it largely determined by unique characteristic of the individual securities. On other hand, market liquidity has largely been determined by macroeconomic factor that are systemic to economy. Moreover, the study of relationship between market liquidity and return is useful to investigate whether market liquidity is indeed a priced factor for stock index return, particularly in developing countries.

There are several reasons that the comparison studies between developing and developed markets is interesting, such as: First, most research on liquidity-return hypothesis are for the US market. Thus the results may be biased because of data-snooping (Lo and MacKinlay, 1990; Nguyen and Lo, 2013) and cannot be generalized to other markets. The result on non-US market also show mixed result; thus, it is essential to provide further studies on the relationship between

liquidity and return using non-US data. Second, developing market has different trend with developed market.

In addition to that, since not every market has bid-ask spread data, investor has problem if they want to invest in the developing countries which not provide liquidity measurement data as complete as those in developed market. Thus, this study uses four types of liquidity measures, such as trading value, turnover, turnover volatility (turnover SD), and Amihud illiquidity variable. Those four measurements are widely used to measure liquidity in some paper such as Chordia *et al.* (2001), Jun *et al.* (2003), Nguyen and Lo (2013) and many others.

This study use four measurements (trading value, turnover, turnover volatility, and Amihud illiquidity) because those measurements are easy to find and available in most of the countries. Unlike other measurement such as bid- ask spread that is not always available in most of the country especially in the developing country where the data is relatively poor quality and the detailed transaction data are not widely available. The four types of liquidity measures utilized in this study are easy to find but it does not mean that, the measurements are not good. According to the Marshall and Young (2003) turnover rate is a more powerful liquidity proxy than spread , this argument is based on previous study of Constantinides (1986) and Vayanos (1998) that argue, transaction cost or spread` mainly influence holding periods and  volumes of trading and further affect expected return. Following Jun *et al.* (2003) this study also include turnover SD ratio basically this variable is turnover ratio divided by standard deviation of return index. According to Jun *et al.* (2003) this measure could be more appropriate to use in predicting the relation between liquidity and equity return in developing countries. Another measurement which is utilized in this study is Amihud (2002) illiquidity variable, this variable also call price impact variable or price pressure variable because it captures the impact of order flow on price.

Overall, this study examines the relationship between market liquidity using multiple measures such as (turnover ratio, trading volume, turnover SD ratio and also Amihud (2002) Illiquidity) and market return in the emerging countries and  the developed countries. More specifically, this study also investigates the relationship of market liquidity and market return during crisis and non-crisis, using dummy variable. This study can be useful for investor, academic and regulators to understand the link between market liquidity and equity.

In the remainder of the paper, section 2 provides a description of the data and the research methodology. Section 3 describes and analyzes our empirical results. Finally, section 4 offers the conclusions drawn from this study.

## 2. DATA AND RESEARCH METHODOLOGY

### 2.1. Data and Sample Selection

The primary source for the data in this study is Thomson Reuters Data Stream. The data is monthly data between December 1999 and December 2013. This study uses data from 16 developing countries and 6 developed countries all over the world including country in Europe, Asia, and Africa. The classification of developing and developed country is based on emerging

country index based on the Morgan Stanley Capital international (MSCI). Moreover, for the purpose of comparability, all data is defined in US dollar units.

The liquidity variables in this study are as follows: trading value, turnover ratio, turnover SD ratio, and Amihud illiquidity ratio. We expect that the higher trading volume, the higher the trading value of a given security, other things being equal (Amihud and Mendelson, 1986; Jun *et al.*, 2003). Moreover, this study also utilizes turnover ratio as a comparable measure of liquidity across market. Turnover ratio is a ratio between dollar value of shares traded and market value or market capitalization. The turnover ratio is expressed as the following:

$$TR_{i,w} = \frac{TV_{i,w}}{MV_{i,w}}$$

Where $TR_{i,w}$ is the turnover ratio of country $i$ in week $w$, $TV$ is trading value *and MV* is stock market value.

In addition to that, this study also use turnover volatility ratio as another measure of market liquidity. Based on Jun *et al.* (2003) turnover volatility (turnover SD) is a measurement of liquidity that can capture price change of a quoted securities because it count from turnover ratio divided by the Standard Deviation (SD) of the market return. Standard deviation (SD) is calculated using a trailing 52 weekly return for each of developing and developed equity market. The formula for turnover SD ratio is as follows:

$$Turn\ SD = \frac{TR_{i,w}}{SD_{i,w}}$$

Where $Turn\ SD_{i,w}$ is turnover SD of country $i$ in week $w$, $TR_{i,w}$ is turnover ratio, and $SD_{i,w}$ is standard deviation of return.

Moreover, Amihud Illiquidity is a variable created by Amihud (2002). Amihud variable illiquidity is the daily ratio of absolute stock return to its volume in dollar, averaged over same period which can be defined as follows:

$$Illiq_{i,w} = \sum_{t=1}^{d,i,w} \frac{|R_{i,d,w}|}{TV_{i,d,w}}$$

Where $Illiq_{i,w}$ is illiquidity variable of country $i$ in week $w$, $R_{i,d,w}$ is average daily return.

In this study, Amihud variable can be interpreted as daily price response if changing one dollar of trading volume. According to Amihud (2002), Amihud illiquidity is related to disagreement between traders about new information. When investor find out about the implication of news to corporate value, the price of company stock change without any trade while disagreement will affect trading value. Similarly, Amihud variable also can also be viewed as a measure of agreeement among investors about recent information.

## 2.2. Research Methodology

This study utilizes fixed-effect panel data regression to cover both time-series and cross-sectional data. According to Baltagi *et al.* (2013), fixed-effect panel data regression is capable to

control variable that change over time and across entities. Since each country has its own characteristics, this paper controls this nature using fixed effect. Moreover, this study also use dummy variable for crisis as shown in equation (1) to study the relationship between the market liquidity and the market return during crisis and non-crisis time in developing country. The dummy variable is 1 for crisis time and 0 for the non-crisis time. The crisis dummy variable of crisis is set as 1 between August 2007 and February 2009. Thus, the equation (1) is expressed as follows:

$$R_{i,w} = \beta_0 + \beta_1 MSCI_{i,w} + \beta_2 Liquid_{i,w} + \beta_3 D\ crisis\ X\ Liquid_{i,w} + \beta_4 D\ Crisis\ + \beta_5\ DY_{i,w} + \beta_6 ER_{i,w} \tag{1}$$

where $R_{i,w}$ is Market returns of developing or developed country in country i in week $w$, *MSCI* is regional MSCI return, $D\ crisis$ is dummy variable of crisis and non-crisis, in which 1 for the crisis time and 0 for non-crisis, $Liquid$ is liquidity measurement (trading value, turnover, turnover volatility, illiquidity), $DY$ is the dividend yield, and $ER$ is the exchange rate.

This study also use market adjusted return as another dependent variable for robustness test. Market adjusted return is the market return after controlling regional market beta, which is defined by MSCI regional index. Following Jun *et al.* (2003) the calculation of market-adjusted return is as follows:

$$R_{i,w} = \alpha + \beta_1 MSCI_{i,w} + \varepsilon_{i,w} \tag{2}$$

Moreover, this study also performs robustness check by using market adjusted return as shown in equation (3) below:

$$AR_{i,w} = R_{i,w} - (\alpha + \beta_1 MSCI_{i,w}) \tag{3}$$

where $AR_{i,w}$ is market Adjusted return of country *i* in time *w*

Moreover, the market adjusted return equation utilized in this study is provided in equation (4) as follows :

$$AR_{i,w} = \beta_0 + \beta_1\ Liquid_{i,w} + \beta_2 D\ crisis\ X\ Liquid_{i,w} + \beta_3 D\ Crisis\ + \beta_4\ DY_{i,w} + \beta_5 ER_{i,w} \tag{4}$$

## 3. EMPIRICAL RESULTS

Table 3.1 and 3.2 present descriptive statistics of the 16 developing countries and 10 developed countries, respectively. Additional information regarding the name of stock exchange and stock index of each country is provided in Appendix A. Moreover, each of the variable is based on the data recorded in December 2013, to describe the recent condition of the country.

Moreover, both Table 3.1 and 3.2. also provide the average of all data in each country per December 2013. For example, based on table 3.1, the highest average weekly return, in developing countries, is in South Africa as much as 0.026. On the other hand, the minimum weekly return average is in Turkey as much as -0.082. In addition to that, the largest trading value in developing countries is in South Korea, followed by Taiwan and India. The market value of the total company in developing country is in China and South Korea. Furthermore, The turnover ratio is greatest in

Turkey and South Korea, and lowest in Czech Republic, Egypt, Poland, and South Africa. In table 3.2., the highest average weekly return is in Sweden, Australia, and Japan. In developed countries, the stock exchange with leading trading volume, market value, turnover ratio, and turnover volatility is Japan. The highest Amihud variable, however, is in Japan and United Kingdom.

**Table-3.1.** Descriptive Statistics of Developing country stock market variables (per December 2013) in US dollars

| No | Country | Weekly Return | Trading Value (000) | Market Value (million) | Turnover | Turnover volatility | Amihud | Exchange Rate | Dividend Yield |
|----|---------|---------------|---------------------|------------------------|----------|---------------------|--------|---------------|----------------|
| 1 | Czech Republic | 0.009 | 41529.6 | 53754 | 0.001 | 0.037 | 2.25E-07 | 19.9 | 4.5 |
| 2 | Egypt | 0.007 | 17627.1 | 28995 | 0.001 | 0.019 | 4.15E-07 | 6.9 | 1.5 |
| 3 | Hungary | -0.007 | 33126.2 | 17886 | 0.002 | 0.118 | 2.05E-07 | 218.2 | 3.5 |
| 4 | India | 0.011 | 9278988.3 | 459371 | 0.020 | 0.865 | 1.77E-09 | 62.3 | 1.5 |
| 5 | South Korea | 0.010 | 16615927.3 | 1119126 | 0.148 | 8.580 | 5.74E-11 | 1055.6 | 1.4 |
| 6 | Malaysia | 0.013 | 420999.2 | 318717 | 0.001 | 0.110 | 2.98E-08 | 3.3 | 2.9 |
| 7 | Mexico | 0.013 | 3019505.3 | 357583 | 0.008 | 0.401 | 4.47E-09 | 13.1 | 1.7 |
| 8 | Philippines | 0.009 | 340110.8 | 143933 | 0.002 | 0.085 | 2.76E-08 | 44.4 | 2.0 |
| 9 | Poland | 0.010 | 332889.2 | 269717 | 0.001 | 0.050 | 2.95E-08 | 3.0 | 3.3 |
| 10 | South Africa | 0.026 | 802185 | 574195 | 0.001 | 0.078 | 3.25E-08 | 10.5 | 2.8 |
| 11 | Taiwan | 0.015 | 11026809.7 | 804903 | 0.014 | 0.971 | 1.36E-09 | 30.0 | 2.7 |
| 12 | Thailand | -0.033 | 3770930.9 | 348315 | 0.011 | 0.405 | 8.69E-09 | 32.8 | 3.4 |
| 13 | Turkey | -0.082 | 1043328.3 | 185469 | 0.563 | 13.924 | 7.84E-08 | 2.2 | 3.1 |
| 14 | Indonesia | 0.004 | 1280289.6 | 339566 | 0.004 | 0.133 | 3.24E-09 | 10.5 | 2.3 |
| 15 | China | 0.019 | - | 3697000 | - | - | - | - | 2.3 |
| 16 | Brazil | 0.002 | 3830277.9 | 720934 | 0.005 | 0.207 | 4.12E-10 | 2.4 | 3.8 |

**Table-3.2.** Descriptive Statistics of Developed countries' stock market variables (per December 2013) in US dollars

| No | Country | Weekly Return | Trading Value | Market Value | Turnover | Turnover volatility | Amihud | Interest Rate | Exchange Rate | Dividend Yield |
|----|---------|---------------|---------------|--------------|----------|---------------------|--------|---------------|---------------|----------------|
| 1 | United States | 0.013 | 156068200 | 6241557 | 25.005 | 623.550 | 8.09373E-11 | 0.25 | 1.000 | 1.3 |
| 2 | Japan | 0.023 | 922226000000 | 30748631040 | 29.992 | 999.750 | 2.44345E-14 | 0.00 | 104.7 | 1.5 |
| 3 | German | 0.014 | - | 87972 | - | - | - | 3.13 | - | 32.0 |
| 4 | France | 0.019 | 4001445.660 | 733593 | 5.455 | 288.740 | 4.83403E-09 | 5.32 | 0.7 | 3.0 |
| 5 | United Kingdom | 0.022 | 3292422.657 | 1456796 | 2.260 | 144.400 | 6.63352E-09 | 4.94 | 0.8 | 3.5 |
| 6 | Canada | 0.014 | 5941123.541 | 1772823 | 3.351 | 423.510 | 2.36632E-09 | 1.06 | 1.1 | 3.0 |
| 7 | Australia | 0.024 | 14963409.640 | 1495371 | 10.006 | 618.430 | 1.6064E-09 | 2.58 | 1.1 | 4.0 |
| 8 | Singapore | 0.021 | 1635315.002 | 335216 | 4.878 | 325.200 | 1.27729E-08 | 0.14 | 1.3 | 3.2 |
| 9 | Spain | 0.017 | 3796867.486 | 458808 | 8.276 | 303.870 | 4.44972E-09 | 0.24 | 0.7 | 3.7 |
| 10 | Sweden | 0.037 | 319496749.800 | 27159836 | 11.764 | 715.040 | 1.14448E-10 | 0.69 | 6.5 | 3.0 |

Table 3.3 panel A and B show the descriptive statistics of all the variables in this study in developing and developed countries, respectively. Table 3.3 panel A provides descriptive statistics of pooled monthly data for all 16 developing country markets over the period January 2000 through December 2013. Returns in the developing country has a mean 0.00277 or 0.27%. Standard deviation of the return is 0.036 or 3.6%, which mean the data of return can be 3.6% higher or lower. The minimum value of the return for the 16 developing country for a 14 year is -0.262 or 26% and the maximum value is 0.294 or 29%, the gap of the return value show that the return variable has a high variation. Next variable is the Ln trading, which is generated from the log of the weekly trading value.

The mean of Ln trading in 16 developing country is 14.039% with the standard deviation 2.5%. Moreover, the descriptive statistics of liquidity measurements is as follow: the turnover ratio mean of this variable is 0.05 with the standard deviation of 0.14. Turnover volatility has a mean 1.7 with the big standard deviation which is 4.3. The maximum value of the turnover volatility is 89 and the minimum value is o. The mean of Amihud (2002) is 1.04E-06 and the standard deviation of 8.26E-06.

Table 3.3 Panel B show that descriptive statistics of pooled monthly data for all 10 Developed equity markets over the period January 2000 through December 2013. Returns in the developing country has a mean 0.001031 or 0.10%, which is smaller compared to that of developing countries. Standard deviation of the return is 0.028554 which mean the data of return can be 2.8% higher or lower. The next variable is the Ln trading with average 16.661% and standard deviation 5.38%. The maximum value of Ln trading is 28.47% and the minimum value is 0.438%. Moreover, Turnover volatility has a mean 1032.471 with the large standard deviation which is 14.87705 the maximum value of the turnover volatility is 5643.694 and the minimum value is 0.000816. In addition to that, Amihud (2002) is on average, $6.87 * 10^{-5}$ and standard deviation of 0.000433. The maximum value of Amihud variable is 0.013648 and the minimum is 0.000 from the maximum and minimum.

**Table-3.3.** Descriptive Statistics

A. Developing Countries

|  | Return | Ln Trading Volume | Turnover ratio | Turnover volatility | Amihud | Divided yield | Exchange rate |
|---|---|---|---|---|---|---|---|
| Mean | 0.002779 | 14.03900 | 0.057338 | 1.700575 | 0.0000010 | 2.307494 | 99.42772 |
| Median | 0.003846 | 13.98446 | 0.009377 | 0.317306 | 8.90E-10 | 2.360000 | 9.891499 |
| Maximum | 0.294087 | 21.48260 | 2.072248 | 89.97352 | 0.000251 | 44.59 | 1545.300 |
| Minimum | -0.26253 | 6.079366 | 0.000000 | 0.000000 | 0.000000 | 0.740000 | 0.318200 |
| Std. Dev. | 0.036367 | 2.559597 | 0.147132 | 4.320244 | 0.0000083 | 5.991000 | 273.0879 |
| Skewness | -0.03027 | -0.066795 | 4.239710 | 4.287719 | 14.83999 | 98.22932 | 3.481093 |
| Kurtosis | 7.633483 | 3.143010 | 28.92127 | 32.80556 | 295.9520 | 965.000 | 13.74018 |
| Observations | 12512 | 11737 | 11936 | 11936 | 11292 | 11936 | 12512 |

B. Developed Countries

|  | Return | Ln Trading Volume | Turnover ratio | Turnover volatility | Amihud | Divided yield | Exchange rate |
|---|---|---|---|---|---|---|---|
| Mean | 0.001031 | 16.66169 | 23.54154 | 1032.471 | 6.87E-05 | 2.550990 | 12.13279 |
| Median | 0.002999 | 16.73216 | 20.10906 | 829.5280 | 6.49E-10 | 2.480000 | 1.035900 |
| Maximum | 0.189781 | 28.47673 | 133.1580 | 5643.694 | 0.013648 | 8.830000 | 134.6900 |
| Minimum | -0.25305 | 0.438193 | 2.97E-05 | 0.000816 | 0.000000 | 0.160000 | 0.579600 |
| Std. Dev. | 0.028554 | 5.380817 | 14.87705 | 726.2677 | 0.000433 | 1.263122 | 31.44292 |
| Skewness | -0.46866 | -0.618413 | 1.908459 | 1.718261 | 12.58118 | 0.634380 | 2.748396 |
| Kurtosis | 7.692648 | 4.572030 | 8.211934 | 7.002309 | 239.4620 | 3.796421 | 8.796937 |
| Observations | 7776 | 6737 | 6077 | 6077 | 6737 | 7263 | 7809 |

Table 3.4 Panel A and Panel B show the coefficients of correlation among the three liquidity variables together with returns and several other variables. As expected, the three liquidity measures are heavily correlated with each other. From Panel A, there exists high correlation between trading value and turnover ratio (0.63), between trading value and turnover volatility (0.62) and between turnover and turnover volatility (0.93). The three measurements of liquidity and Amihud variable, however, are run separately so there is no problem with multicollinearity. From Panel B, the highest correlation between liquidity measures is between turnover ratio and turnover volatility (0.815). The correlation between return and other control variables is small, ranging from -0.066703 to -0.000741.

**Table-3.4.** Correlation Matrix

A. Developing Countries

| | Return | Ln Trading Volume | Turnover ratio | Turnover volatility | Amihud | Divided yield | Exchange rate |
|---|---|---|---|---|---|---|---|
| Return | 1 | | | | | | |
| Ln Trading Volume | 0.011912 | 1 | | | | | |
| Turnover ratio | 0.026527 | 0.633432 | 1 | | | | |
| Turnover sd ratio | 0.020559 | 0.625165 | 0.931404 | 1 | | | |
| Amihud | 0.005197 | -0.363472 | -0.160219 | -0.156312 | 1 | | |
| Divided yield | -0.00387 | -0.03564 | -0.005135 | -0.004856 | 0.043652 | 1 | |
| Exchange rate | 0.000912 | 0.398662 | 0.50851 | 0.598439 | -0.03095 | -0.003942 | 1 |

B. Developed Countries

| | Return | Ln Trading Volume | Turnover ratio | Turnover volatility | Amihud | Divided yield | Exchange rate |
|---|---|---|---|---|---|---|---|
| Return | 1 | | | | | | |
| Ln Trading Volume | -0.003459 | 1 | | | | | |
| Turnover ratio | -0.066703 | 0.389484 | 1 | | | | |
| Turnover sd ratio | -0.044961 | 0.26862 | 0.815177 | 1 | | | |
| Amihud | 0.006221 | -0.242244 | -0.095183 | -0.085507 | 1 | | |
| Divided yield | -0.052561 | -0.385928 | -0.292549 | -0.295274 | -0.029933 | 1 | |
| Exchange rate | -0.000741 | 0.828547 | 0.122335 | 0.033107 | -0.022233 | -0.344345 | 1 |

Table 3.5 and 3.6 present the main results of our study for the sample of developing countries and developed countries, respectively. Both tables show that market liquidity influence market return differently in developed and developing countries. From table 3.5, in developing country, the evidence shows that market liquidity (measured by Trading value, Turnover, and Turnover volatility) positively affects return and the effect is increasing during crisis time based on two measurement of liquidity. However in developing country, Amihud variable cannot capture the effect of liquidity toward return. On the other hand, from table 3.6, all measurement of liquidity (Trading value, Turnover, and Turnover volatility) is significantly affect return in developed country. Moreover, in developed countries, all liquidity measures except Amihud affect return negatively. The result differences between relation market liquidity toward market return in developing and developed countries may be due to the different point a view of investor when observing the liquidity in developing and developed countries. Based on Jun *et al.* (2003), positive relationship between the market liquidity and stock market return is due to positive association of the market liquidity to economic growth and market liberalization in developing country. Thus, in developing country, higher liquidity is perceived as the good sign and the market with higher liquidity value may lead to higher return.Moreover, from table 3.5 and 3.6., we can see that the relationship between liquidity and stock market return show mixed relationship. Dummy crisis by itself is mainly significant in developing countries, but not in developed countries. The interaction between liquidity and dummy crisis also shows different result between developing and developed countries. From table 3.5, The liquidity measures, except Amihud, have different effect during crisis or non-crisis in developing countries. For instance, Ln trading, Turnover, and Turnover volatility more significantly affect return in a positive way during crises than it does during normal period. In the contrary, the result from table 3.6 show that in developed country, only Amihud variable more negatively affect market return during crisis. Other liquidity measures, such as Trading value, Turnover ratio and Turnover volatility, however, does not add additional effect of market liquidity toward market return.

**Table-3.5.** Relationship between market liquidity and return in developing countries

| Variable | Market Return | | | | Market-Adjusted Return | | | |
|---|---|---|---|---|---|---|---|---|
| MSCI | 0.443306*** | 0.444148*** | 0.444267*** | 0.430421*** | | | | |
| | (-4.762309) | (-4.767348) | (-4.766297) | (-4.247918) | | | | |
| Ln trading | 0.001424*** | | | | 0.00142*** | | | |
| | (-4.749941) | | | | (-3.35429) | | | |
| ln trading*D_Crisis | 0.000679*** | | | | 0.000578* | | | |
| | (-3.930789) | | | | (-1.93365) | | | |
| Turnover ratio | | 0.010952** | | | | 0.005951*** | | |
| | | (-2.159507) | | | | (-2.913181) | | |
| Tunover ratio*D_Crisis | | 0.006668 | | | | 0.001309 | | |
| | | (-1.374489) | | | | (-0.160213) | | |
| Turnover SD ratio | | | 0.00025*** | | | | 5.31E-05 | |
| | | | (-4.989811) | | | | (-0.540111) | |
| Turnover SD ratio* D_Crisis | | | 0.000351*** | | | | 0.000316* | |
| | | | (-4.829796) | | | | (-1.966198) | |
| Amihud | | | | 0.000475 | | | | 0.000482 |
| | | | | -0.383402 | | | | (-0.8162) |
| Amihud*D_Crisis | | | | -0.00611 | | | | -0.00648 |
| | | | | (-1.3311) | | | | (-0.3361) |
| D_Crisis | -0.01489*** | -0.00391*** | -0.00404*** | -0.00105 | -0.01632*** | -0.00644*** | -0.0069*** | -0.00398 |
| | (-4.73647) | (-5.9395) | (-6.20148) | (-0.72753) | (-3.56901) | (-7.84802) | (-7.71906) | (-0.2383) |
| Dividend yield | -4.60E-13*** | -5.39E-13*** | -5.40E-13*** | -5.16E-13*** | -5.9E-13*** | -6.8E-13*** | -6.8E-13*** | -6.55E-13 |
| | (-12.9552) | (-19.1312) | (-19.1321) | (-14.7325) | (-22.71) | (-2960.62) | (-1521.87) | 0 |
| Exchange rate | 4.76E-06*** | -7.31E-06 | 5.08E-06** | -1.31E-05*** | -5.6E-06* | -1.4E-05*** | -5.75E-06 | -2.43E-05 |
| | -2.851211 | (-1.31779) | -2.190797 | (-5.77932) | (-1.8074) | (-2.59744) | (-1.076) | (-0.3233) |
| Adjusted R-squared | 0.182015 | 0.181196 | 0.181014 | 0.166857 | 0.003306 | 0.001892 | 0.001882 | 0.001584 |

*** At 1% significant level, ** at 5% significant level, *10% significant level

**Table-3.6.** Relationship between market liquidity and return in developed countries

| Variables | Market Return | | | | Market Adjusted return | | | |
|---|---|---|---|---|---|---|---|---|
| MSCI | 0.807728*** | 0.786813*** | 0.788604*** | 0.807685*** | | | | |
| | (-14.3024) | (-13.45146) | (-13.50051) | (-14.33762) | | | | |
| Ln trading | -0.00052** | | | | -0.0005** | | | |
| | (-2.39154) | | | | (-2.35871) | | | |
| Ln trading*D_Crisis | 0.000113 | | | | 0.000112 | | | |
| | (-0.786513) | | | | (-0.765802) | | | |
| Turnover ratio | | -0.00011*** | | | | -0.0001*** | | |
| | | (-2.59961) | | | | (-2.76871) | | |
| Turnover ratio*D_Crisis | | -3.11E-05 | | | | -2.99E-05 | | |
| | | (-0.60334) | | | | (-0.60188) | | |
| Turnover volatility | | | -1.26E-06*** | | | | -1.17E-06*** | |
| | | | (-2.61828) | | | | (-2.88619) | |
| Turnover volatility* D_Crisis | | | -1.88E-06 | | | | -1.85E-06 | |
| | | | (-1.23562) | | | | (-1.24329) | |
| Amihud | | | | 2.089657*** | | | | 2.067222*** |
| | | | | -17.5935 | | | | -59.21779 |
| Amihud*D_Crisis | | | | -2.68089*** | | | | -2.64265*** |
| | | | | (-11.931) | | | | (-19.1392) |
| D_Crisis | -0.00255 | 0.001421 | 0.002118 | -0.00035 | -0.00245 | 0.00158 | 0.002313 | -0.00027 |
| | (-1.04894) | -1.208917 | -1.617709 | (-0.5385) | (-0.94939) | -1.258799 | -1.684386 | (-0.554) |
| Dividend yield | -0.00118*** | -0.00117*** | -0.00141*** | -0.00111*** | -0.00117*** | -0.00116*** | -0.0014*** | -0.00111*** |
| | (-6.05032) | (-6.33895) | (-6.52638) | (-5.64342) | (-6.02993) | (-6.24736) | (-6.65982) | (-5.62727) |
| Exchange rate | -1.51E-07 | -3.84E-05** | -1.84E-05 | -3.77E-06 | 5.71E-08 | -3.50E-05 | -1.68E-05 | -3.46E-06 |
| | (-0.01845) | (-2.30204) | (-1.61841) | (-0.52501) | (-0.007085) | (-2.44914) | (-1.65425) | (-0.49546) |
| Adjusted R squared | 0.557064 | 0.544017 | 0.543783 | 0.557377 | 0.001519 | 0.003298 | 0.002986 | 0.002221 |

*** At 1% significant level, ** at 5% significant level, *10% significant level.

Our mixed result regarding the relationship between liquidity and return is aligned with previous literatures. For instance, the notion of positive relationship between liquidity and return is supported by Amihud et al. (1990) which show that stock with higher liquidity have higher price recovery during the crisis due to flight-to-liquidity phenomena. On the other hand, the positive liquidity-return notion is supported by the study of Chordia et al. (2001), Amihud (2002) and Liang and Wei (2012) in developed country. According to them, the negative relationship of liquidity toward return is because investor perceive liquidity as risk so that increasing liquidity (liquidity premium) lead to negative return. The difference of result between developing and developed countries is due to segmentation of developing countries from the global market (Jun et al., 2003)

## 4. CONCLUSIONS

This study focuses on examining whether market liquidity affect stock index return differently in developing and developed countries. Moreover, we also compare the effect of market liquidity to

stock index return during crisis and non-crisis. To measure the effect of liquidity, this study uses the same four measurements of liquidity including trading value, turnover ratio, turnover volatility, and Amihud illiquidity. Our study utilizes data of 16 emerging countries based on MSCI emerging country index and also 10 developed country based on MSCI developed country index. The methodology is panel data with fixed effect for both developing and developed country. For robustness check, this study employs adjusted market return as the other dependent variable.

This study presents mixed results regarding the relationship between market liquidity and market return in the developing and developed countries. In the developing countries, three liquidity measures such as trading value, turnover ratio, and turnover volatility show statistically significant impact toward market return. The coefficients of those liquidity measures are positive toward return, meaning that liquidity positively affect market return, or stock index with higher liquidity have higher return. These results are aligned with the previous study by Jun *et al.* (2003) and Gervais *et al.* (2001) that find market liquidity and trading volume positively affect equity return. Unlike other measurements, however, Amihud illiquidity does not significantly associated with market return in developing country. This finding is, however, in line with the study of Dey and Wang (2012) which shows that Amihud variable is not significant toward return spread. They argue that this result happens because Amihud illiquidity is a noisy estimator with little power in explaining time series variation of stock return. All results are robust and still significant event after controlling dividend yield, exchange rate and world market beta.

Additional analysis of the relationship between market liquidity and market return in developed country reveal contradicting results with those of developing countries. In developed country, three measures of liquidity (i.e. trading value, turnover ratio, and turnover volatility) has significant negative relationship with stock index return. Moreover, for developed country, the effect of interaction variable to market return during crisis time is inconclusive. Three interaction variables (liquidity measure and Crisis) do not significantly affect return. The only significant coefficient is the interaction variable of Amihud Illiquidity variable. Furthermore, the relationship between the Amihud illiquidity and stock index return during crisis period is different with that during normal period. This result is aligned with the finding of Amihud *et al.* (1990) which shows that the market with higher illiquidity have greater price decline during crisis.

## APPENDIX

A. List of Stock Exchanges and Stock Indices in Developing and Developed Countries in our study

| No | Country | Stock Exchange | Stock Indexes |
|----|---------|----------------|---------------|
| 1 | United States | New York Stock Exchange | S&P 500 |
| 2 | Japan | Tokyo Stock Exchange | Nikkei 225 |
| 3 | German | Börse Frankfurt | Deutsche Boerse AG German Stock |
| 4 | France | Euronext Paris | CAC 40 |
| 5 | United Kingdom | London Stock Exchange | FTSE 100 |
| | | | *Continue* |

| | | | |
|---|---|---|---|
| 6 | Canada | Toronto Stock Exchange | S&P Toronto Stock Exchange Composite |
| 7 | Australia | Australian Securities Exchange | ASX 200 |
| 8 | Singapore | Singapore Exchange | Strait Times (STI) |
| 9 | Spain | Bolsa de Madrid | IBEX 35 |
| 10 | Sweden | OMX Stockholm | OMXS 30 |
| 11 | Czech Republic | Prague Stock Exchange (PSE) | Prague Stock Exchange |
| 12 | Egypt | Egyptian Exchange | Egyptian EGX 30 |
| 13 | Hungary | Budapest Stock Exchange (BSE) | Budapest Stock Exchange |
| 14 | India | National Stock Exchange of India | S&P BSE SENSEX |
| 15 | South Korea | Korea Exchange | Korea Stock Exchange KOSPI |
| 16 | Malaysia | Bursa Malaysia | FTSE Bursa Malaysia KLCI |
| 17 | Mexico | Bolsa Mexicana de Valores | Mexican Bolsa IPC |
| 18 | Philippines | Philippine Stock Exchange (PSEi) | Philippines Stock Exchange PSEi |
| 19 | Poland | Warsaw Stock Exchange | Warsaw Stock Exchange WIG20 |
| 20 | South Africa | Johannesburg Securities Exchange | FTSE/JSE Africa All Share |
| 21 | Taiwan | Taiwan Stock Exchange | Taiwan Stock Exchange Weighted |
| 22 | Thailand | Stock Exchange of Thailand (SET) | Stock Exchange of Thailand SET |
| 23 | Turkey | Borsa Istanbul (BIST) | Borsa Istanbul 100 |
| 24 | Indonesia | Indonesia Stock Exchange | JKSE composite |
| 25 | China | Shanghai Stock Exchange | Shanghai Stock Exchange Composite |
| 26 | Brazil | Brazil Sao Paulo Stock Exchange (BOVESPA) | Ibovespa Brasil Sao Paulo Stock Exchange |

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