Liquidity and Returns in the Trinidad and Tobago Stock Market

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Preliminary draft (for comments please)

ABSTRACT

The study examines two central issues in the context of the Trinidad and Tobago Stock Exchange: 1) whether swings in the composite index impact on the nexus between liquidity and returns, and (2), whether stocks with lower liquidity yield higher returns. To investigate these issues, the study uses fixed effect panel estimation techniques. It is found that 1) the swing in the index does not impact significantly on the relationship between liquidity and returns; 2) the relationship is sensitive to the sample of companies selected; and 3), the overall market do not reflect the negative relationship between liquidity and returns as hypothesized in the literature.

1.0INTRODUCTION

The Trinidad and Tobago Stock exchange is a nascent exchange in which there is a tendency of market players to buy and hold stocks rather than actively trade them. Moreover, given the thinness of the market, the attractiveness of these assets to investors may be weak. Indeed, the attractiveness of the market would be dependent on the potential returns investors can earn, given the liquidity risk exposure they face when investing on the market.

The vast quantum of research on the liquidity/return relationship suggests that investors generally prefer to hold assets that are easily convertible and would therefore require a risk premium for securities that are relatively

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illiquid.[2] By extension, an inverse relationship is said to exist between the level of liquidity and stock returns. Investors are willing to forego higher returns for higher liquidity and financial institutions tailor their portfolios to meet specific liquidity needs and concerns. Many studies in developed markets have concurred on the result yet the issue in emerging markets is not yet conclusive. Similarly, debates on the methodological approach and/or on suitable measures for liquidity are still ongoing. Liquidity in this context is defined as the ability to quickly buy or sell large quantities of an asset at a relatively low cost. Measures used to capture liquidity are often grouped into: transactions cost, trading volume, volatility measures and other measures. Each set of proxies reflects a different dimension of liquidity (or illiquidity) and as a result comparisons among stocks are most useful with similar proxies.

Liquidity levels in a market affect not only domestic investment but also the degree to which foreign companies are willing to invest in the local market. Contemporary firms are increasingly raising capital in the global financial market, or are cross-listing stocks on more than one stock exchange. These companies seek markets that are perceived to be quite liquid since it implies: a greater supply of funds is available to finance investment; it is easier to access those funds (relative to less liquid markets); and the relative costs of obtaining those funds are fairly low. When the market liquidity is low, firms and (institutional) investors are hesitant to participate in such markets. In fact, Harvey, et al. (2003) reported an important finding from a study conducted in 1992 which stated that low liquidity was one of the main reasons that prevented foreign institutional investors from investing in emerging markets.

Moreover, liquidity tends to disappear whenever there is a financial dilemma. The experience in many countries shows that this market

[2] See for example, Datar et al. (1998) and Marshal (2006) just to mention a few studies.

condition leads to panic and may further exacerbate the fallout. It is therefore important for us to understand the dynamics of liquidity: the conditions that influence it; its role in determining the level of returns for investors; its impact on financial stability and the development of capital markets. Policy makers must be clear on which variables (economic or otherwise) they must target in order to adjust the conditions that influence liquidity. For example, the introduction of the Automated Trading System on the Trinidad and Tobago Stock Exchange (TTSE) in March of 2005 is expected to yield, inter alia, efficiency gains due to improvements in liquidity.

The objective of this research is to determine the impact of market-wide liquidity on stock market returns in the TTSE, with a view of investigating whether the inverse relationship that exists in the literature for developed markets is also present on the TTSE. The investigation involved the use of panel data estimation to analyze the impact of liquidity measures on a return variable while simultaneously controlling market conditions. In particular, liquidity measures such as: the volume of shares traded to total outstanding stocks and a trading day dummy variable were regressed on the stocks' daily return variable.

The paper is organized in the following way. Section 2 delineates some of the major ideas discussed in the literature. Section 3 details the construction of the variables, presents summary statistics and stylized facts, and outlines the methodological approach adopted. The regression results are and inferences drawn are presented in section 4 and concluding remarks are given in section 5.

2.0 LITERATURE REVIEW

The increasing body of literature on the liquidity-return relationship suggests that liquidity directly impacts stock market returns as well as asset prices. Liquidity can be defined as the ease with which assets are converted to cash and vice versa while keeping prices relatively stable. Finding a suitable proxy is necessary in order to establish the nexus between liquidity and stock returns. However, such a measure can be quite elusive since liquidity is made up of a number of dimensions and is influenced by the microstructure of a stock market. As a result a single measure may not be forthcoming. Holl and Winn (undated) found measures with similar designs were correlated and classified them in terms of transaction costs, trading volume, volatility and other.

The transaction cost measures, capture the general costs incurred when obtaining a stock irrespective of the level of market prices. The bid-ask spread is the most widely used proxy for transaction cost and stocks that are more liquid are usually characterized by smaller bid-ask spreads than less liquid ones. The ability to trade large numbers of securities is often estimated by trading volume measures. Value of shares trades, the turnover ratio and the number of shares are among the measures generally used to capture this dimension of a stock. Volatility is reflected by the speed with which price fluctuations resulting from trades are dissipated, and the number of non-trading days is yet another measure that can be used.

Amihud and Mendelson (1986) were among the pioneers who hypothesized that expected stock returns is positively related to the bid-ask spread. They used New York Stock Exchange (NYSE) stocks data over the period 1961 – 1980 to validate their hypothesis. They define bid-ask spread as the difference between the bid and ask prices and associated this measure with the cost of illiquidity. Using panel estimation, they found a strong positive relationship between return and spread, even after controlling for market betas. The implications of such results are that low-liquidity investments

require long holding periods to mitigate the burden of illiquidity, and long holding periods should be compensated with greater expected returns.

This finding led to a barrage of critiques and counter critiques. Eleswarapu and Reinganum (1993) pointed out that Amihud and Mendelson (1986) selection criteria to include firms in their pooled, cross-section and time series, methodology explained their results as an artifact of a seriously limited sample rather than as a consequence of a true positive spread-expected return relationship (Tapia, et al. 1998). Eleswarapu et al. (1993) looked at the liquidity relationship using the same measures as Amihud and Mendelson (1986), but with an updated time period (1961-1990), and found that the relationship between liquidity and stock returns was only significant in January[3] (Keene 2004). Chen and Kan (1996) found that the Amihud and Mendelson (1986) findings were specific to the methodology they employed, and that a different methodological approach to the same data would result in no return-spread relationship (Marshall, 2006). Eleswarapu (1996) suggested that the NYSE quoted spreads do not reflect the actual cost of transacting since many of the transactions occur inside the quotes (Tapia, et al. 1998). Articles such as Brennan and Subrahmanyam (1996) refuted the findings of Eleswarapu and Reinganum (1993) and find some support for the Amihud and Mendelson (1986) study. Further, Eleswarapu (1997) undertook another study using NASDAQ stocks. The study found supporting evidence for the positive return-spread relationship.

The liquidity-return relationship was further explored by numerous studies which eventually led to the development of other liquidity proxies such as the turnover rate. Hauggen and Baker (1996) found a statistically significant negative return-turnover rate relationship for stocks that were

[3] Eleswarapu et al. (1993) reported similar evidence for the 1981 – 1990 sub-period (Tapia et al., 1998)

part of the Russell 3000 stock index. This was confirmed by Hu (1997) and Datar, Naik and Radcliffe (1998) using NYSE data. Brennan, Chordia, and Subrahmanyam (1998) also found a negative return-liquidity relationship using NYSE and NASDAQ stocks, however, their proxy for liquidity was measured by trading volume rather than by turnover rate (Marshall, 2006). Many other papers investigated the liquidity-return relationship and used various constructs as proxies for liquidity; nevertheless, the general finding of an inverse association supported the ideas outlined in Amihud and Medelson (1986).

Studies on the liquidity-return relationship in emerging markets are few and far between. Harvey, et al. (2003) used data from Standards and Poor's Emerging Markets Database to investigate the impact of market wide liquidity on expected returns. They accepted, from earlier studies, that the evidence of poor liquidity in emerging markets was a result of a lack of diversity in securities and ownership. In addition, they acknowledged some obstacles to their analysis included: the relatively poor quality of data in emerging markets which made detailed transaction data none-existent and the relatively short time-series samples from the perspective of traditional asset pricing empirics, this made pure time-series tests country-by-country less useful.[4] They used a vector autoregressive model and found that the liquidity-return relationship in the emerging markets is consistent with that found in the more developed markets.

The universe of liquidity measures is considerably greater than those that have been used by papers testing the relationship between return and liquidity. Aitken and Winn (1997) reported that there are some 68 extant measures used in the literature and suggested that there is little or no agreement on the best measure to be use.

[4] Because of the relatively short time – series and the volatility of emerging market returns, the data across emerging markets were pooled (Harvey, et al. 2003)

In general, the concepts of liquidity and its inverse relationship with returns have been agreed on by researchers. The appropriateness of different liquidity proxies seemed to be dependent on the microstructure of individual stock markets. Some markets capture detailed information which may allow for the construction of varied liquidity measure while other markets have relatively weak data sets and limits on the data available. The major challenge therefore in constructing a return-liquidity relationship is that of constructing an appropriate liquidity measure given the existing microstructure of the stock market.

3.0 METHODOLOGY

Model Specification

The liquidity measures (lq or td) capture the turnover ratio and the electronic trading dummy variable (dum) while the control variables included the percentage change in the composite index (ic) and depth (md). They were regressed on the return measure (R),

$$R_{it} = \beta_{it} + \beta_1 lq_{it} + \beta_2 IC_{it} + \beta_3 dum_{it} + \alpha_4 md_t + u_{it}. \qquad (1)^5$$

R_{id} represents the return measure and β_{i0} the intercept value for each cross-sectional unit. LIQ_{id} represents the liquidity proxy used in the regression and it assumes a common coefficient across all cross-sectional units. It may be represented by the turnover measure or the trading dummy variable. The control variable, CON, is used to account for of market size, and the change in stock market index. The coefficients on these variables are expected to be positive. Another dummy variable (dum) is also included to trace the impact of electronic trading on stock returns. Finally, ε_{id} represents the error terms in the regression.

[5] A time dummy was also tried in place of the turn over ratio as the liquidity measure but the results were very similar so it is not reported here, but is available upon request.

The central hypothesis of this study is that there is an inverse relationship between stock market returns and liquidity. As such the null hypothesis is, $\beta_1 < 0$.

The estimations for each equation would be conducted on the overall sample, the upside of the index and then the downside of the index. In addition, the result would be compared to see the sign of the coefficient on liquidity when liquidity is regressed against return.

An attempt is also made to see if the results would be robust to the degree of liquidity of stocks. The regression 1 is conducted with respect to the most liquid stocks and compared to the least liquid stocks with respect to the up period. The process is repeated for the negative slope of the index to see how the results compare.

Effect of liquidity on the magnitude of return

The disadvantage of estimating equation 1, is that β_1 would tend to be biased towards been negative in the period of downturn of the stock market index. As a result, model 2 seeks to address this issue by estimation whether liquidity impacts on the magnitude of when the stock market index is reflects a positive gradient, compared to when it reflect a negative gradient. As a result, a new equation is formed with

$$dR_{it} = \alpha_{it} + \alpha_1 liq_{it} + \alpha_2 IC_{it} + \alpha_3 dum_{it} + \alpha_4 md_t + \varepsilon_{it} \quad \text{.....(2)}^6$$

where dR_{it}, measured as $dR = R_{it} - R_{it-1}$, is the size of return measured as the absolute value of the change in market return for a listed company at time t. When regressed in this way, α_1 gives the relationship between liquidity and the magnitude of change in returns.

Estimation Method

[6] The results are very similar when the time dummy is used in place of the turnover ratio.

Panel estimation was employed in this study to test the validity of the liquidity impact on stock returns. A cross-sectional fixed effects model with cross-sectional (SUR) weightings was used. Seemingly unrelated regression (SUR), also known as the multivariate regression, estimates the parameters of the system, accounting for heteroskedasticity and contemporaneous correlation in the errors across equations. The wider system was estimated for the entire period of 536 trading days; for 293 trading days when the stock market was trended upwards; and for 242 trading days when the stock market was experiencing a decline to determine if the liquidity-return relationship remained consistent.

3.2. Construction of Variables

The regression consists of three sets of variables – the dependent variable, the liquidity variables and the control variable(s).

A stock's return was calculated as the difference between the closing quotations on day t and day t-1. Thus, the return for stock i on day d is given by:

$$R_{it} = CP_{it} - CP_{it-1}$$

where R_{it} is the return on stock i on trading-day t; CP_{it} is the closing price of stock i on the last trading day and CP_{it-1} is the closing price of stock i on the previous trading day.

Notwithstanding the diversity of liquidity measures used in the literature and the various dimensions they capture, two measures of liquidity were selected for investigation. These were the proportion of total outstanding shares traded (lq) and the frequency of trade (td).The measures were selected because they were simple to construct and the data were readily available.

$$liq_{it} = \frac{volume_{it}}{totalshares_{it}} \times 100$$

Where, $volume_{it}$ is the volume of stock i traded on day t and $total\ shares_{it}$ is the total outstanding shares of stock i on day t. A dummy variable (du) was used to capture the frequency of trade for each stock.

tcd_{it} = 1 if stock i was traded on day t and 0 otherwise.

The percentage change in the stock market composite index (ic) and a variable to capture the depth of the stock market (md) were included as control variables. Depth was calculated as the market value of total stock traded on day t as a percentage of total market capitalization. This variable is sometimes used as a proxy for market liquidity. To account for trends in the general price movement of stocks, the percentage change in the composite index was included. During the period, the TTSE adopted an automated trading system and a dummy variable, elc, was included to determine the effects on such a system on returns.

Data

The data for this study were obtained from the Trinidad and Tobago Stock Exchange. Twenty-three stocks were examined over five-hundred and thirty-six trading days, between May 21st, 2003 to December 30th, 2006. This section describes the data and outlines the models used to address the hypothesis. In doing so, the methodology for selecting stocks and the construction of the variables are discussed.

3.1. Inclusion Requirements

Stocks were included in the study if they met the following criteria:

- A stock had to be present on the Trinidad and Tobago Stock Exchange throughout the entire period.
- Only stock in the first tier ordinary shares were considered

- Stocks whose price remained constant throughout the period were dropped from the sample
- Variables for each stock had to be of the same integrated order

3.3. Stylised facts

The TTSE was formally established in October 1981 with a mandate "to facilitate the efficient mobilization and allocation of capital, fair and orderly secondary market trading in securities and the efficient clearing and settlement of transactions within a dynamic legal and regulatory framework.[7]" At present, there are 33 companies listed on the first tier market and 2 companies on the second tier market. The total market capitalization now stands at $94.5 billion. There is normally three trading days in a week and trades are done through an electronic trading system[8]. Trades are settled within three days.

Table 1 reports the summary statistics associated with the variables investigated. On average, stock market returns was positive for the period.

Table 1-Descriptive statistics for daily stacked variables[9]

[7] The information in this section was obtained from the Trinidad and Tobago Stock Exchange web site – www.stockex.co.tt
[8] The electronic trading system was introduced on March 18 2005.
[9] R – Return measure is the difference between the closing on trading day t and day t-1. LQ is the liquidity measure; it is the proportion of stock traded to total outstanding stocks. IC measures the percentage change in the composite index and SMD measures the market sized, defined as the value of total stocks traded as a percentage of total market capitalization.

	R	LQ	IC	SMD
Mean	0.011458	0.032594	0.122704	0.024266
Median	0	0.000119	0.060541	0.012331
Maximum	5.45	73.40005	35.74142	0.47941
Minimum	-5.4	0	-25.4592	0.000463
Std. Dev.	0.239464	0.710676	1.956234	0.045522
Skewness	1.760725	90.96923	7.126252	6.00688
Kurtosis	116.3619	9254.732	260.1878	48.22297
Jarque-Bera	6595129	4.39E+10	34017533	1122548
Probability	0	0	0	0

Figure 1 shows the trend in the composite index[10] for the two-year period of the study. It illustrates a general rise in stock prices during the fist half of the period and in contrast a bear market was depicted in the latter period. The composite index grew by over 115 percent during its upward movement over 293 trading days and declined by 22 percent after 243 trading days.

[10] The composite index is a measure of the current aggregate market value as a percent of a base aggregate market value – January 1, 1983. (TTSE Annual report 2004)

Figure 1

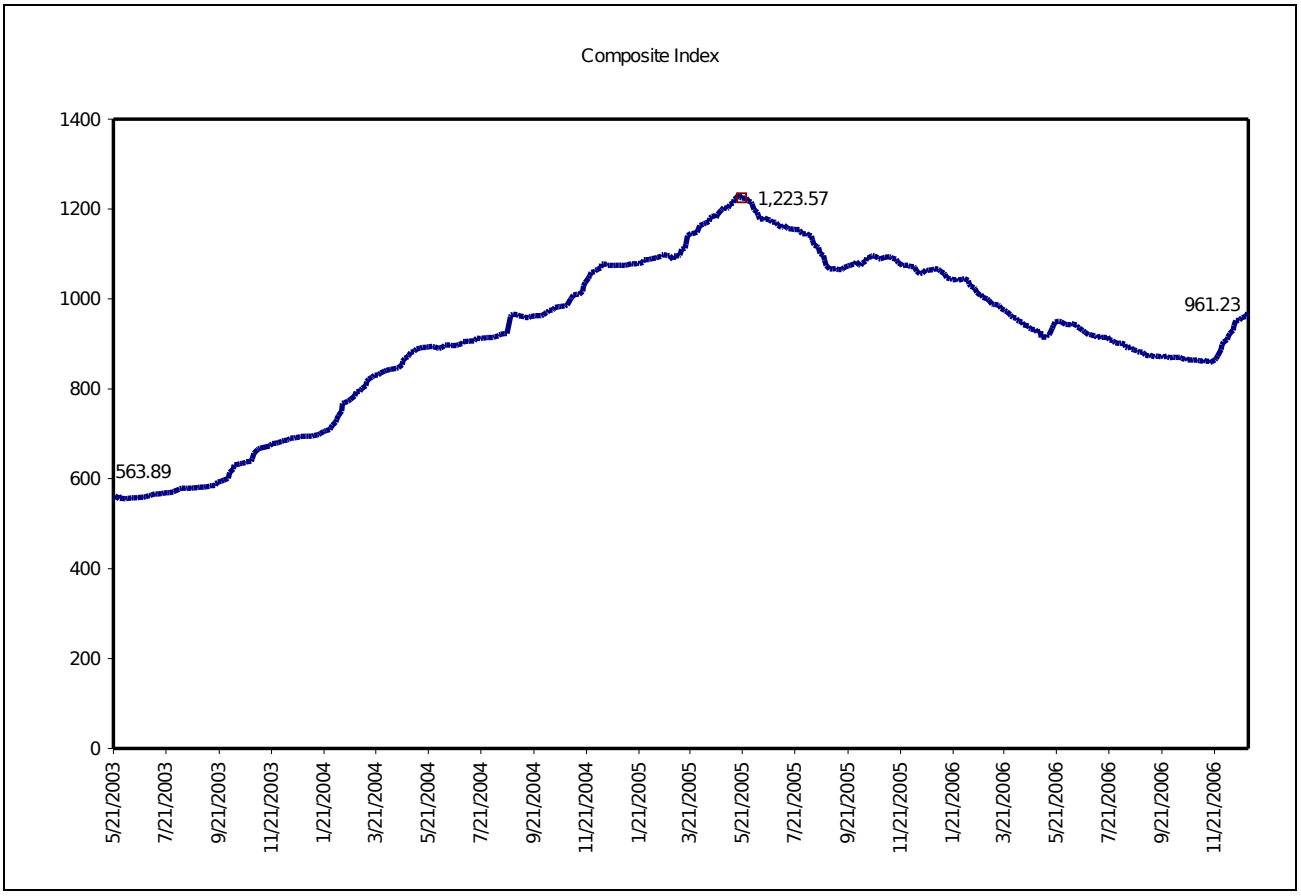


Figure 2 is a scatter plot of the market depth on the TTSE. It shows the daily plot of the total value of stocks traded as a percentage of the total market capitalization. The concentration of low levels for this variable indicates that value of daily trades was relatively small compared to the total market capitalization. Except for a few days the value of stocks traded was less than 0.1 percent of the total market capitalization. This illustration may be indicative of: a very thin market, a highly illiquid market, buy and hold characteristic of investors or various combinations of the three.

Figure 2

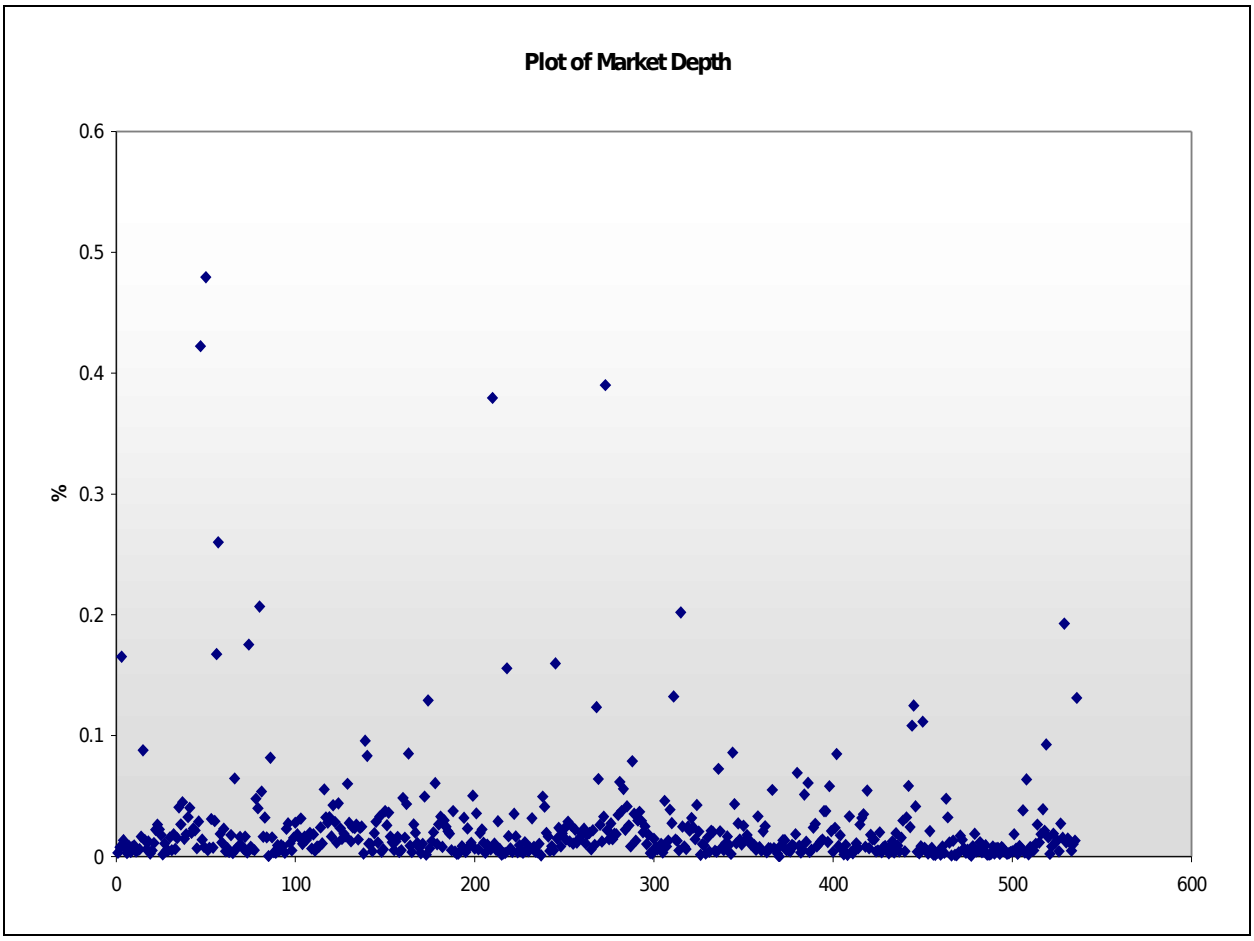
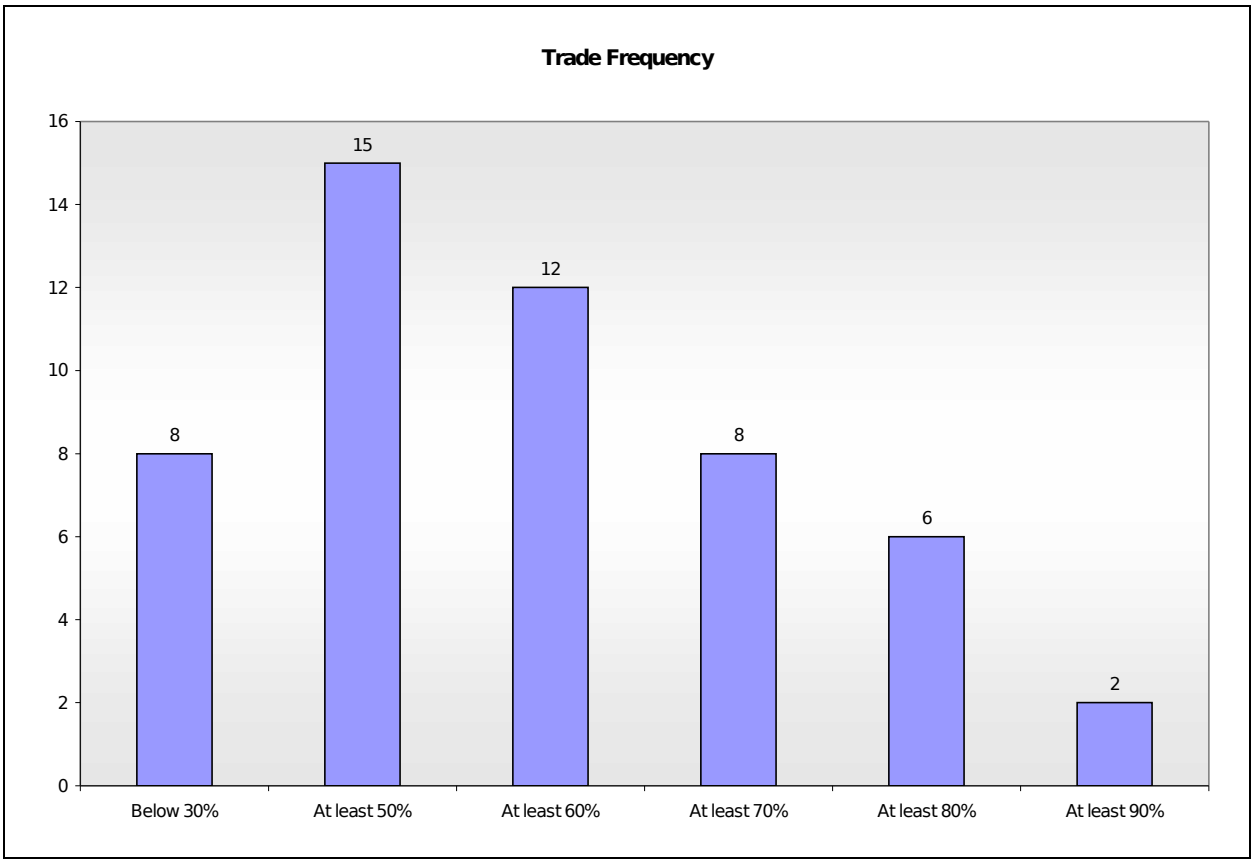


Figure 3 shows the frequency of trade for stocks during the 536 trading days. 8 of the 23 stocks traded less that 30 percent of the trading days, 15 were traded for more than 50 percent.

Figure 3



EMPIRICAL RESULTS

4.1. Unit root test

The panel unit root test is a powerful test that utilizes various tests in determining the existence of unit roots. Levin, Lin and Chu (2002); Breitung (2000); Im, Pesaran and Shin (2003); Fisher-type tests using ADF and PP tests (Maddala and Wu (1999) and Choi (2001)) and Hadri (1999) were used and the summary results are outlined in table 2. Levin, Lin, and Chu (LLC), Breitung, and Hadri tests all assume that there is a common unit root

process so that ρ_i[11] is identical across cross-sections. The first two tests employ a null hypothesis of a unit root while the Hadri test uses a null of no unit root. On the other hand, the Im, Pesaran, and Shin, and the Fisher – ADF and PP tests all allow for individual unit root processes so that ρ_i may vary across cross-sections. The tests are all characterized by the combining of individual unit root tests to derive a panel-specific result (Eviews 5 users guide).

Table 2

Method (Summary)	Statistic	Prob.**
Null: Unit root (assumes common unit root process)		
Levin, Lin & Chu t* Null: Unit root (assumes individual unit root process)	-172.77	0
Im, Pesaran and Shin W-stat	-160.678	0
ADF - Fisher Chi-square	11566.9	0
PP - Fisher Chi-square	12092.3	0

Table 2 provides the results of the group unit root test performed on variables including returns (r); the liquidity measure (lq); percentage change in the composite index (IC); and market size (md). The results indicate that all other tests reject the existence of a unit root. (See Appendix A.1 and A.2 for the full output of the group unit root test and the individual Augmented Dicky-Fuller).

Panel Estimation

As a first step, equation 1 is used to test the nexus between liquidity and returns for (A) the entire period, (B) for the positive gradient of the composite index, and (C) for the negative gradient of the index, to examine the nexus between liquidity and returns.

[11] ρ_i represents the autoregressive coefficients, if $| \rho_i | = 1$ then a unit root exists.

(A) The entire period

Table 3 report the panel estimation results for the entire period 2003 to 2006. The regression controls for the market size and for the introduction of electronic trading and a fixed effect model is used. Interestingly, the dummy variable for the introduction of the electronic trading is negative, supporting the observation that negative returns began to take place not too long after the introduction of the electronic trading system.

Table 3 Result from regression

Dependent Variable: R				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.017504	0.001639	10.68043	0
LQ	-0.00591	0.000393	-15.0374	0
IC	0.002055	0.000547	3.75873	0.0002
Dum	-0.01458	0.00214	-6.81353	0
MD	0.048279	0.023454	2.058472	0.0396
R-squared	0.029937			
F-statistic	14.57346			
Prob(F-statistic)	0			
Durbin-Watson stat	1.608329			

The regression results reported in Table 3 supports the hypothesis often suggested in the literature, that a negative relationship can be expected between liquidity and returns. Thus, if the results are taken on the surface, it would suggest that there is efficiency of the market in this respect. Yet, considering that for almost half of the sample the stock market index reflected a negative gradient, the results call for a deeper inspection of the market.

(B) The up side of the composite price index

As a result, estimations were conducted separately for the upturn period and the downturn period and the results were reported in Tables 4 and 5c respectively.

Table 4 Regression covering the period of up side of the composite index (2003-2005)

Dependent Variable: R				
		Std. Error	t-Statistic	Prob.
C	0.035514	0.000904	39.28963	0
LQ	0.013886	0.002734	5.087004	0
IC	0.001216	0.000306	3.969223	0.0001
MD	0.035222	0.014265	2.469143	0.0136
R-squared	0.055264			
F-statistic	15.70762			
Prob(F-statistic)	0			
Durbin-Watson stat	1.641332			

Table 2 shows a positive relationship between liquidity and returns for the up period of the composite index, α_4. As a result, the null hypothesis that there is a negative relationship between liquidity and returns is rejected for the up period when all the firms are used.

(C) The down side of the composite index

For Table 5, the results are different. A negative relationship between liquidity and returns is found, thus upholding the null hypothesis as was the case when the entire period was examined.

Table 5 Regression covering the down side of the composite index, (2005-2006)

Dependent Variable: R				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.00861	0.001427	-6.03672	0
LQ	-0.00638	0.000444	-14.3869	0
IC	0.111881	0.002685	41.67665	0
MD	-0.02527	0.042247	-0.59808	0.5498
R-squared	0.275457			
Adjusted R-squared	0.272188			
F-statistic	84.24806			
Prob(F-statistic)	0			
Durbin-Watson stat	1.704106			

Given that the tests do not reject the null hypothesis when the gradient of the composite index is negative, the degree of robustness of the test results was examined. In the first place, the sample was divided into those firms which exhibited the highest level of liquidity and those firms which exhibited the lowest level of liquidity to see whether the relationship is maintained across sub-samples. Secondly, an attempt was made to compare the magnitude of change in returns to see whether there is a significant difference between the upside and the downside of the composite index.

Applying Estimation to sub samples

The sub-sample was set up by dividing the sample into the 8 firms which exhibited the highest level of average liquidity when liquidity is measured in terms of the frequency of trade, and the corresponding number of firms which reflected the least level of liquidity. The regressions were first applied to the up-period, and reported in Tables 6 and 7.

Table 6 Eight Companies exhibiting the highest average liquidity for the up period

Dependent Variable: R				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.077197	0.004107	18.7972	0
LQ	0.036914	0.011965	3.085238	0.0021
IC	0.002893	0.001396	2.071758	0.0384
MD	0.1725	0.065749	2.623609	0.0088
R-squared	0.043793			
F-statistic	10.68491	Durbin-Watson stat		1.582977
Prob(F-statistic)	0			

Table 7 Eight Companies exhibiting the highest level of liquidity for the down period

Dependent Variable: R				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0219	0.004992	-4.3871	0
LQ	0.193061	0.069573	2.774933	0.0056
IC	0.274968	0.010786	25.49333	0
R-squared	0.262979			
F-statistic	76.67516	Durbin-Watson stat		1.638393
Prob(F-statistic)	0			

The results suggest that the eight companies exhibiting the highest level of liquidity exhibited a positive relation with returns for the up period, consistent with the overall results. The null hypothesis of a negative relationship was also rejected for the down turn in the index, suggesting the negative relationship was not supported for the sub-sample of firms with the highest returns.

The results were next compared for the eight companies exhibiting the lowest average liquidity for both the up period of the composite index and the down period. The results showed a positive relationship between liquidity and return for the up period, see Table 8.

Table 8 Eight Companies exhibiting the lowest level of liquidity for the up period

Dependent Variable: R1?				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009533	0.000262	36.32025	0.0000
LQ?	0.005105	0.001948	2.620828	0.0088
IC?	3.31E-05	9.69E-05	0.341553	0.7327
R-squared	0.037044			
F-statistic	9.976293	Durbin-Watson stat		1.586972
Prob(F-statistic)	0.000000			

When the down period is considered, the results suggested a negative relationship between liquidity and returns, see Table 9. This is in contrast to the result obtained when companies with the highest level of liquidity in the sub-sample for the same period are considered. Thus, the hypothesis of a negative relationship between liquidity and return was not rejected for the companies with the lowest liquidity in the stock exchange.

Table 9 Eight Companies exhibiting the lowest level of liquidity for the down period

Dependent Variable: R				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.007173	0.000224	-32.05130	0.0000
LQ	-0.006149	0.000465	-13.21400	0.0000
IC	0.000370	0.000504	0.733535	0.4633
R-squared	0.103519			
F-statistic	24.81377	Durbin-Watson stat		1.917391
Prob(F-statistic)	0.000000			

Nexus between liquidity and the magnitude of returns

The final robustness test is to examine the nexus between liquidity and the magnitude of change in returns, to see whether the downturn in the index provides a significantly different result. Tables 10 and 11 compare the two slopes of the composite index.

Table 10 Nexus between liquidity and returns for the up period

Dependent Variable: ACR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.065233	0.000487	133.8309	0.0000
LQ	0.015211	0.002707	5.619348	0.0000
IC	0.000366	0.000183	1.997892	0.0458
R-squared	0.093643			
F-statistic	28.80420	Durbin-Watson stat		1.133252
Prob(F-statistic)	0.000000			

Table 11 Nexus between liquidity and returns for the down period

Dependent Variable: ACR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.112041	0.000341	328.8317	0.0000
LQ?	0.013120	0.000655	20.01530	0.0000
IC?	-0.002642	0.000772	-3.421556	0.0006
R-squared	0.230091			
F-statistic	69.28435	Durbin-Watson stat		1.158882
Prob(F-statistic)	0.000000			

Table 12 Comparison of liquidity for the absolute returns

Wald Test:
Pool: LIQUIDITY

Test Statistic	Value	df	Probability
F-statistic	8.228292	(1, 5564)	0.0041
Chi-square	8.228292	1	0.0041

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
-0.015000000000000006 + C(2)	-0.001880	0.000655

Restrictions are linear in coefficients.

Given the nature of the estimations, a positive coefficient, α_1, is guaranteed. However, the results suggest that α_1 is significantly larger in the up period of the composite index, than the down period of the composite index. This result can be observed from the use of the Wald test, the results for which are shown in Table 12. Thus, the results suggest that liquidity has a larger impact on the magnitude of the change in returns in the up period compared to the down period.

Conclusion

While, a negative relationship between liquidity and returns was obtained initially in the study when the overall sample was used, further probing suggests that the results are not robust to the change in the slope of the composite index, or the sample utilized in the study. Deeper inspection of the market does not support an inverse relationship between liquidity and stock market returns when the slope of the composite index is positive. Moreover, the liquidity/return nexus seems to be more sensitive to the sample of firms examined.

An inference that can be gleaned from the study is that the introduction of the electronic trading system did not significantly impact on the liquidity/return nexus, at least in the short-run. Nevertheless, the evidence suggests that liquidity has a larger impact on the change in returns when the index slopes upwards compared to when the index slopes downwards.

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