Special Feature B

Global Evidence on the Premium for Market Illiquidity

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1 Introduction

Market liquidity is a primary concern for investors as it affects their ability to get into and out of their security investments at minimum costs. Liquidity refers to the ease at which assets can be traded without significantly moving its price. In a frictionless capital market, there is no role for liquidity as investors can buy or sell assets in any quantity without incurring costs. However, in reality, there are trading costs associated with buying and selling securities. An important component of the trading costs is the price impact of trades. A security is illiquid if the seller who initiates the trade has to sell at a discount from prevailing prices[2] to be able to execute the sale immediately. Similarly, a buyer who initiates the trade of an illiquid security may have to pay a premium to induce investors to sell to her quickly. Hence, the price impact of trading reflects the liquidity of the underlying asset and market. The bid and ask quoted prices can be viewed as the price impact of a sell and a buy transaction, respectively, for standard market orders that do not exceed the quoted depth at these prices, that is, the quantities for which these quotes apply. Amihud and Mendelson (1986) propose that illiquidity is priced, that is, illiquid stocks—those with greater trading costs—command a higher expected return relative to liquid ones in equilibrium, since investors demand higher compensation for bearing illiquidity costs.

In this Special Feature, we examine two issues related to liquidity in stock markets globally: (i) the time-series variation in stock market liquidity; and (ii) the impact of liquidity on expected stock returns.[3] Market liquidity can vary with the uncertainty in the financial environment. In bad times, markets may become more illiquid as demand for liquidity may be higher since investors who want to exit their investments demand immediacy. At the same time, the agents who provide liquidity by taking offsetting positions may be financially constrained as funding becomes more costly and harder to get. In addition, taking and holding a position subjects liquidity providers to greater risk for which they want to be compensated. For these reasons, liquidity providers will buy securities for a greater discount, which means the price impact—and illiquidity—will rise. As liquidity is priced, the expected returns of stocks will rise in such episodes and their prices will fall (Amihud, 2002).

We examine these two issues using data on stocks traded in Singapore and 42 other stock markets. We find that over time there is significant variation in liquidity levels: market liquidity declines—illiquidity rises—in periods of global market turmoil. And, across markets,

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2 For simplicity we can refer to the mid-point of the bid and ask quoted prices prior to the transaction.

3 This article draws heavily on the findings presented in our paper on "The Illiquidity Premium: International Evidence" published in the Journal of Financial Economics (2015). We have expanded the sample to include the recent decade and incorporated some new analyses.

there is a positive relation between average stock returns and stock illiquidity, implying a higher cost of capital for companies with illiquid stocks.

As lower cost of financing decreases the hurdle rate for corporate investments, improvements in stock liquidity can boost aggregate investments in the economy. Stock illiquidity can be improved by better corporate disclosure policies which reduce asymmetric information among market players, appropriate trading regulation, facilitation of market making, and appropriate regulation of trading by insiders. Our findings emphasise the universal nature of the phenomenon.

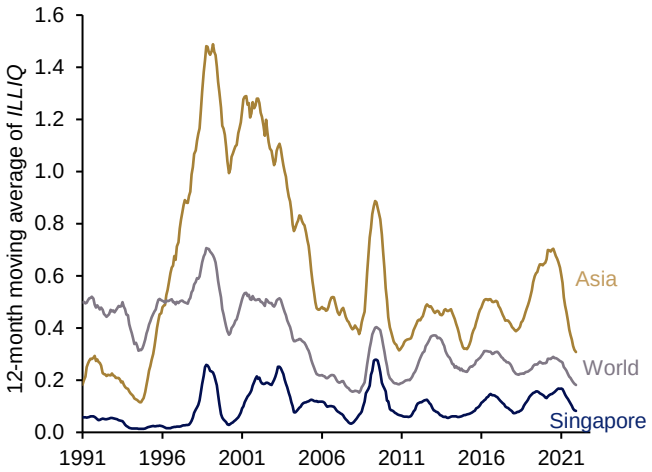
2 The Liquidity of Stock Markets

We begin by examining the liquidity level in 43 stock markets around the world. These stock markets include 13 markets in Asia (China, Hong Kong SAR, India, Indonesia, Japan, Malaysia, Pakistan, the Philippines, Singapore, South Korea, Sri Lanka, Taiwan and Thailand) and 30 markets in the rest of the world (i.e., the Americas, Europe, Australia and New Zealand).[4] We use daily return and trading volume data on stocks traded in these exchanges from 1990 to 2021, obtained from Datastream. We measure illiquidity of each stock i in month t, $ILLIQ_{i,t}$, as the monthly average of the daily ratio of absolute returns to dollar trading volume, a coarse proxy of illiquidity costs including the price impact cost (Amihud, 2002). The monthly stock illiquidity of market or country c, $ILLIQ_{c,t}$, is the market-capitalisation-weighted average of the monthly average illiquidity of all stocks traded in the market. In addition to country-level illiquidity, we calculate the average illiquidity at the regional and global levels by averaging (equal weighting) the monthly $ILLIQ$ across markets included in the region.

Chart 1 plots the 12-month moving average of $ILLIQ$ for Singapore, Asia and all markets in our sample. The chart displays a significant time-series variation in market illiquidity at the country, region and global levels. Notably, the average illiquidity in the stock markets moves together, with periods of market illiquidity coinciding with periods of financial turmoil. We observe spikes in market illiquidity during major market downturns. In particular, markets became more illiquid during the dotcom crisis in 2000, the global financial crisis in 2008–2009 and more recently during the COVID-19 pandemic of 2020. The lower liquidity in bad market states is consistent with greater price impact of trades when markets are more volatile, and funding is costlier and more constrained.

[4] These 30 markets contain seven American markets (Argentina, Brazil, Canada, Chile, Mexico, Peru, and the US), 21 European markets (Austria, Belgium, Cyprus, Denmark, Egypt, Finland, France, Germany, Greece, Israel, Italy, Netherlands, Norway, Poland, Portugal, South Africa, Spain, Sweden, Switzerland, Turkey, and the UK), Australia and New Zealand. The filters applied to the data are detailed in Amihud *et al.* (2015).

Chart 1 12-month moving average of *ILLIQ* for Singapore, Asia and the World

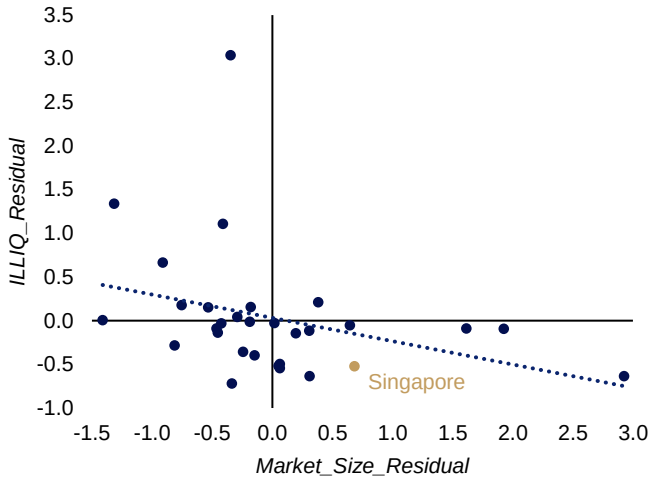


Source: Authors' own calculations

As seen in **Chart 1**, the Singapore stock market is more liquid than both the Asian market average and the global average. The average of the Asian markets, a large share of which constitutes emerging illiquid markets, is more illiquid than the global average. In our detailed analysis (not shown here), we find that the most liquid markets are also the biggest markets (e.g., the US, China, Japan and the UK). In these markets, for many stocks a high transaction volume takes place without meaningfully moving the prices. The Singapore Stock Exchange is relatively liquid despite being a smaller market. We estimate a panel regression of annual market illiquidity (*ILLIQ*) on the lagged size of the stock market (*Market_Size*), measured by the logarithm of total stock market capitalisation of all companies listed on the domestic exchange (data from 1990 to 2020 are obtained from the World Bank). The regression includes the logarithm of the country's GDP, year and region fixed effects (the regions are America, Asia, Europe), and the standard errors are clustered by country. We find that the slope coefficient of *Market_Size* is −0.258 with $t = -3.41$, and is highly significant, supporting the view that illiquidity is lower for larger markets after controlling for the size of the country's economy. Naturally, these results do not suggest the direction of causality. It could be that better regulation that makes a market more liquid attracts more firms to go public and list in the market, and hence induces more trading.

We also examine the relative stock market illiquidity as a function of the total capitalisation of each market, controlling for the country's size as measured by its GDP. For this figure, we run two panel regressions, one of *ILLIQ* and one of *Market_Size* on GDP and the fixed effects, and then regress the residuals from the regression of *ILLIQ* (*ILLIQ_Residual*) on the residuals from the regression of *Market_Size* (*Market_Size_Residual*). We use 30 countries for which data is available from the World Bank for the year 2020. **Chart 2** displays the inverse relation between *ILLIQ_Residual* and *Market_Size_Residual*, represented by a negative slope line. Notably, the Singapore stock market is more liquid than that predicted by the linear relation based on market size, adjusted for the effect of the size of the economy. This observation also holds over the years in our sample period, though not reported here. In other words, Singapore's stock exchange has achieved a higher liquidity than expected purely based on its market's capitalisation.

Chart 2 Correlation between *ILLIQ_Residual* and *Market_Size_Residual*



Source: Authors' own estimates

3 The Pricing of Illiquidity: Portfolio Approach

In this section, we examine whether investors require a positive premium for investing in relatively illiquid stocks. We group stocks into portfolios based on their return volatility and stock illiquidity in each quarter. We do this to ensure that the stock illiquidity effect that we capture is not confounded with the effect of volatility, defined as the standard deviation of daily stock returns during the same period. At the end of each quarter, we sort stocks by their volatility and group them into three portfolios, and then within each volatility portfolio we sort stocks by their *ILLIQ* and group them into five portfolios. This procedure yields 15 (3x5) portfolios, with high and low *ILLIQ* stocks in the extreme quintiles within each volatility group. Next, we calculate the returns on these portfolios in the following three months, skipping one month after the end of the portfolio formation.[5] This three-month rebalancing procedure is repeated to obtain a time series of monthly portfolio returns. The portfolio formation is updated at the end of each quarter. For example, at the end of March 2000, we form the 15 portfolios using return volatility and *ILLIQ* computed from daily data from January to March 2000, and compute portfolio returns in May, June, and July, skipping April 2000. Similarly, the returns in August, September, and October 2000 are for portfolios formed at the end of June 2000.

The illiquidity premium is the difference in returns between the least and the most liquid portfolios, averaged across the three volatility portfolios. The return on the illiquid-minus-liquid portfolios, denoted *IML*, captures the return premium earned by the most illiquid portfolio each month relative to the most liquid portfolio in that month in each market. The *IML* premium earned for each market is averaged across all markets in Asia and globally. These estimations are reported in **Table 1**. We also report the average *IML* for Singapore stocks.

Table 1 shows that the average *IML* in Singapore is 0.75% per month (a little over 9% p.a.), suggesting that there is a significant and positive illiquidity premium in the Singapore

[5] We use return-weighted portfolio returns (i.e., one plus the previous month return as the weight) to mitigate potential upward bias in equal-weighted portfolio returns (Asparouhova *et al.*, 2010, 2013).

stock market. The average monthly *IML* is 1.04% for the Asian markets and 0.67% for the global markets, which are significant both economically and statistically. Thus, there is strong international evidence that investors care about stock liquidity and demand a significant premium for illiquid stocks.

Table 1 Illiquidity premium around the world: Monthly returns on the hedge portfolio *IML*, composed of Illiquid-Minus-Liquid stocks

	Singapore	Asia	World
Panel A: Mean returns on *IML*			
Mean	0.750	1.040	0.673
(t-statistic)	(2.65)	(6.87)	(6.46)
Panel B: Mean risk-adjusted returns on *IML*			
Mean	0.981	1.052	0.774
(t-statistic)	(3.24)	(5.58)	(7.17)

Note: Panel A reports the mean monthly returns (%) for stocks listed in Singapore, 13 Asian markets and 43 stock markets globally. Panel B presents the *IML* return premium after adjusting for exposures to global and regional risk factors that include the market, size and value factors.

All estimates significant at 1% significance level.

We consider the possibility that the illiquidity premium is driven by the exposure of illiquid stocks to risk factors. For instance, illiquid stocks usually have lower market capitalisation. Since a smaller size may indicate greater risk, the risk effect and the illiquidity effect may be confounded and the higher average return on illiquid stocks may be due to the premium for riskier small firms. On the other hand, illiquid stocks may have a higher exposure to the market—a higher β—which has a positive risk premium. We account for the exposure of stocks to common risk factors by employing the size and value factors following Fama and French (1993). We form for each market the factors SMB—the return on small-minus-big stocks and HML—the return on high-minus-low book-to-market ratio.[6] We calculate the global size and value factors as the weighted average of the countries' factors using the aggregated market values of each market as weights. We also classify the 43 sample markets into six regions based on their geographical locations and economic development status,[7] and construct regional size and value factors. Global market return is measured by the return of the MSCI All Countries World Index in excess of the U.S. one-month Treasury bill rate, and regional returns are based on the value-weighted average of returns in markets within the region.[8] Finally, each market's *IML* is regressed on the three global factors and the three regional factors (of the region to which the market belongs)—i.e., overall market factor and size and value factors—to get the country's risk-adjusted illiquidity premium, $alpha_{IML}$.[9] We then average $alpha_{IML}$. for the Asian markets and globally. As shown in Panel B of **Table 1**, the $alpha_{IML}$ values are very close to that of the unadjusted average premiums, *IML*. For Singapore $alpha_{IML}$ is 0.98% per month, or about 12% p.a. This is slightly lower than the average risk-adjusted illiquidity premium for Asia and higher than the global average risk-adjusted premium. All risk-adjusted premiums are highly significant. These findings mean that there

6 This is also referred to as value-minus-growth factor.

7 The six regions are Asia, Europe (and Africa) and America, and in each we have developed and emerging markets.

8 For details of the global and regional factors' construction, please refer to Amihud *et al.* (2015).

9 The t-statistics are those for the averages of the Asia or World markets. For Singapore, the t-statistic is obtained directly from the regression of *IML* on the global factors and the Asian developed countries' factors.

exists a significant illiquidity premium that is not explained by exposures to standard risk factors.

4 The Illiquidity Premium: An Alternative Estimation

We employ another method for estimating the illiquidity premium, which controls for the characteristics of individual stocks. In each country we conduct cross-sectional regressions of monthly stock returns in excess of the risk-free rate on stock characteristics. Our focus is on the stock illiquidity, $ILLIQ$, controlling for the following variables: size (the stock capitalisation in logarithm), book/market, return volatility, and returns in the past three and the preceding nine months, which capture the momentum effect (Jegadeesh and Titman, 1993). The values of all explanatory variables are lagged by one month relative to the dependent variable, the monthly stock excess return (over the risk-free rate). Thus, the regressions are predictive, estimating the effects of the explanatory variables on expected return.[10] Next, we calculate the time-series average of the monthly coefficients of each variable for each country. For Singapore, we present the mean and t-statistic from this calculation. For Asia and the World, we present the means and t-statistics across markets of the market-level average estimates of the coefficients.

Table 2 Cross-sectional relation between stock returns and stock illiquidity ($ILLIQ$), controlling for firm characteristics

Market	$ILLIQ$	Size	Book/Market	Volatility	Past 3-month Returns	Past 9-month Returns
Singapore	0.105	−0.140	0.268	−0.608	0.010	0.003
	(2.76)	(−2.08)	(3.00)	(−2.84)	(1.69)	(0.66)
Asia	0.055	−0.254	0.379	−0.519	0.004	0.001
	(3.20)	(−6.80)	(3.27)	(−5.36)	(2.52)	(1.34)
World	0.071	−0.159	0.285	−0.466	0.012	0.005
	(4.95)	(−6.63)	(6.55)	(−8.34)	(7.36)	(7.15)

Note: The table reports the mean regression coefficients from monthly cross-sectional regressions of stock returns on stock characteristics for stocks listed in Singapore, 13 Asian markets and 43 stock markets globally. Numbers in parentheses indicate the corresponding t-statistics.

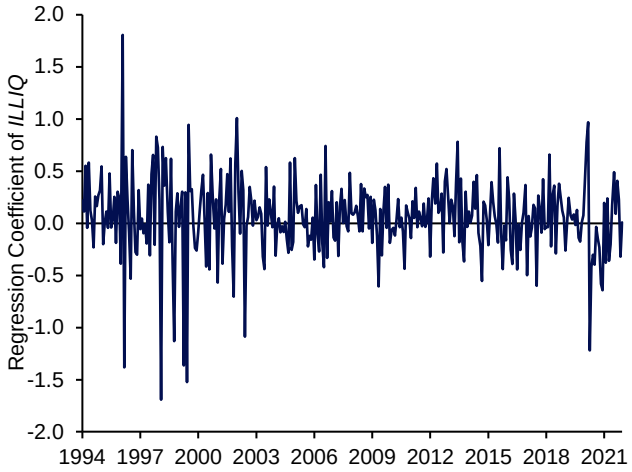
All $ILLIQ$, Size, Book/Market and Volatility coefficients are significant at 5% significance level.

The results are presented in **Table 2**. We find that the coefficient of $ILLIQ$ in Singapore is 0.105 with a t-statistic of 2.76, indicating that a stock whose illiquidity is twice the average illiquidity of the Singapore Exchange has a higher return of 0.105% per month, or 1.26% per year. For the Asian markets, the average coefficient of $ILLIQ$ is significantly positive at 0.06 (t = 3.20). The effect of $ILLIQ$ in the global markets is also reliably positive at 0.07 (t = 4.95). Other firm characteristics also predict stock returns. For instance, stocks with high lagged return volatility perform poorly in the following period, consistent with the results in Amihud (2002) and Ang, Hodrick, Xing and Zhang (2006). It is noteworthy that, while illiquidity predicts higher expected return, volatility predicts lower expected return. Importantly, the coefficient of $ILLIQ$ remains significant and positive after controlling for various firm characteristics,

[10] In addition, this regression is return weighted to control for the possible bias due to microstructure noise.

suggesting that the relationship between stock return and illiquidity is stable, powerful, and not driven by any other firm characteristics.

Chart 3 Average monthly regression coefficients of *ILLIQ* of Asian Markets



Source: Author's own estimates

To examine how the pricing of stock illiquidity in Asia varies over time, we calculate the average of the monthly estimated coefficient of *ILLIQ* in the above market-by-market regressions across the Asian markets, and then plot the time series of the 12-month moving average of the cross-country average monthly coefficient of *ILLIQ*. This is presented in **Chart 3**. (This series starts from January 1994 due to the data availability of control variables and the use of a 12-month moving average.) For most of the period we observe a positive illiquidity premium, measured by the mean of the coefficient of *ILLIQ*. The pricing of illiquidity varies over time. In particular, the illiquidity premium was highly negative following the 1998 Asian crisis and the burst of the dotcom bubble which followed in 1999–2000, and in the COVID-19 pandemic crisis of 2020–2021, meaning that illiquid stocks underperformed particularly during economic crises.

5 Concluding Remarks

The evidence presented in this article highlights the importance of stock market liquidity in affecting the cost of equity capital across 43 countries. There is strong evidence that investors require a premium for illiquidity which is significant economically as well as statistically. This holds internationally, encompassing the markets of Singapore, Asia and the rest of the world.

Liquid stock markets are important for economic growth. Facilitating liquid trading in stocks and bonds lowers the expected return demanded by investors, which includes a premium for illiquidity, thus lowering the corporate cost of capital. Put differently, the more liquid the stock, the higher is its price for any given cash flow that it generates. This encourages raising capital in the market for investments that fuel economic growth.

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