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Commonality in Liquidity

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Commonality in Liquidity

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Abstract

Following previous research which established that liquidity commonality exists within one stock market over a short period of time, this paper finds that liquidity commonality also exists globally. Utilising a large number of stock exchanges and a twelve year research timeframe, this paper observes that liquidity commonality exists in both developed and emerging markets. In particular, liquidity commonality is higher in emerging markets compared to developed markets and is weaker in areas where there is strong financial market integration. Results show that by region, Asia has the highest liquidity commonality whereas North America has the lowest. Furthermore, the five countries with the highest liquidity commonality are all emerging markets: China, Turkey, Taiwan, India and Korea.

Keywords: Global Financial Stability, Liquidity Risk and Liquidity Management

JEL Classification: G12, G15, G2, G29

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I. Introduction

Commonality in liquidity among stocks bears important implications for investors. Empirical evidence shows that liquidity commonality is a systematic risk factor and that investors require compensation for a stock whose liquidity co-moves with market liquidity (e.g., Acharya and Pedersen, 2005; Lee, 2011).

This study examines whether liquidity commonality exists globally. While past research has shown that liquidity commonality exists, most of this research has studied only one stock exchange at a time, using very short research timeframes (for example Chordia, Roll and Subrahmanyam, 2000; Hasbrouk and Seppi, 2001; Huberman and Halka, 2001; Brockman and Chung, 2002, 2006, 2008; Fabre and Frino, 2004; Domowitz, Hansch and Wang, 2005; Lee et al., 2006; Hillier, Hillier and Kyaw, 2007; Kempf and Mayston, 2008; Pukthuanthong-Le and Visaltanachoti, 2009). Although some of the later research utilised multiple-exchange datasets, issues such as unrefined microstructure data (Karolyi, Lee and van Dijk, 2012) and relatively short timeframes (Brockman, Chung and Perignon, 2009) still persisted. This study attempts to extend and improve on past research by using extensive international datasets containing more refined and accurate microstructure data covering 39 markets over a period of 12 years. The extensive study period, covering multiple markets, allows this study to make cross-time and cross-market comparisons. This study also compares liquidity commonality between markets at different stages of development (developed and emerging markets), and tests the effects of regional financial integration in Europe (Eurozone and EU) on liquidity commonality.

The remainder of this paper is organised as follows. Section II describes the data and empirical methodologies used. Section III presents the empirical evidence for the main regression results for 39 markets. Section IV reports the robustness tests, using Chordia, Roll and Subrahmanyam's (2000) model, incorporating US variables and world variables. Section V concludes the paper.

II Data and Empirical Methodologies

This research uses extensive Taqtic datasets containing intraday financial information on 22,381 firms across 39 markets in different regions—Asia, Europe, Latin America, the Middle East and Africa, and North America—over a period of 12 years from January 2, 1996 to December 31, 2007 (due to irregularity of data during the global financial crisis, we have only used data up until the end of 2007. Furthermore, the collection of data for longer than 12 years is challenging, given the amount of time and energy required to compile this unique set of data). Only the main stock exchange in each market is included, except in the case of China, Japan and the US where two major exchanges are included for each of these countries (Shanghai and Shenzhen; Osaka and Tokyo; American Stock Exchange and New York Stock Exchange respectively). Appendix A lists all the markets, stock exchanges, and years used in this research. To ensure there were sufficient observations each year for each market, if the data for any year contained significantly fewer observations than in other years for the same market, this study did not use the data for that year for that market. While the majority of the stock exchanges in the datasets are covered for the entire 12 year period between 1996–2007, for the reason given above, there are some exceptions—Argentina (1998–2007), Brazil (1998–2007), Chile (2002–07), Ireland (2000–07), Korea (2003–07), Mexico (1998–2007), and Poland (2001–07). The datasets contain a greater number of firms from developed markets (14,468 firms) than from emerging markets (7,913 firms). The Japanese stock exchanges have the greatest number of firms in the sample (2,663 firms), followed by the United Kingdom (2,125 firms) and the US stock exchanges (2,000 firms). The Irish stock exchange has the smallest number of firms (54 firms) mainly due to its relatively shorter sample period (2000–07).

Table 1 presents the descriptive statistics for Relative Spreads (*RS*), daily proportional changes (Δ) in *RS* (ΔRS), and absolute daily proportional changes in *RS* ($|\Delta RS|$). All stocks in the datasets are primary quote, major security equity stocks. Trading frequency filters were applied to ensure sufficient observations for each firm in each year, by excluding firms with less than 50 observations per year. In order to delete outliers, this study excluded *RS* larger than 0.5; and excluded *RS* with daily proportional changes larger than 200% or smaller than -200%. After data cleaning, 2.07% of stocks were excluded; and 22,381 stocks remained in the sample.

This study modifies Chordia, Roll and Subrahmanyam's (2000) equation[1] to test for liquidity commonality. The regression in Equation (1) below is used to test whether liquidity co-moves between firms and their corresponding markets globally:

$$\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

[1] Chordia, Roll and Subrahmanyam (2000) regress the daily percentage changes in firm liquidity on the daily percentage changes in the concurrent market liquidity, lead market liquidity, lagged market liquidity, concurrent market returns, lead market returns, lagged market returns, and the daily percentage changes in firm volatility. In order to isolate the effect of how the daily changes in market liquidity affects the daily changes in firm liquidity, this study drops the control variables used in Chordia, Roll and Subrahmanyam's (2000) equation, by excluding the market returns and firm volatility variables from the regression. As part of the robustness test, however, this study also runs regressions using Chordia, Roll and Subrahmanyam's (2000) equation, and finds that the results are similar. The results of the robustness test are included in Table 4.

Relative Spread (RS)[2] is used as the proxy for liquidity. RS is defined as P_A-P_B/P_t; where P_A is the ask price, P_B is the bid price, and P_t is the stock price. Daily percentage changes (Δ) in Relative Spread ($\Delta RS_{j,t}$) for stock j at day t is regressed on the daily percentage changes in the concurrent market liquidity ($\Delta RS_{M,t}$), lead market liquidity ($\Delta RS_{M,t+1}$), and lagged market liquidity ($\Delta RS_{M,t-1}$) for market M on day t. The lead and lagged daily changes in market liquidity are included to capture any lagged adjustment in market liquidity. Daily proportional changes in Relative Spread for each stock ($\Delta RS_{j,t}$) is computed as $\Delta RS_{j,t}=RS_{j,t}-RS_{j,t-1}/RS_{j,t-1}$. $\Delta RS_{M,t}$ denotes the proportional changes in Relative Spread in each market across successive trading days, where $\Delta RS_{M,t}=(RS_{M,t}-RS_{M,t-1})/RS_{M,t-1}$ for trading day t. Lag ($\Delta RS_{M,t-1}$) and lead ($\Delta RS_{M,t+1}$) proportional changes in mean Relative Spread for all stocks in each corresponding market are included as control variables to capture any lagged adjustment in commonality. The β_1 coefficient is expected to be positive and significant if firm liquidity co-moves with market liquidity. Following Chordia, Roll and Subrahmanyam (2000), market liquidity and market returns variables are computed excluding firm j, so that each regression's time series regression is slightly different to any other, to remove any potentially misleading constraints on the average coefficients. Following Chordia, Roll and Subrahmanyam (2000), percentage changes rather than levels are used for two reasons: first, the main research interest is to measure the level of co-movement between individual stock liquidity and market liquidity rather than the liquidity level per se; and second, it is likely that econometric problems such as the issue of non-stationarity might arise if time series of liquidity levels are used.

[2] The results are similar when effective spread ($2|P_t-P_m|$) and absolute spread (P_A-P_B) are used as liquidity proxies, where P_t is the stock price, P_m is $(P_A+P_B)/2$, P_A is the ask price, and P_B is the bid price.

III Empirical Evidence

The global existence of liquidity commonality is studied in 39 markets using larger international datasets, more refined liquidity measurement, and a modified version of Chordia, Roll and Subrahmanyam's (2000) equation.

Table 2 presents the equal-weighted concurrent co-movement of liquidity between individual stocks and the corresponding markets, categorised into developed and emerging markets. It is evident from the results in Table 2 that liquidity commonality is a persistent phenomenon that occurs in all markets. With the exception of Chile, all markets have positive and significant $\Delta RS_{M,t}$ coefficients at the 5% level. Though Chile has a positive $\Delta RS_{M,t}$ coefficient, it is only significant at the 15% level, suggesting only weak signs of liquidity commonality in that market. Furthermore, all markets with the exception of Chile, have markets' *SUM Coef.* which are positive, and *SUM Null Sign Test* are significant at the 1% level. *SUM Coef.* reports the coefficients sum of β_1, β_2, and β_3. *SUM Null Sign Test* reports the significance of the sign test of the null hypothesis that the median of the sum of $\Delta RS_{M,t}$, $\Delta RS_{M,t}$, and $\Delta RS_{M,t}$ is zero. This null hypothesis is rejected for each market in the sample, confirming the results that liquidity commonality exists between individual stocks and market liquidity. *% Firm Pos Coef.* and *% Firm Neg Coef.* report the percentages of firms that have positive and negative slope coefficients, respectively.

% Firm Pos&Sig Coef. and *% Firm Neg&Sig Coef.* report the percentages of firms that have positive and significant, and negative and significant slope coefficients, respectively, at the 5% significance level. In each market, *% Firm Pos Coef.* and *% Firm Pos&Sig Coef.* exceed *% Firm Neg Coef.* and *% Firm Neg&Sig Coef.* This

suggests that $\Delta RS_{M,t}$ plays an important role in $\Delta RS_{j,t}$ in each market, and confirms the earlier findings of the persistency of liquidity commonality around the world. The results in Table 2 confirm previous research findings that liquidity commonality is evident in different markets around the world (Chordia, Roll and Subrahmanyam, 2000; Hasbrouk and Seppi, 2001; Huberman and Halka, 2001; Brockman and Chung, 2002, 2006, 2008; Coughenour and Saad, 2004; Fabre and Frino, 2004; Domowitz, Hansch and Wang, 2005; Kamara, Lou and Sadka, 2008; Kempf and Mayston, 2008; Lee et al., 2006; Hillier, Hillier and Kyaw, 2007; Pukthuanthong-Le and Visaltanachoti, 2009; Brockman, Chung and Perignon, 2009; and Karolyi, Lee and van Dijk, 2012). Taken together, the results reported in Table 2 are the core evidence of co-movement between market liquidity and the liquidity of individual stocks. It is worth noting that Chile is the only market that shows very weak signs of liquidity commonality, despite its positive $\Delta RS_{M,t}$ coefficients. It is suspected that the reason for this may be due to the fact that only six years of data from Chile is available for use (2002–07), while data covering a 12 year period is available for most of the other markets in the datasets. A longer observation period may be required to obtain meaningful results on Chilean liquidity commonality.

The magnitude of liquidity commonality varies with the stage of development of different markets. The results in Table 2 demonstrate larger mean $\Delta RS_{M,t}$ coefficients, higher R^2 means, and higher percentages of firms with positive and significant coefficients in emerging markets; all of which indicate higher liquidity co-movement. Using R^2 means as the proxy for market liquidity commonality, Figures 3.1 and 3.2 illustrate that commonality in emerging markets consistently exceeds that in developed markets. Figure 5 shows China’s level of liquidity commonality far exceeds other countries and regions. This result coincides with Karolyi, Lee and van Dijk's (2012) finding that China has the highest level of liquidity commonality.

To further explore the discrepancy of liquidity commonality between developed and emerging markets, Table 3 presents the yearly regression results of liquidity commonality in emerging and developed markets from 1996–2007. Liquidity commonality is persistent in every year from 1996–2007 in both developed and emerging markets, with mean and median $\Delta RS_{M,t}$ coefficients that are consistently positive and significant at the 1% level. Consistent with the results in Table 2, emerging markets display higher levels of liquidity commonality compared to developed markets, where mean and median $\Delta RS_{M,t}$ coefficients and R^2 for emerging markets are consistently higher than in developed markets. Figure 1 illustrates the overall comparison of liquidity commonality in developed and emerging markets, using the mean R^2 values reported in Table 3. Overall, emerging markets' R^2 is at 6%, while developed markets' R^2 is at 2.9%; clearly indicating a higher level of liquidity commonality in emerging markets. Figure 2 illustrates the comparison of yearly liquidity commonality, plotted using yearly developed and emerging markets' R^2 values as reported in Table 3. It is apparent from Figure 2 that liquidity commonality is consistently higher in emerging markets than in developed markets.. Figure 3 compares yearly liquidity commonality by region, and shows that liquidity commonality in Asia is consistently higher commonality than in North America. Brockman, Chung and Perignon's (2009) results also showed that Asia illustrates the highest liquidity commonality amongst other regions.

This study also observes that the magnitude of liquidity commonality varies with the regionalisation and financial market integration of different markets. Figure 4 illustrates the comparison of liquidity commonality by market development over the period 2002–2007,[3] categorising markets as emerging markets, developed markets, EU[4] markets and Eurozone[5] markets, using mean R^2 values reported in Table 3. Liquidity commonality for EU markets and Eurozone markets is lower relative to other developed markets as well as lower than emerging markets, which suggests that the convergence of national and regional financial markets could be linked to lower liquidity commonality. This observation is supported by the regional comparison of liquidity commonality in Figure 5, where Eurozone and EU markets again rank relatively low in terms of liquidity commonality.

IV Robustness Tests

This section presents the robustness tests for the cross-sectional regressions. Specifically, it is important to know whether the validity of the empirical results presented in Section III of this dissertation remain robust after controlling for (i) firm and market variables; (ii) US market variables; and (iii) world market variables.

a. Robustness Test using Chordia, Roll and Subrahmanyam's (2000) Equation

First, Chordia, Roll and Subrahmanyam's (2000) equation is applied in Equation (2) to test the robustness of the main regression equation specified in Equation (1). Chordia, Roll and Subrahmanyam (2000) applied their regression equation only to NYSE data

[3] Financial integration of the Eurozone commenced in 2001, hence data is examined from 2002–2007 so that results in the Eurozone and EU markets can be compared.

[4] Eleven EU markets are included, namely Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, and the United Kingdom.

[5] Eight Eurozone markets are included, namely Austria, Belgium, Finland, France, Germany, Italy, Netherlands, and Spain.

from 1992. In this study the same regression equation is applied to extensive international datasets comprising 12 years coverage of 39 markets. The difference between Equation (2) and the main regression equation in Equation (1)[6] is the inclusion of four additional control variables, namely concurrent market returns ($RE_{M,t}$), lagged market returns ($RE_{M,t-1}$), forward market returns ($RE_{M,t+1}$) and changes in individual firms' volatility ($\Delta VOL_{j,t}$). $RE_{M,t}$, $RE_{M,t-1}$ and $RE_{M,t+1}$ are included to remove any effect of spurious dependence between market liquidity and market returns. $\Delta Vol_{j,t}$ is included to capture any potential nuisance effects that could affect liquidity, and is proxied by squared stock returns. The main goal of Equation (2) is to find out whether the co-movement between $\Delta RS_{j,t}$ and $\Delta RS_{M,t}$ is driven by $RE_{M,t}$, $RE_{M,t-1}$, $RE_{M,t+1}$ or $\Delta Vol_{j,t}$. Chordia, Roll and Subrahmanyam's (2000) equation is specified below:

$$\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \varphi \Delta Vol_{j,t} + \varepsilon_{j,t} \quad (2)$$

Consistent with the main findings on the evidence of liquidity commonality around the world as reported in Section III, Table 4 shows that all markets' $\Delta RS_{M,t}$ coefficients are positive and significant at the 5% level, with the exceptions of Brazil and Chile. Brazil has positive $\Delta RS_{M,t}$ coefficient that are only significant at 10%; while Chile has a positive but insignificant $\Delta RS_{M,t}$ coefficient. Chile[7] is the only market that shows very weak signs of liquidity commonality. Consistent with the main findings, all *SUM Coef.* are positive; and sign tests that *SUM Coef.* have zero medians are rejected at the 5% level for all markets except Chile. Also consistent with the main findings, Table 4

[6] $\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t}$. See further Section II.

[7] As explained in Section III, it is suspected that this is due to the shorter six year data timeframe used for Chile (2002–2007), as opposed to the 12 year timeframe (1997–2007) used for most other markets.

shows the same trend suggesting higher liquidity commonality in emerging markets than in developed markets, where emerging markets have larger mean $\Delta RS_{M,t}$ coefficients, higher R^2 means, and higher percentages of firms with positive and significant coefficients. The US results are consistent with Chordia, Roll and Subrahmanyam's (2000) 1992 NYSE results, although the magnitude of the $\Delta RS_{M,t}$ coefficients are comparatively smaller. This might be due to the inclusion of both NYSE and American Stock Exchange data in this study, and the use of 12 years of US data instead of just a single year of data as in Chordia, Roll and Subrahmanyam's (2000) study. Furthermore, this study's results are also comparable with other papers that apply Chordia, Roll and Subrahmanyam's (2000) market liquidity equation, such as works by Brockman and Chung (2002, 2006, 2008), Brockman, Chung and Perignon (2009), Coughenour and Saad (2004) Fabre and Frino (2004), Kamara, Lou and Sadka (2008), Kempf and Mayston (2008), Lee et al. (2006), and Pukthuanthong-Le and Visaltanachoti (2009). Taken together, Table 4 shows results that are consistent with the main findings reported in Table 2, which lends support to the main findings that liquidity commonality is persistent in all markets.[8] Even after the effects of market returns and volatility are taken into consideration, the direction, magnitude and significance of β_1 in Equations (1) and (2) are comparable.

b. Robustness Test incorporating US Variables

Second, this study tests the robustness of the main regression in Equation (1) by including US market liquidity variables, namely changes in the concurrent US market returns ($\Delta RS_{US,t}$), lagged US market returns ($\Delta RS_{US,t-1}$), and lead US market returns

[8] Chile is the only market that shows very weak signs of liquidity commonality. As explained in Section III, it is suspected that this is due to the shorter six year data timeframe used for Chile (2002–2007), as opposed to the 12 year timeframe (1996–2007) used for most other markets.

($\Delta RS_{US,t+1}$), in Equations (3) and (4), in order to check whether these US variables play any significant roles in affecting liquidity commonality. This study includes these US market variables to remove any potential effect of spurious dependence between market liquidity and liquidity from the US market. While the inclusion of these additional US market control variables is the main difference between Equations (3) and (4) and this study's main regression equation in Equation (1), Equation (3) also controls for market returns ($RE_{M,t}$, $RE_{M,t-1}$, and $RE_{M,t+1}$) and changes in stock volatility ($\Delta Vol_{j,t}$), for the same reasons as these variables were included in Equation (2). The main purpose of Equations (3) and (4) is to find out whether the co-movement between $\Delta RS_{j,t}$ and $\Delta RS_{M,t}$ is driven by $\Delta RS_{US,t}$, $\Delta RS_{US,t-1}$, $\Delta RS_{US,t+1}$ or other control variables. Equations (3) and (4) are specified below:

$$\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \omega_1 \Delta RS_{US,t} + \omega_2 \Delta RS_{US,t-1} + \omega_3 \Delta RS_{US,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \varphi \Delta Vol_{j,t} + \varepsilon_{j,t} \quad (3)$$

$$\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \omega_1 \Delta RS_{US,t} + \omega_2 \Delta RS_{US,t-1} + \omega_3 \Delta RS_{US,t+1} + \varphi \Delta Vol_{j,t} + \varepsilon_{j,t} \quad (4)$$

Panel A(i) and Panel B(i) in Table 5 report the results for Equations (3) and (4) respectively. These results support the robustness of the main findings in Section III by demonstrating the persistency of liquidity commonality in all markets studied. Panel A(i) in Table 5 shows that all markets, with the exceptions of Brazil and Chile, have $\Delta RS_{M,t}$ coefficients that are positive and significant $\Delta RS_{M,t}$ coefficients at the 5% level. Brazil has positive $\Delta RS_{M,t}$ coefficients that are only significant at rgw 10% level. Chile has positive though insignificant $\Delta RS_{M,t}$ coefficient, indicating only weak signs of liquidity commonality within that market. Panel B(i) in Table 5 shows that all markets' $\Delta RS_{M,t}$ coefficients are positive and significant at the 5% level, with the exception of Chile,[9] which is positive and significant only at the 10% level. For both Panel A(i) and Panel B(i), $\Delta RS_{US,t}$ coefficients are at much smaller in magnitude and in significance compared to $\Delta RS_{M,t}$ coefficients. In Panel A(i), only 41% (16 out of 39 markets) of $\Delta RS_{US,t}$ have coefficients that are positive and significant at the 5% level; compared to 94.9% (37 out of 39 markets) of $\Delta RS_{M,t}$. In Panel B(i), only 76.9% (30 out of 39 markets) of $\Delta RS_{US,t}$ have coefficients that are positive and significant at 5% level; compared to 97.4% (38 out of 39 markets) of $\Delta RS_{M,t}$. Also consistent with the main findings, this study finds that liquidity commonality is higher in emerging markets than in developed markets. Taken together, these results indicate that the US market liquidity is not an important factor influencing the relationship between individual stocks' liquidity and market liquidity.

c. Robustness Test incorporating World Variables

Third, this study tests the robustness of the main regression equation in Equation (1) by including world market liquidity variables, namely changes in the concurrent world market returns ($\Delta RS_{World,t}$), lagged world market returns ($\Delta RS_{World,t-1}$), and lead world market returns ($\Delta RS_{World,t+1}$), in Equations (5) and (6), in order to check whether these world factors play any important roles in affecting liquidity commonality. World market is defined as consisting of all 39 markets in the datasets. These world market variables are included to remove any spurious dependence between market liquidity and world market liquidity. While the inclusion of these additional world market control variables

[9] As explained in Section III, it is suspected that the reason why Chile is the only market that shows weak sign of liquidity commonality is due to the shorter Chilean data availability in this research.

is the main difference between Equations (5) and (6) and this study's main regression equation in Equation (1), Equation (5) also controls for market returns ($RE_{M,t}$, $RE_{M,t-1}$, and $RE_{M,t+1}$) and changes in stock volatility ($\Delta Vol_{j,t}$), for the same reasons as the inclusion of these variables in Equations (2) and (3). The main purpose of Equations (5) and (6) is to find out whether the co-movement between $\Delta RS_{j,t}$ and $\Delta RS_{M,t}$ is driven by $\Delta RS_{World,t}$, $\Delta RS_{World,t-1}$, $\Delta RS_{World,t+1}$, or other control variables. Equation (5) is the same as Brockman, Chung and Perignon's (2009, p.873) "Global versus Local Commonality" regression. However, the purpose of including the world liquidity variables in this study is different from that of these authors. In Equation (5), world liquidity variables ($\Delta RS_{World,t}$, $\Delta RS_{World,t-1}$, $\Delta RS_{World,t+1}$) are included as controls to test the validity of commonality between $\Delta RS_{j,t}$ and $\Delta RS_{M,t}$. This reasoning is different to that of Brockman, Chung and Perignon (2009), who included world liquidity variables to examine both the contributions of local and global components of commonality on individual firms' liquidity. Equation (5) controls for market returns variables; while Equation (6) excludes these controls. The equations are specified below:

$$\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \lambda_1 \Delta RS_{World,t} + \lambda_2 \Delta RS_{World,t-1} + \lambda_3 \Delta RS_{World,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \varphi \Delta Vol_{j,t} + \varepsilon_{j,t} \quad (5)$$

$$\Delta RS_{j,t} = \alpha_{j,t} + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \lambda_1 \Delta RS_{World,t} + \lambda_2 \Delta RS_{World,t-1} + \lambda_3 \Delta RS_{World,t+1} + \varepsilon_{j,t} \quad (6)$$

Panel A(ii) and Panel B(ii) in Table 5 report the results for Equations (5) and (6) respectively. Results from these panels demonstrate the persistency of liquidity commonality in all markets studied, supporting the robustness of the main findings reported in Section II. Panel A(ii) in Table 5 shows that, with the exceptions of Brazil and Chile, all other markets' $\Delta RS_{M,t}$ coefficients are positive and significant at the 5% level. Brazil has $\Delta RS_{M,t}$ coefficient that is positive and significant at the 10% level; and Chile's $\Delta RS_{M,t}$ coefficient is positive though insignificant. Panel B(ii) in Table 5 shows that, with the exception of Chile,[10] all other markets' $\Delta RS_{M,t}$ coefficients are positive and significant at the 5% level. Consistent with the main results, for both Panel A(ii) and Panel B(ii), $\Delta RS_{World,t}$ coefficients are at much smaller magnitude and significance compared to $\Delta RS_{M,t}$ coefficients. In Panel A(ii), only 43.6% (17 out of 39 markets) of $\Delta RS_{World,t}$ have coefficients that are positive and significant at the 5% level; compared to 94.9% (37 out of 39 markets) of $\Delta RS_{M,t}$. In Panel B(ii), only 69.2% (27 out of 39 markets) of $\Delta RS_{World,t}$ have coefficients that are positive and significant at the 5% level; compared to 94.9% (37 out of 39 markets) of $\Delta RS_{M,t}$. Consistent with the main findings, this study finds that liquidity commonality is higher in emerging markets than in developed markets. The results also indicate that the world market is not a main driving factor of the direction, magnitude and significance of liquidity commonality between individual stocks and the market.

V Conclusion

In conclusion, this study finds convincing empirical evidence that liquidity commonality is a global phenomenon that exists in both developed and emerging markets.. This study also finds that liquidity commonality varies with market development and financial market integration, where it is consistently more prominent

[10] For the same reason as explained in Section III, it is suspected that the shorter Chilean dataset used in this research has contributed to the weaker liquidity commonality result in Chile.

in emerging markets than in developed markets, and is lower in regions with strong financial market integration. The regional commonality comparison shows that the Asian market has the highest liquidity commonality, and North America ranks the lowest. In the market-by-market comparison, emerging markets exceed other regions in liquidity commonality—the five countries with the highest commonality, in descending order, are China, Turkey, Taiwan, India and Korea. The results also show that liquidity commonality is lower in regions with higher financial market integration such as in the EU and the Eurozone.

Table 1 Descriptive Statistics of Relative Statistics

This table presents the descriptive statistics of time-series means, medians and standard deviations (*Std*) of Relative Spread (*RS*), daily changes in Relative Spread across successive trading days for each stock (*ΔRS*), and daily absolute values of the proportional changes in Relative Spread for each stock (|*ΔRS*|) for all 39 markets, categorised into developed and emerging markets. Means of the descriptive statistics for developed and emerging markets are also presented. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Relative Spread (*RS*) for each stock on each day is computed as $RS=P_A-P_B/P_t$, where P_A is the stock's average ask price on day t; P_B is the stock's average bid price on day t; and P_t is the stock's average price on day t. Daily changes in Relative Spread for each stock (*ΔRS*) is computed as $\Delta RS=RS_t-RS_{t-1}/RS_{t-1}$.

Market	No. of Firms	RS			ΔRS			|ΔRS|		
		Mean	**Median**	**Std**	**Mean**	**Median**	**Std**	**Mean**	**Median**	**Std**
Developed Markets										
Australia	1,524	0.027	0.018	0.031	0.054	-0.003	0.462	0.314	0.207	0.343
Austria	94	0.012	0.007	0.019	0.057	-0.005	0.468	0.341	0.255	0.326
Belgium	156	0.012	0.007	0.018	0.063	-0.010	0.538	0.397	0.305	0.368
Canada	1,135	0.030	0.017	0.040	0.066	0.000	0.477	0.342	0.252	0.338
Denmark	188	0.019	0.012	0.023	0.066	-0.007	0.485	0.351	0.258	0.342
Finland	143	0.015	0.009	0.019	0.068	-0.011	0.501	0.365	0.271	0.349
France	866	0.023	0.011	0.038	0.038	-0.020	0.548	0.403	0.304	0.373
Germany	726	0.036	0.021	0.047	0.057	-0.005	0.465	0.333	0.242	0.329
Hong Kong	885	0.025	0.015	0.032	0.050	-0.003	0.427	0.280	0.166	0.326
Ireland	54	0.027	0.014	0.037	0.073	-0.004	0.473	0.350	0.270	0.327
Italy	279	0.009	0.005	0.014	0.059	-0.002	0.451	0.320	0.229	0.323
Japan	2,663	0.009	0.006	0.012	0.050	0.000	0.435	0.288	0.181	0.330
Netherlands	151	0.012	0.006	0.021	0.058	-0.002	0.458	0.324	0.229	0.329
New Zealand	120	0.018	0.011	0.024	0.056	-0.002	0.521	0.360	0.255	0.381
Norway	223	0.021	0.012	0.029	0.059	-0.007	0.488	0.344	0.243	0.352
Singapore	490	0.026	0.014	0.034	0.032	0.000	0.346	0.190	0.062	0.291
Spain	133	0.009	0.005	0.012	0.055	-0.001	0.422	0.293	0.202	0.310
Sweden	292	0.016	0.010	0.021	0.057	-0.003	0.436	0.299	0.201	0.323
Switzerland	221	0.013	0.008	0.017	0.067	-0.018	0.538	0.404	0.316	0.361
United Kingdom	2,125	0.048	0.029	0.057	0.038	0.000	0.330	0.211	0.132	0.256
United States	2,000	0.007	0.003	0.013	0.034	0.000	0.306	0.211	0.148	0.225
Mean		**0.020**	**0.011**	**0.026**	**0.055**	**-0.005**	**0.456**	**0.320**	**0.225**	**0.329**
Emerging Markets										
Argentina	74	0.021	0.013	0.024	0.064	-0.008	0.529	0.384	0.287	0.369
Brazil	74	0.028	0.011	0.043	0.066	-0.010	0.497	0.365	0.274	0.344
Chile	115	0.024	0.014	0.034	0.053	-0.037	0.583	0.440	0.350	0.386
China	1,315	0.002	0.002	0.001	0.027	-0.001	0.258	0.170	0.110	0.195
Greece	321	0.015	0.010	0.015	0.063	-0.006	0.440	0.314	0.225	0.314
India	1,411	0.020	0.009	0.031	0.055	-0.009	0.442	0.314	0.220	0.317
Indonesia	334	0.044	0.027	0.049	0.030	0.000	0.367	0.202	0.061	0.308
Israel	600	0.068	0.038	0.079	0.061	-0.012	0.557	0.407	0.310	0.385
Korea	722	0.009	0.006	0.010	0.058	-0.004	0.422	0.293	0.199	0.309
Malaysia	686	0.018	0.010	0.023	0.047	-0.004	0.443	0.291	0.174	0.338
Mexico	105	0.018	0.008	0.033	0.051	-0.035	0.563	0.422	0.327	0.375
Philippines	193	0.038	0.021	0.047	0.035	0.000	0.424	0.257	0.111	0.339
Poland	143	0.026	0.014	0.035	0.066	-0.018	0.536	0.397	0.302	0.366
Portugal	55	0.015	0.008	0.024	0.051	0.000	0.442	0.297	0.197	0.331
South Africa	343	0.024	0.013	0.036	0.057	-0.027	0.555	0.414	0.323	0.373
Taiwan	671	0.006	0.005	0.007	0.025	-0.002	0.267	0.159	0.082	0.216
Thailand	483	0.023	0.010	0.037	0.038	-0.002	0.392	0.234	0.098	0.318
Turkey	268	0.013	0.012	0.008	0.015	-0.002	0.200	0.096	0.033	0.176
Mean		**0.023**	**0.013**	**0.030**	**0.048**	**-0.010**	**0.440**	**0.303**	**0.205**	**0.320**

Table 2 Market Liquidity Commonality

This table presents the equal-weighted concurrent (i.e. on the same trading day) co-movement of liquidity between individual stocks and the corresponding markets, categorised into developed (Panel A) and emerging (Panel B) markets, using Relative Spread (*RS*) as the proxy for liquidity. All controlled variables in Equation (1) are excluded, that is, by excluding lead ($RE_{M,t+1}$), lag ($RE_{M,t-1}$), concurrent ($RE_{M,t}$) equal-weighted market return, and firm volatility ($\Delta VOL_{j,t}$). The regression results are obtained by (1) regressing all stock-day observations for each market-year; then (2) taking the market means of the regressions. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. . Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Relative Spread (*RS*) for each stock on each day is computed as $RS=P_A-P_B/P_t$, where P_A is the stock's average ask price on day t; P_B is the stock's average bid price on day t; and P_t is the stock's average price on day t. Daily proportional changes in Relative Spread for each stock ($\Delta RS_{j,t}$) is computed as $\Delta RS_{j,t}=RS_{j,t}-RS_{j,t-1}/RS_{j,t-1}$. $\Delta RS_{M,t}$ denotes the proportional changes in Relative Spread in each market across successive trading days, where $\Delta RS_{M,t}=(RS_{M,t}-RS_{M,t-1})/RS_{M,t-1}$ for trading day t. Lag ($\Delta RS_{M,t-1}$) and lead ($\Delta RS_{M,t+1}$) proportional changes in mean Relative Spread for all stocks in each corresponding market are included as control variables to capture any lagged and lead adjustment in commonality. Coefficient mean (β_1) for $\Delta RS_{M,t}$, t-statistics for $\Delta RS_{M,t}$, and regression R^2 are presented in the table. Adjusted-R^2 is computed but not presented in the table below, since only mean R^2 values are needed to compute the co-movement between individual stocks' liquidity and market liquidity. *% Firm Pos Coef.* and *% Firm Neg Coef.* report the percentages of firms that have positive and negative slope coefficients, respectively. *% Firm Pos&Sig Coef.* and *% Firm Neg&Sig Coef.* report the percentages of firms that have positive and significant and negative and significant slope coefficients, respectively, at the 5 percent significance level. *SUM Coef.* reports the mean of the sum of the lead, lag and concurrent coefficients. *SUM Null Sign Test* reports the p-value of the sign test of the null hypothesis that H0:Sum Median = 0. Means for developed and emerging markets are computed for all market- and firm-level variables.

Equal-weighted regressions of Relative Spread are estimated using a modified Chordia, Roll and Subrahmanyam (2000) equation , as given in Equation (1):

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

Panel A: Developed Markets

Market	**No. of Firms**	**$\Delta RS_{M,t}$ Mean (β_1)**	**$\Delta RS_{M,t}$ t-stat**	**R^2 Mean (%)**	**% Firm Pos Coef.**	**% Firm Pos&Sig Coef.**	**% Firm Neg Coef.**	**% Firm Neg&Sig Coef.**	**SUM Coef.**	**SUM Null Sign Test**
Australia	1524	0.205	29.19	2.9	78.0	14.8	22.0	1.2	0.294	0.000
Austria	94	0.123	10.45	2.5	75.5	23.4	24.5	5.3	0.160	0.000
Belgium	156	0.061	6.22	2.4	67.3	14.7	32.7	4.5	0.088	0.000
Canada	1135	0.411	54.18	2.5	90.5	38.1	9.5	0.2	0.496	0.000
Denmark	188	0.132	12.41	2.5	79.8	20.7	20.2	0.5	0.202	0.000
Finland	143	0.144	13.15	2.2	85.3	26.6	14.7	0.7	0.243	0.000
France	866	0.289	44.61	2.8	89.8	38.3	10.2	2.2	0.316	0.000
Germany	726	0.325	37.31	2.4	90.5	31.3	9.5	0.7	0.399	0.000
Hong Kong	885	0.367	42.26	3.2	89.4	33.4	10.6	0.7	0.509	0.000
Ireland	54	0.039	3.45	2.4	64.8	3.7	35.2	0.0	0.065	0.006
Italy	279	0.332	45.86	2.6	97.8	70.3	2.2	0.0	0.475	0.000
Japan	2663	0.620	138.06	3.9	96.7	67.1	3.3	0.2	0.764	0.000
Netherlands	151	0.161	17.70	2.6	90.7	33.8	9.3	0.7	0.197	0.000
New Zealand	120	0.055	5.00	2.6	73.3	6.7	26.7	0.8	0.088	0.000
Norway	223	0.141	13.93	2.6	83.0	17.9	17.0	0.4	0.250	0.000
Singapore	490	0.227	29.27	2.9	91.2	29.2	8.8	0.4	0.375	0.000
Spain	133	0.314	34.27	3.3	97.0	75.9	3.0	0.0	0.369	0.000
Sweden	292	0.316	35.49	2.6	93.5	52.4	6.5	0.3	0.465	0.000
Switzerland	221	0.219	21.03	2.6	86.4	30.8	13.6	0.0	0.279	0.000
United Kingdom	2125	0.260	42.99	2.6	80.5	15.7	19.5	2.3	0.283	0.000
United States	2000	0.327	63.92	2.5	93.4	42.2	6.6	0.3	0.432	0.000
Mean		**0.241**	**33.37**	**2.7**	**85.5**	**32.7**	**14.5**	**1.0**	**0.321**	**0.000**

Panel B: Emerging Markets

Market	No. of Firms	$\Delta RS_{M,t}$ Mean (β_1)	$\Delta RS_{M,t}$ t-stat	R^2 Mean (%)	% Firm Pos Coef.	% Firm Pos&Sig Coef.	% Firm Neg Coef.	% Firm Neg&Sig Coef.	SUM Coef.	SUM Null Sign Test
Argentina	74	0.098	6.82	2.4	82.4	14.9	17.6	1.4	0.130	0.000
Brazil	74	0.025	2.48	2.5	67.6	12.2	32.4	5.4	0.048	0.000
Chile	115	0.021	1.43	3.1	52.2	3.5	47.8	4.3	0.028	0.117
China	1315	0.958	236.96	13.1	100.0	98.2	0.0	0.0	0.967	0.000
Greece	321	0.614	68.99	4.4	99.1	84.7	0.9	0.0	0.742	0.000
India	1411	0.557	85.56	5.3	93.4	60.6	6.6	1.9	0.749	0.000
Indonesia	334	0.193	20.69	3.8	85.9	28.1	14.1	1.5	0.358	0.000
Israel	600	0.342	25.04	4.2	81.2	21.5	18.8	1.2	0.381	0.000
Korea	722	0.773	69.07	4.9	97.9	60.5	2.1	0.6	0.826	0.000
Malaysia	686	0.491	78.26	3.2	98.5	70.8	1.5	0.0	0.632	0.000
Mexico	105	0.050	4.87	3.0	66.7	14.3	33.3	2.9	0.078	0.005
Philippines	193	0.066	6.85	2.9	73.6	10.4	26.4	4.7	0.107	0.000
Poland	143	0.215	14.18	2.5	89.5	19.6	10.5	0.7	0.322	0.000
Portugal	55	0.053	6.87	2.3	87.3	14.5	12.7	5.5	0.102	0.000
South Africa	343	0.161	19.03	2.6	82.5	20.4	17.5	2.6	0.207	0.000
Taiwan	671	0.730	90.43	5.9	99.9	83.0	0.1	0.0	0.816	0.000
Thailand	483	0.177	27.75	2.8	89.4	27.7	10.6	0.2	0.308	0.000
Turkey	268	0.760	67.87	9.2	99.3	90.7	0.7	0.0	0.782	0.000
Mean		**0.349**	**46.29**	**4.3**	**85.9**	**40.9**	**14.1**	**1.8**	**0.421**	**0.007**

Table 3 Market Liquidity Commonality in Developed and Emerging Markets by Year

This table presents the equal-weighted concurrent (i.e. on the same trading day) co-movement of liquidity between individual stocks and the corresponding markets, categorised into developed and emerging markets, using Relative Spread (*RS*) as the proxy for liquidity. All controlled variables in Equation (1) are excluded, that is, by excluding lead ($RE_{M,t+1}$), lag ($RE_{M,t-1}$), concurrent ($RE_{M,t}$) equal-weighted market return, and firm volatility ($\Delta VOL_{j,t}$). The regression results are obtained by (1) regressing all stock-day observations for each market-year; then (2) taking the region-year means of the regressions. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. . Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Relative Spread (*RS*) for each stock on each day is computed as $RS=P_A-P_B/P_t$, where P_A is the stock's average ask price on day t; P_B is the stock's average bid price on day t; and P_t is the stock's average price on day t. The proportional changes in Relative Spread across successive trading days for each stock ($\Delta RS_{j,t}$) is computed as $\Delta RS_{j,t}=RS_{j,t}-RS_{j,t-1}/RS_{j,t-1}$. $\Delta RS_{M,t}$ denotes the proportional changes in Relative Spread in each market across successive trading days, where $\Delta RS_{M,t}=(RS_{M,t}-RS_{M,t-1})/RS_{M,t-1}$ for trading day t. Lag ($\Delta RS_{M,t-1}$) and lead ($\Delta RS_{M,t+1}$) proportional changes in mean Relative Spread for all stocks in each corresponding market are included as control variables to capture any lagged and lead adjustment in commonality. Coefficient mean (β_1) for $\Delta RS_{M,t}$, t-statistics for $\Delta RS_{M,t}$, and regression R^2 are presented in the table. Coefficients for the control variables are not reported in this table. Adjusted-R^2 is computed but not presented in the table below, since only mean regression R^2 values are needed to compute the co-movement between individual stocks' liquidity and market liquidity.

Equal-weighted regressions of Relative Spread are estimated using a modified Chordia, Roll and Subrahmanyam (2000) equation, as given in Equation (1):

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

Emerging/ Developed Markets	**Year**	**$\Delta RS_{M,t}$ Mean**	**$\Delta RS_{M,t}$ Median**	**$\Delta RS_{M,t}$ t-stat**	**R^2 Mean (%)**	**R^2 Median (%)**
Developed Markets	1996	0.391	0.334	38.01	2.8	1.9
	1997	0.403	0.369	47.88	3.3	2.2
	1998	0.416	0.395	43.33	2.8	2.0
	1999	0.353	0.315	43.46	2.5	1.8
	2000	0.391	0.370	58.58	2.6	1.8
	2001	0.350	0.314	58.94	3.1	2.2
	2002	0.313	0.274	48.70	2.6	1.8
	2003	0.259	0.187	38.85	2.7	1.8
	2004	0.299	0.233	50.59	2.7	1.8
	2005	0.337	0.285	52.36	2.6	1.7
	2006	0.374	0.321	61.98	3.7	1.9
	2007	0.460	0.429	91.25	3.6	2.4
Mean		**0.362**	**0.319**	**52.83**	**2.9**	**1.9**
Emerging Markets	1996	0.476	0.486	46.07	4.7	2.7
	1997	0.510	0.533	48.11	6.1	3.6
	1998	0.520	0.539	50.78	5.4	3.7
	1999	0.462	0.462	46.46	4.4	3.0
	2000	0.520	0.519	52.28	4.9	3.3
	2001	0.582	0.593	65.02	6.0	3.8
	2002	0.539	0.508	61.20	5.3	3.3
	2003	0.548	0.502	63.42	5.2	3.5
	2004	0.611	0.596	82.89	7.0	4.3
	2005	0.569	0.554	72.11	6.3	3.3
	2006	0.636	0.594	83.32	6.8	3.7
	2007	0.634	0.659	95.31	9.4	4.5
Mean		**0.551**	**0.545**	**63.91**	**6.0**	**3.6**

Table 4 Market Liquidity Commonality for Relative Spread (With Market Returns and Volatility)

This table presents the equal-weighted concurrent (i.e. on the same trading day) co-movement of liquidity between individual stocks and the corresponding markets, using Relative Spread (*RS*) as the proxy for liquidity. The regression results are obtained by (1) regressing all stock-day observations for each market-year; then (2) taking the market means of the regressions. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Relative Spread (*RS*) for each stock on each day is computed as $RS=P_A-P_B/P_t$, where P_A is the stock's average ask price on day t; P_B is the stock's average bid price on day t; and P_t is the stock's average price on day t. Daily proportional changes in Relative Spread for each stock ($\Delta RS_{j,t}$) is computed as $\Delta RS_{j,t}=RS_{j,t}-RS_{j,t-1}/RS_{j,t-1}$. $\Delta RS_{M,t}$ denotes the proportional changes in Relative Spread in each market across successive trading days, where $\Delta RS_{M,t}=(RS_{M,t}-RS_{M,t-1})/RS_{M,t-1}$ for trading day t. Lag ($\Delta RS_{M,t-1}$) and lead ($\Delta RS_{M,t+1}$) proportional changes in mean Relative Spread for all stocks in each corresponding market are included as control variables to capture any lagged and lead adjustment in commonality. Lead ($RE_{M,t+1}$), lag ($RE_{M,t-1}$) and concurrent ($RE_{M,t}$) equal-weighted market return are included as control variables to remove any spurious dependence between market liquidity (RS_M) and market returns (RE_M). Daily proportional change in individual stock squared return ($\Delta VOL_{j,t}$) is included as a control variable to capture individual stocks' volatility, treated as a nuisance variable that might affect liquidity, where $\Delta VOL_{j,t}=\Delta RE^2_{j,t}= RE^2_{j,t}-RE^2_{j,t-1}/RE^2_{j,t-1}$. Coefficient mean ($\beta_1$) for $\Delta RS_{M,t}$, t-statistics for $\Delta RS_{M,t}$, and regression R^2 are presented in the table. Coefficients for the control variables are not reported in this table. Adjusted-R^2 is computed but not presented in the table below, since only mean R^2 values are needed to compute the co-movement between individual stocks' liquidity and market liquidity. *% Firm Pos Coef.* and *% Firm Neg Coef.* report the percentages of firms that have positive and negative slope coefficients, respectively. *% Firm Pos&Sig Coef.* and *% Firm Neg&Sig Coef.* report the percentages of firms that have positive and significant and negative and significant slope coefficients, respectively, at the 5 percent significance level. *SUM Coef.* reports the sum of the lead, lag and concurrent coefficients, which is equal to ($\beta_1+\beta_2+\beta_3$). *SUM Null Sign Test* reports the p-value of the sign test of the null hypothesis that H0:Sum Median = 0. Means for developed and emerging markets are also presented.
Equal-weighted regressions of Relative Spread are estimated applying Chordia, Roll and Subrahmanyam's (2000) equation, as given in Equation (2):

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \delta_4\Delta VOL_{j,t} + \varepsilon_{j,t} \quad (2)$$

Panel A: Developed Markets

Market	**No. of Firms**	**$\Delta RS_{M,t}$ Mean (β_1)**	**$\Delta RS_{M,t}$ t-stat**	**R^2 Mean (%)**	**% Firm Pos Coef.**	**% Firm Pos&Sig Coef.**	**% Firm Neg Coef.**	**% Firm Neg&Sig Coef.**	**SUM Coef.**	**SUM Null Sign Test**
Australia	1,524	0.129	17.13	6.2	68.6	6.8	31.4	1.4	0.163	0.000
Austria	94	0.108	9.14	5.2	74.5	19.1	25.5	6.4	0.129	0.000
Belgium	156	0.048	4.66	5.5	66.7	10.3	33.3	2.6	0.061	0.001
Canada	1,135	0.381	47.08	4.9	88.4	32.7	11.6	0.5	0.439	0.000
Denmark	188	0.119	11.03	5.7	77.7	18.6	22.3	1.1	0.178	0.000
Finland	143	0.115	10.46	4.9	81.8	19.6	18.2	1.4	0.192	0.000
France	866	0.284	43.00	5.7	89.8	37.2	10.2	2.1	0.307	0.000
Germany	726	0.310	34.75	4.9	89.7	28.1	10.3	0.7	0.370	0.000
Hong Kong	885	0.167	17.84	6.5	74.0	9.3	26.0	1.2	0.201	0.000
Ireland	54	0.038	3.35	5.5	70.4	3.7	29.6	0.0	0.065	0.005
Italy	279	0.290	38.68	5.0	97.1	62.7	2.9	0.0	0.389	0.000
Japan	2,663	0.574	120.11	6.3	95.5	60.9	4.5	0.1	0.685	0.000
Netherlands	151	0.140	14.98	5.3	87.4	27.8	12.6	0.7	0.155	0.000
New Zealand	120	0.047	4.09	5.6	70.0	4.2	30.0	1.7	0.066	0.000
Norway	223	0.095	8.69	5.8	73.1	10.8	26.9	0.9	0.156	0.000
Singapore	490	0.092	11.31	7.0	69.2	8.6	30.8	0.4	0.129	0.000
Spain	133	0.285	31.53	5.7	97.7	72.9	2.3	0.0	0.307	0.000
Sweden	292	0.242	25.65	5.4	89.0	36.3	11.0	0.3	0.347	0.000
Switzerland	221	0.211	19.65	5.4	86.9	30.3	13.1	0.0	0.264	0.000
United Kingdom	2,125	0.231	37.02	5.5	77.6	13.2	22.4	2.2	0.228	0.000
United States	2,000	0.265	48.81	5.4	90.2	31.1	9.8	0.2	0.301	0.000
Mean		**0.199**	**26.62**	**5.6**	**81.7**	**25.9**	**18.3**	**1.13**	**0.24**	**0.000**

Panel B: Emerging Markets											
Market	**No. of Firms**	**$\Delta RS_{M,t}$ Mean (β_1)**	**$\Delta RS_{M,t}$ t-stat**	**R^2 Mean (%)**	**% Firm Pos Coef.**	**% Firm Pos&Sig Coef.**	**% Firm Neg Coef.**	**% Firm Neg&Sig Coef.**	**SUM Coef.**	**SUM Null Sign Test**
Argentina	74	0.063	4.24	6.0	70.3	8.1	29.7	2.7	0.058	0.012
Brazil	74	0.018	1.72	6.4	64.9	10.8	35.1	8.1	0.030	0.020
Chile	115	0.011	0.74	6.7	50.4	4.3	49.6	3.5	0.013	0.396
China	1,315	0.920	195.81	15.3	100.0	96.7	0.0	0.0	0.883	0.000
Greece	321	0.535	57.08	6.6	99.7	77.3	0.3	0.0	0.607	0.000
India	1,411	0.453	68.34	8.4	91.1	49.3	8.9	2.1	0.610	0.000
Indonesia	334	0.116	11.75	9.6	75.4	13.5	24.6	1.2	0.209	0.000
Israel	600	0.281	19.19	9.1	76.0	16.0	24.0	1.7	0.275	0.000
Korea	722	0.670	52.73	8.0	96.4	44.3	3.6	0.7	0.651	0.000
Malaysia	686	0.362	52.03	5.9	95.8	50.6	4.2	0.0	0.422	0.000
Mexico	105	0.039	2.72	6.9	66.7	13.3	33.3	3.8	0.012	0.031
Philippines	193	0.036	3.62	6.7	63.2	8.3	36.8	3.1	0.048	0.031
Poland	143	0.184	12.06	5.3	85.3	14.0	14.7	1.4	0.239	0.000
Portugal	55	0.049	6.19	5.3	83.6	7.3	16.4	3.6	0.094	0.000
South Africa	343	0.142	16.27	5.7	79.9	19.5	20.1	2.0	0.170	0.000
Taiwan	671	0.526	62.58	9.0	98.7	67.2	1.3	0.0	0.526	0.000
Thailand	483	0.111	16.66	6.9	80.1	11.4	19.9	0.4	0.181	0.000
Turkey	268	0.654	56.57	12.3	98.5	79.5	1.5	0.4	0.644	0.000
Mean		**0.287**	**35.57**	**7.8**	**82.0**	**32.9**	**18.0**	**1.93**	**0.32**	**0.027**

Table 5 Market Liquidity Commonality—Local, US and World Markets

This table (Panels A and B) presents the concurrent (i.e. on the same trading day) co-movement of liquidity between individual stocks and the corresponding markets, using Relative Spread (*RS*) as the proxy for liquidity; controlled for US and world market liquidity in Equations (3) and (5) with all control variables included; and in Equations (4) and (6) without the inclusion of control variables. Panel A presents the regression results of Equations (3) and (5); and Panel B presents the regression results of Equations (4) and (6). In Panel B, all control variables in Equation (1)—that is, lead ($RE_{M,t+1}$), lag ($RE_{M,t-1}$), concurrent ($RE_{M,t}$) equal-weighted market return, and firm volatility ($\Delta VOL_{j,t}$)—are excluded. The regression results are obtained by (1) regressing all stock-day observations for each market-year; then (2) taking the market means of the regressions. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets. Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Relative Spread (*RS*) for each stock on each day is computed as $RS=P_A-P_B/P_t$, where P_A is the stock's average ask price on day t; P_B is the stock's average bid price on day t; and P_t is the stock's average price on day t. The proportional changes in Relative Spread across successive trading days for each stock ($\Delta RS_{j,t}$) is computed as $\Delta RS_{j,t}=RS_{j,t}-RS_{j,t-1}/RS_{j,t-1}$. $\Delta RS_{M,t}$ denotes the proportional changes in Relative Spread in each market across successive trading days, where $\Delta RS_{M,t}=(RS_{M,t}-RS_{M,t-1})/RS_{M,t-1}$ for trading day t. Lag ($\Delta RS_{M,t-1}$) and lead ($\Delta RS_{M,t+1}$) proportional changes in mean Relative Spread for all stocks in each corresponding market are included as control variables to capture any lagged and lead adjustment in commonality. Lead ($RE_{M,t+1}$), lag ($RE_{M,t-1}$) and concurrent ($RE_{M,t}$) equal-weighted market return are included as control variables to remove any spurious dependence between market liquidity (RS_M) and market returns (RE_M). Daily proportional change in individual stock squared return ($\Delta VOL_{j,t}$) is included as a control variable to capture individual stocks' volatility, treated as a nuisance variable that might affect liquidity, where $\Delta VOL_{j,t}=\Delta RE^2_{j,t}=RE^2_{j,t}-RE^2_{j,t-1}/RE^2_{j,t-1}$. The additional control variables in Equations (3) and (4) include the concurrent, lag and lead changes in US market liquidity (i.e. $\Delta RS_{US,t}$, $\Delta RS_{US,t-1}$ and $\Delta RS_{US,t+1}$), where $\Delta RS_{US,t}=RS_{US,t}-RS_{US,t-1}/RS_{US,t-1}$, and where US market liquidity refers to liquidity value in the US market. The additional control variables in Equations (5) and (6) include the concurrent, lag and lead changes in world market liquidity (i.e. $\Delta RS_{World,t}$, $\Delta RS_{World,t-1}$ and $\Delta RS_{World,t+1}$), where the world market refers to all 39 markets in the datasets. In the table below, Equations (3)-(6)'s coefficient means (β_1) for $\Delta RS_{M,t}$, t-statistics for $\Delta RS_{M,t}$, and regression R^2 are presented. Coefficients for the control variables are not reported in this table. Adjusted-R^2 is computed but not presented in the table below, since only mean regression R^2 values are needed to compute the co-movement between individual stocks' liquidity and market liquidity. *(i) Local and US Market Liquidity Commonality* refers to Equation (3) in Panel A and Equation (4) in Panel B; and *(ii) Local and World Market Liquidity Commonality* refers to Equation (5) in Panel A and Equation (6) in Panel B.

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \delta_4\Delta VOL_{j,t} + \varepsilon_{j,t} \quad (2)$$

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \omega_1\Delta RS_{US,t} + \omega_2\Delta RS_{US,t-1} + \omega_3\Delta RS_{US,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \delta_4\Delta VOL_{j,t} + \varepsilon_{j,t} \quad (3)$$

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \lambda_1\Delta RS_{World,t} + \lambda_2\Delta RS_{World,t-1} + \lambda_3\Delta RS_{World,t+1} + \delta_1 RE_{M,t} + \delta_2 RE_{M,t-1} + \delta_3 RE_{M,t+1} + \delta_4\Delta VOL_{j,t} + \varepsilon_{j,t} \quad (4)$$

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \omega_1\Delta RS_{US,t} + \omega_2\Delta RS_{US,t-1} + \omega_3\Delta RS_{US,t+1} + \varepsilon_{j,t} \quad (5)$$

$$\Delta RS_{j,t}= \alpha + \beta_1\Delta RS_{M,t} + \beta_2\Delta RS_{M,t-1} + \beta_3\Delta RS_{M,t+1} + \lambda_1\Delta RS_{World,t} + \lambda_2\Delta RS_{World,t-1} + \lambda_3\Delta RS_{World,t+1} + \varepsilon_{j,t} \quad (6)$$

PANEL A: Market Liquidity Commonality—Local, US and World Markets (With Market Returns and Volatility)											
		(i) Local and US Market Liquidity Commonality					(ii) Local and World Market Liquidity Commonality				
	No. of	$\Delta RS_{M,t}$	$\Delta RS_{M,t}$	$\Delta RS_{US,t}$	$\Delta RS_{US,t}$	R^2	$\Delta RS_{M,t}$	$\Delta RS_{M,t}$	$\Delta RS_{World,t}$	$\Delta RS_{World,t}$	R^2
Market	**Firms**	**Mean (β_1)**	**t-stat**	**Mean (ω_1)**	**t-stat**	**Mean (%)**	**Mean (β_1)**	**t-stat**	**Mean (λ_1)**	**t-stat**	**Mean (%)**
Developed Markets											
Australia	1,524	0.131	16.47	0.030	3.24	8.9	0.131	16.76	0.005	0.70	8.7
Austria	94	0.110	8.80	0.072	2.11	7.3	0.103	8.71	0.023	0.65	7.3
Belgium	156	0.041	3.79	-0.002	-0.07	8.2	0.047	4.40	0.091	3.09	8.0
Canada	1,135	0.333	40.11	-0.007	-0.84	6.8	0.371	44.07	0.017	2.87	6.8
Denmark	188	0.128	11.51	0.061	2.71	8.2	0.119	10.79	0.059	2.60	8.1
Finland	143	0.104	9.34	0.004	0.15	7.1	0.104	9.27	0.036	1.53	7.0
France	866	0.274	39.37	0.007	0.54	8.1	0.280	40.75	0.003	0.22	8.1
Germany	726	0.302	32.79	0.004	0.38	6.9	0.303	32.93	0.029	3.39	6.9
Hong Kong	885	0.159	16.41	0.009	0.97	8.8	0.155	16.02	0.033	3.65	8.9
Ireland	54	0.030	2.45	0.183	4.20	7.9	0.034	2.90	-0.083	-1.72	8.0
Italy	279	0.286	36.05	0.033	2.59	6.7	0.280	36.89	0.025	2.03	6.8
Japan	2,663	0.582	117.13	0.014	3.47	8.2	0.575	118.66	0.000	-0.09	8.0
Netherlands	151	0.132	13.69	0.029	1.40	7.2	0.129	13.17	0.072	3.42	7.4
New Zealand	120	0.044	3.74	0.056	1.78	8.5	0.043	3.65	0.020	0.68	8.1
Norway	223	0.093	8.43	0.055	2.39	8.2	0.092	8.22	0.064	2.58	8.2
Singapore	490	0.092	10.78	0.027	3.02	8.9	0.097	11.57	-0.011	-1.30	9.1
Spain	133	0.280	30.41	0.024	1.79	7.1	0.274	29.90	0.042	2.81	7.4
Sweden	292	0.240	24.85	0.004	0.32	7.2	0.231	23.86	0.062	5.16	7.2
Switzerland	221	0.208	18.68	0.044	1.86	7.7	0.195	16.95	0.037	1.50	7.7
United Kingdom	2,125	0.227	34.97	0.007	1.89	7.7	0.229	35.69	-0.010	-2.70	7.7
United States	2,000	0.257	35.66	0.019	3.63	7.3	0.262	38.20	0.015	4.09	7.7
Mean		**0.193**	**24.55**	**0.032**	**1.79**	**7.7**	**0.193**	**24.92**	**0.025**	**1.67**	**7.8**
Emerging Markets											
Argentina	74	0.067	4.42	0.040	0.90	8.6	0.066	4.19	0.052	1.29	8.5
Brazil	74	0.020	1.87	-0.003	-0.05	9.0	0.020	1.91	-0.066	-1.60	8.8
Chile	115	0.018	1.13	0.109	2.03	9.9	0.010	0.61	-0.054	-1.52	9.7
China	1,315	0.918	193.03	-0.001	-0.39	16.7	0.920	194.25	-0.011	-4.97	16.8
Greece	321	0.531	55.51	-0.004	-0.45	8.2	0.526	55.58	0.019	2.04	8.1
India	1,411	0.453	66.03	0.022	2.81	10.6	0.447	65.24	0.053	7.23	10.5
Indonesia	334	0.115	11.16	0.037	2.29	12.4	0.115	10.98	-0.007	-0.45	12.5
Israel	600	0.281	17.99	-0.036	-1.72	13.0	0.281	18.49	-0.060	-3.17	12.8
Korea	722	0.659	50.34	0.007	0.54	10.4	0.676	35.61	0.011	1.20	10.6
Malaysia	686	0.361	50.32	-0.001	-0.15	7.7	0.357	50.20	-0.003	-0.61	7.8
Mexico	105	0.050	4.33	0.012	0.23	9.8	0.048	3.44	0.008	0.07	9.7
Philippines	193	0.035	3.38	0.049	2.21	9.4	0.038	3.63	0.052	2.31	9.5
Poland	143	0.184	11.94	0.024	0.76	7.5	0.175	11.36	0.057	1.79	7.5
Portugal	55	0.051	5.86	0.106	2.77	7.7	0.042	4.95	0.168	4.32	7.7
South Africa	343	0.141	15.50	0.034	1.92	8.2	0.135	15.06	0.038	1.88	8.1
Taiwan	671	0.524	61.84	0.012	2.65	10.8	0.524	61.50	0.001	0.26	10.6
Thailand	483	0.112	15.89	0.000	-0.03	9.3	0.111	16.07	0.046	4.55	9.1
Turkey	268	0.640	55.34	0.012	2.79	13.7	0.650	55.72	0.012	3.07	13.6
Mean		**0.287**	**34.77**	**0.023**	**1.06**	**10.2**	**0.286**	**33.82**	**0.017**	**0.98**	**10.1**

PANEL B: Market Liquidity Commonality—Local, US and World Markets

		(i) Local and US Market Liquidity Commonality					(ii) Local and World Market Liquidity Commonality				
	No. of	$\Delta RS_{M,t}$	$\Delta RS_{M,t}$	$\Delta RS_{US,t}$	$\Delta RS_{US,t}$	R^2	$\Delta RS_{M,t}$	$\Delta RS_{M,t}$	$\Delta RS_{World,t}$	$\Delta RS_{World,t}$	R^2
Market	**Firms**	**Mean (β_1)**	**t-stat**	**Mean (ω_1)**	**t-stat**	**Mean (%)**	**Mean (β_1)**	**t-stat**	**Mean (λ_1)**	**t-stat**	**Mean (%)**
Developed Markets											
Australia	1,524	0.203	27.52	0.050	5.72	5.5	0.202	27.86	0.026	3.45	5.4
Austria	94	0.121	9.86	0.090	2.73	4.6	0.118	10.02	0.057	1.64	4.6
Belgium	156	0.053	5.04	0.037	1.38	5.0	0.059	5.71	0.105	3.71	5.0
Canada	1,135	0.370	47.30	0.017	2.17	4.3	0.401	51.07	0.027	4.54	4.4
Denmark	188	0.137	12.54	0.088	4.01	5.0	0.128	11.81	0.086	3.85	5.0
Finland	143	0.134	12.01	0.040	1.70	4.3	0.132	11.92	0.054	2.39	4.3
France	866	0.279	41.17	0.027	2.33	5.1	0.283	42.13	0.026	2.17	5.2
Germany	726	0.315	35.39	0.026	2.93	4.3	0.316	35.25	0.038	4.63	4.4
Hong Kong	885	0.356	39.70	0.035	3.98	5.4	0.350	39.31	0.066	7.56	5.5
Ireland	54	0.031	2.54	0.212	4.99	4.8	0.034	2.94	-0.057	-1.27	4.9
Italy	279	0.324	42.47	0.069	5.56	4.3	0.322	43.97	0.056	4.73	4.4
Japan	2,663	0.628	134.53	0.018	4.43	5.6	0.622	136.83	0.005	1.73	5.6
Netherlands	151	0.152	16.05	0.066	3.30	4.5	0.147	15.47	0.101	4.81	4.7
New Zealand	120	0.051	4.44	0.063	2.12	5.4	0.053	4.63	0.017	0.59	5.1
Norway	223	0.136	13.12	0.089	3.99	4.9	0.137	13.25	0.102	4.33	4.9
Singapore	490	0.225	28.16	0.045	5.03	4.8	0.228	28.84	0.026	3.11	5.1
Spain	133	0.305	32.74	0.061	4.65	4.8	0.300	32.36	0.074	4.99	5.1
Sweden	292	0.309	33.48	0.046	4.06	4.4	0.300	32.66	0.095	8.13	4.5
Switzerland	221	0.214	19.88	0.061	2.72	4.8	0.200	18.23	0.052	2.24	4.9
United Kingdom	2,125	0.254	40.44	0.022	5.99	4.7	0.256	40.96	0.004	1.05	4.7
United States	2,000	0.309	43.83	0.029	5.66	4.4	0.323	53.97	0.026	8.18	4.6
Mean		**0.234**	**30.58**	**0.057**	**3.78**	**4.8**	**0.234**	**31.39**	**0.047**	**3.65**	**4.9**
Emerging Markets											
Argentina	74	0.098	6.64	0.070	1.60	4.9	0.099	6.65	0.058	1.50	4.8
Brazil	74	0.025	2.41	0.085	1.71	5.2	0.025	2.63	-0.022	-0.54	4.9
Chile	115	0.026	1.67	0.148	2.99	6.0	0.023	1.44	-0.032	-1.00	5.9
China	1,315	0.958	235.25	-0.002	-0.88	14.5	0.959	236.33	-0.010	-4.56	14.6
Greece	321	0.607	67.03	0.009	0.93	5.9	0.607	67.92	0.043	4.52	5.9
India	1,411	0.563	83.92	0.035	4.65	7.4	0.553	82.58	0.050	7.11	7.3
Indonesia	334	0.189	19.65	0.072	4.59	6.6	0.194	19.90	0.029	1.97	6.7
Israel	600	0.338	23.28	0.005	0.27	8.0	0.343	24.28	-0.044	-2.50	7.9
Korea	722	0.760	65.49	0.030	2.46	7.3	0.773	63.92	0.002	0.32	7.6
Malaysia	686	0.491	75.66	0.015	2.09	4.9	0.485	76.17	0.015	2.77	5.0
Mexico	105	0.049	4.56	0.113	2.23	5.9	0.056	4.25	0.040	0.37	5.9
Philippines	193	0.062	6.36	0.068	3.18	5.5	0.066	6.68	0.090	4.17	5.6
Poland	143	0.211	13.74	0.058	1.87	4.7	0.207	13.49	0.080	2.53	4.7
Portugal	55	0.054	6.41	0.119	3.22	4.8	0.045	5.52	0.187	4.76	4.8
South Africa	343	0.156	17.63	0.069	4.09	5.0	0.152	17.51	0.079	4.09	5.0
Taiwan	671	0.726	89.15	0.037	8.40	7.6	0.731	89.95	0.013	4.29	7.5
Thailand	483	0.175	25.75	0.020	1.59	5.1	0.177	26.98	0.062	6.38	5.1
Turkey	268	0.748	66.19	0.015	3.50	10.5	0.755	66.75	0.014	3.64	10.5
Mean		**0.346**	**45.04**	**0.054**	**2.69**	**6.7**	**0.347**	**45.16**	**0.036**	**2.21**	**6.6**

Figure 1 Comparison of Market Liquidity Commonality by Market Development

This figure presents the ranking of market liquidity commonality in developed and emerging markets.. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. . Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Market liquidity commonality is proxied by Equation (1) R^2 mean values, as reported in Table 2. R^2 mean values (in %) are used to capture the concurrent (i.e. on the same trading day) co-movement between changes in individual stocks' liquidity and market liquidity. R^2 mean values are ranked in descending order, i.e. markets with higher market liquidity commonality are ranked higher.

Equal-weighted regressions of Relative Spread are estimated applying a modified Chordia, Roll and Subrahmanyam (2000) equation, as given in Equation (1):

$$\Delta RS_{j,t} = \alpha + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

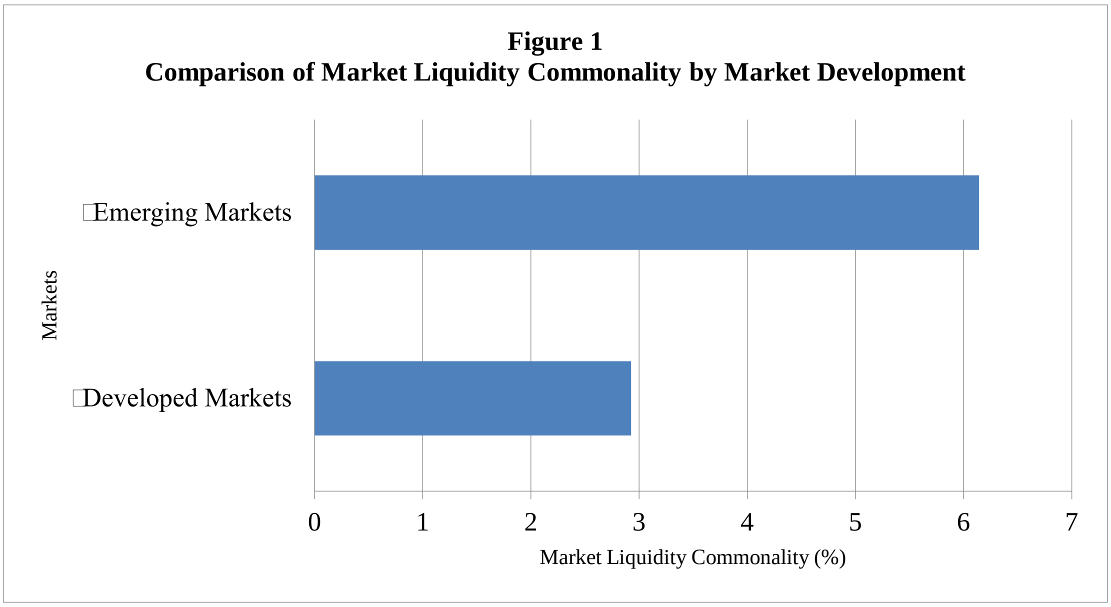


Figure 2 Comparison of Yearly Market Liquidity Commonality by Market Development

This figure presents the trend of market liquidity commonality in developed and emerging markets. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Market liquidity commonality is proxied by Equation (1) R^2 mean values, as reported in Table 3. R^2 mean values (in %) are used to capture the concurrent (i.e. on the same trading day) co-movement between changes in individual stocks' liquidity and market liquidity.

Equal-weighted regressions of Relative Spread are estimated applying a modified Chordia, Roll and Subrahmanyam (2000) equation, as given in Equation (1):

$$\Delta RS_{j,t} = \alpha + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

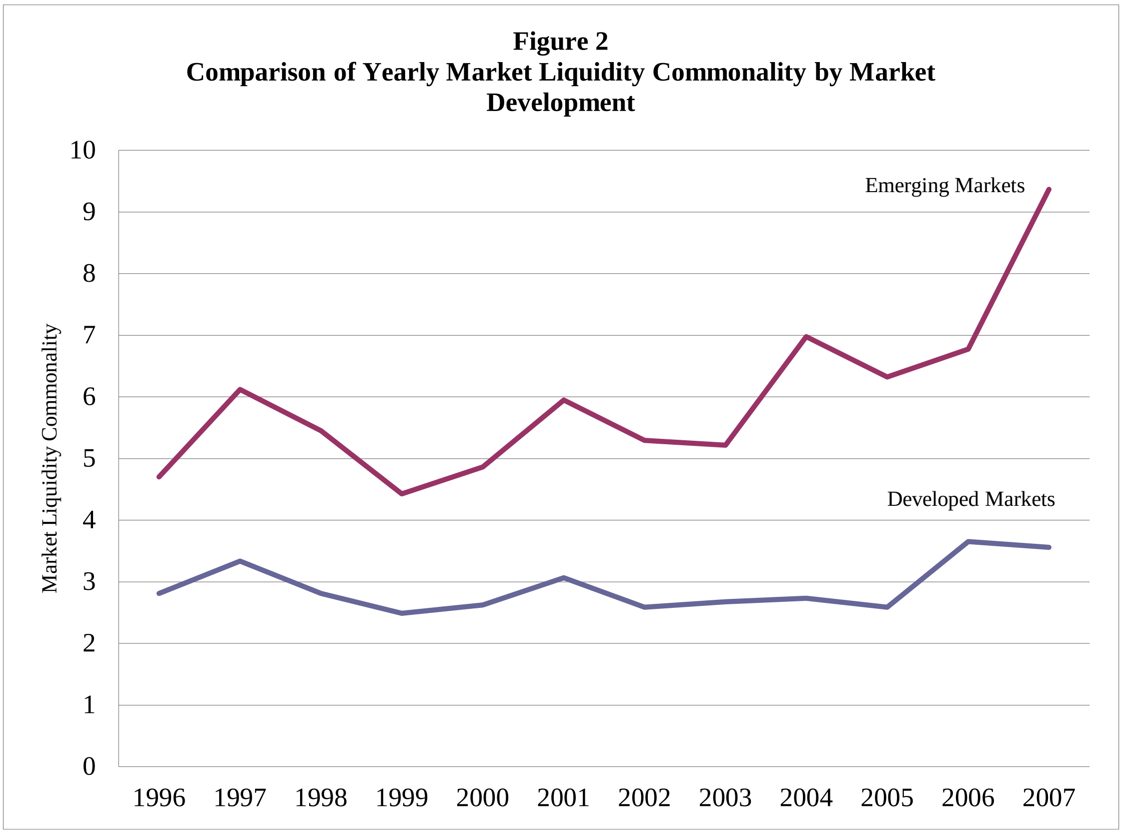


Figure 3 Comparison of Yearly Market Liquidity Commonality between North America and Asia

This figure presents the trend of market liquidity commonality between Asia and North America.. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. . Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Market liquidity commonality is proxied by R^2 mean values from Equation (1), as reported in Table 2. R^2 mean values (in %) are used to capture the concurrent (i.e. on the same trading day) co-movement between changes in individual stocks' liquidity and market liquidity. The North American region includes Canada and the United States, the Asian region includes Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, Philippines, South Korea, Singapore, Taiwan and Thailand.

Equal-weighted regressions of Relative Spread are estimated applying a modified Chordia, Roll and Subrahmanyam (2000) equation, as given in Equation (1):

$$\Delta RS_{j,t} = \alpha + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

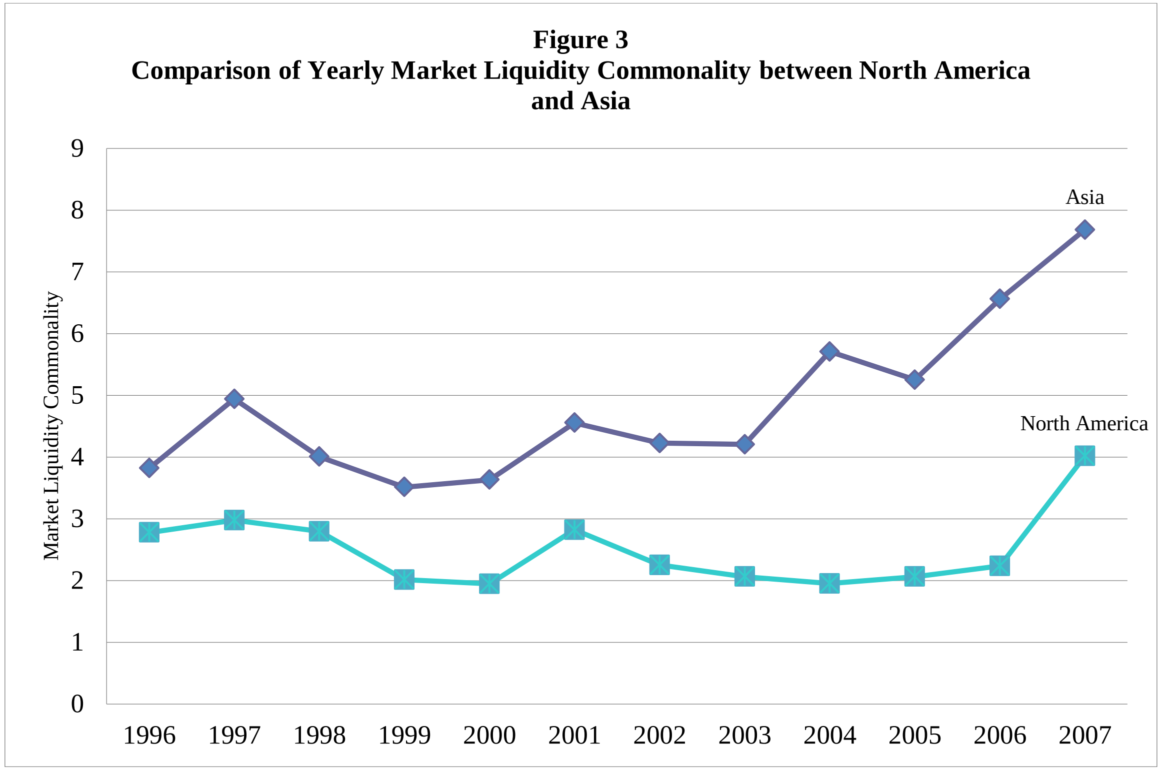


Figure 4 Comparison of Market Liquidity Commonality by Market Development

This figure presents the ranking of market liquidity commonality in emerging markets, developed markets, EU markets and Eurozone markets. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Market liquidity commonality is proxied by Equation (1) R^2 mean values, as reported in Table 2. R^2 mean values (in %) are used to capture the concurrent (i.e. on the same trading day) co-movement between changes in individual stocks' liquidity and market liquidity. The datasets contain eight Eurozone markets, namely Austria, Belgium, Finland, France, Germany, Italy, Netherlands, and Spain. Eleven EU markets are included, namely Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, and the United Kingdom. Financial integration of the Eurozone commenced in 2001. ,

Equal-weighted regressions of Relative Spread are estimated applying a modified Chordia, Roll and Subrahmanyam (2000) equation, as given in Equation (1):

$$\Delta RS_{j,t} = \alpha + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$

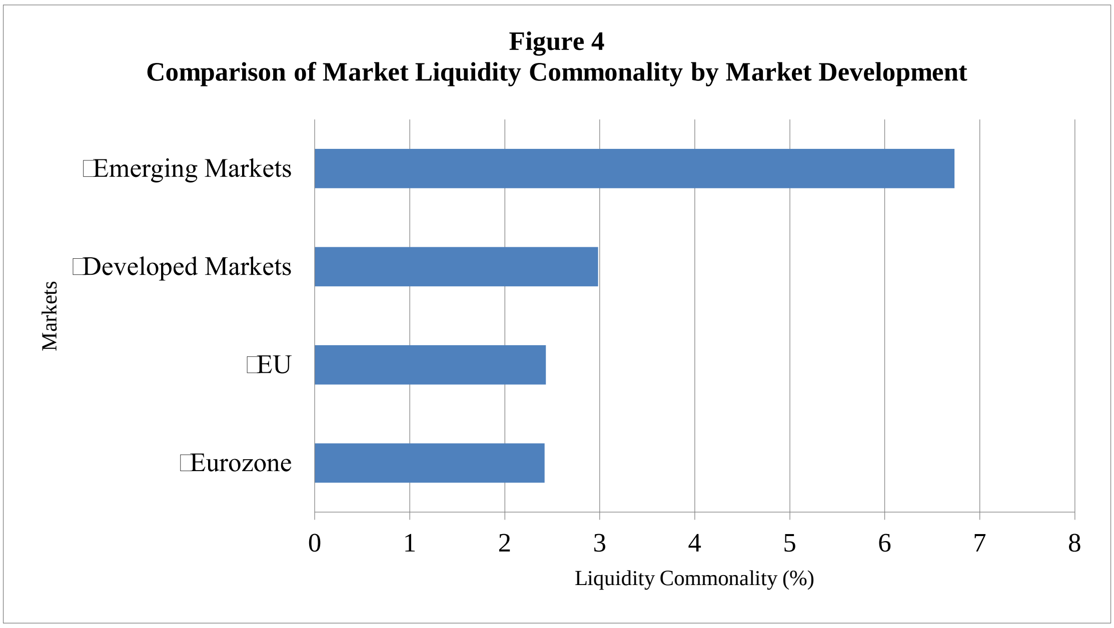
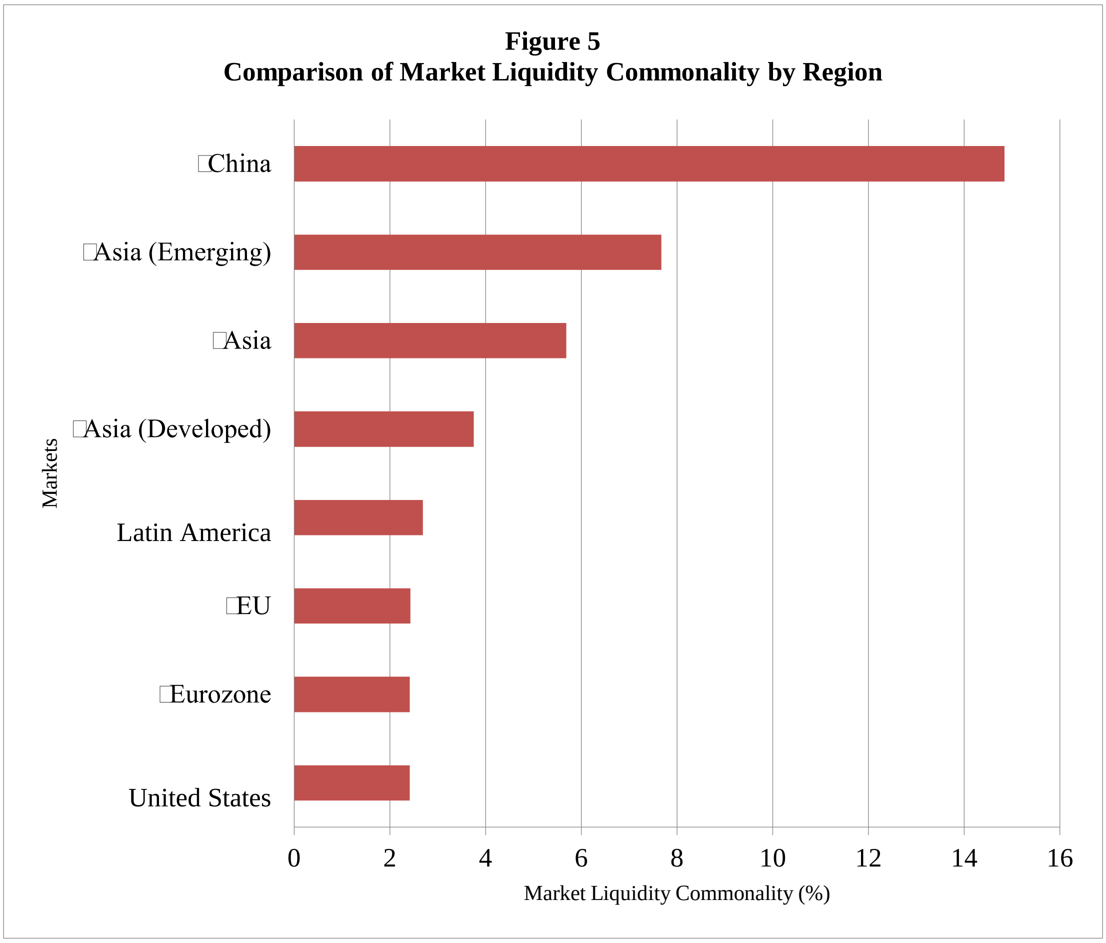


Figure 5 Comparison of Market Liquidity Commonality by Region.

This figure presents the ranking of market liquidity commonality in different regions.. The sample uses global Taqtic datasets containing intraday financial information on 22,381 firms from 39 markets around the world. Intraday Relative Spread values are computed from bid, ask, and current price for each stock; and mean Relative Spread values are computed from the intraday spread values. Market liquidity commonality is proxied by Equation (1) R^2 mean values, as reported in Table 2. R^2 mean values (in %) are used to capture the concurrent (i.e. on the same trading day) co-movement between changes in individual stocks' liquidity and market liquidity. The datasets contain eight Eurozone markets, namely Austria, Belgium, Finland, France, Germany, Italy, Netherlands, and Spain. Eleven EU markets are included, namely Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, and the United Kingdom. Financial integration of the Eurozone commenced in 200.

Equal-weighted regressions of Relative Spread are estimated applying a modified Chordia, Roll and Subrahmanyam (2000) equation, as given in Equation (1):

$$\Delta RS_{j,t} = \alpha + \beta_1 \Delta RS_{M,t} + \beta_2 \Delta RS_{M,t-1} + \beta_3 \Delta RS_{M,t+1} + \varepsilon_{j,t} \quad (1)$$



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