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Investor Sentiment and Emerging Stock Market Liquidity

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Highlights

- We examine the impact of investor sentiment on liquidity of 12 emerging stock markets.
- We also extend our analysis to examine the role of foreign investor sentiment on aggregate emerging market liquidity.
- We find positive (negative) impact of foreign and domestic investor sentiment on emerging markets liquidity (illiquidity).

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Abstract

This study examines the impact of local and foreign investor sentiment on emerging stock market liquidity. We find a positive (negative) effect of investor sentiment on liquidity (illiquidity). Results also reveal that foreign investor sentiment significantly influences emerging stock market liquidity.

Keywords

Investor sentiment, Emerging Stock Market, liquidity, Behavioral Finance

JEL Classification Code: G11, G12 ,G14, G17, G23

1. Introduction

This paper examines the impact of investor sentiment (IS) on emerging stock markets' (ESMs) liquidity. Stock-market liquidity affects market efficiency, transaction cost, expected return, and overall financial stability (Chordia et al., 2001; 2008). Therefore, understanding factors that influence stock-market liquidity is an important concern. Existing literature documents that macroeconomic variables, stock-exchange trading rules, investor-protection rules, information environment, market micro-structure issues, and firm-specific characteristics are possible sources of variation in liquidity (Brockman et al., 2009; Cumming et al., 2011; Karolyi et al., 2012; Moshirian et al., 2017). However, little attention has been paid to examining the impact of IS on stock-market liquidity. In recent years, sentiment and liquidity relationship has drawn considerable attention due to potential impairment caused by a lack of liquidity during the 2008-2009 financial crisis. Existing literature suggests that investors' trading behavior based on noise (Baker and Stein, 2004; DeLong et al., 1990; Huberman and Halka, 2001), overconfidence (Statman et al., 2006), and disposition effect (Shefrin and Statman, 1985) can influence sentiment in the market, which subsequently can affect liquidity. Notably, in a recent study, Liu (2015) asserts that positive (negative) IS increases (decreases) market liquidity. Such empirical evidence in the context of ESMs is negligible. Given that liquidity premium is an important feature of ESMs' return behavior (Bekaert et al., 2007), and investors' behavior in such markets is arguably different from developed markets (Kim and Nofsinger, 2008), a study on the relationship between IS and liquidity using ESM data can shed more light on this issue. Moreover, since the impact of noise trading on financial stability is negative (Shleifer and Summers, 1990), and high noise trading can influence liquidity (Liu, 2015),

the sentiment-liquidity relationship is a pertinent research question from a policy perspective. A related strand of behavioural finance literature also suggests that developed-market IS can have a contagious effect on stock-return behavior in other markets (Baker et al., 2012; Hudson and Green, 2015; Karolyi, et al., 2012; Verma and Soydemir, 2006). Due to the growing importance of ESMs in international portfolio diversification, the impact of foreign IS on aggregate ESM liquidity can be a major issue from practitioners' perspectives. However, no existing study documents the impact of domestic and foreign IS on ESM liquidity.

This study seeks to provide new insights on this noticeable gap in the literature majorly in two ways. First, considering a panel dataset of 12 ESMs, we provide comprehensive evidence of a positive (negative) relationship between domestic sentiment and stock-market liquidity (illiquidity). Second, using time-series data from two aggregate ESM indices, we provide evidence that foreign sentiment (U.S. and Europe) is an important determinant of ESM liquidity.

The rest of the paper proceeds as follows. Section 2 outlines data and methodology. Section 3 examines the results. Section 4 provides robustness tests. Section 5 concludes the paper.

2. Data and Methodology

The sample period spans from April-2002 till March-2015 (156 monthly observations). Sample-period selection is constrained by consistent data availability for sentiment proxies, liquidity-variable construction. The data sources are Bloomberg and the Organization for Economic Cooperation and Development (OECD) databases. This section is divided into two parts. The first part presents data, variables, and the empirical approach used in the panel estimation of 12 ESMs. The second part provides detail discussion on data and variables used for time-series analysis.

2.1 Data, Variables and Empirical Approach in Panel Estimation

The 12 ESMs and their benchmark equity indices used in this study are Brazil (Bovespa Index), China (Shanghai Composite index), India (NSE Nifty 50 index), Indonesia (Jakarta Stock Exchange Composite Index), Mexico (S&P/BMV Mexico Index), Philippines (Philippines Stock Exchange PSEi Index), Poland (Warsaw Stock Exchange Index), South Africa (FTSE South Africa Index), South Korea (Korea Composite Stock Price Index), Russia (RTS Standard Index), Thailand (Stock Exchange of Thailand Index), and Turkey (Borsa Istanbul 100 Index). These 12 ESMs were chosen because they are consistently recognized as a suitable equity asset class in various international indices, such as the MSCI, FTSE, Standard & Poor's, and Dow Jones emerging market indices. For instance, excluding South Korea (only present in the MSCI emerging-market index), all other 11 ESMs account for 65.26 percent, 76.33 percent, 75.13 percent, and 87.77 percent country equity exposure for the MSCI, FTSE, Standard & Poor's, and Dow Jones emerging-market indices

respectively (Philips and Kinniry, 2012). Moreover, a recently published Vanguard emerging-market stock index fund fact sheet shows that the afore mentioned 12 ESMs account for 76.40 percent asset allocation out of 98.70 percent emerging-market equity exposure (Vanguard Group, 2017).

Related literature considers liquidity as an elusive concept, and it is not observed directly but rather has many aspects that cannot be captured in a single measure (Amihud, 2002 p. 33). Liquidity, by its very nature, is difficult to measure because it encompasses a number of transactional properties of the underlying asset (Lesmond, 2005). Therefore, we use three liquidity measures to control for trading frequency, price-impact characteristics, and transaction-cost aspects. First, following Datar et al. (1998) and Fernández-Amador et al. (2013), we use traded value (TV), measured as the product of the number of shares traded with respective stock prices. Second, we use Amihud's (2002) illiquidity (ILLIQ) proxy. Third, based on Corwin and Schultz's (2012) measure of illiquidity, we incorporate high-low spread ratio (HLS) as our third liquidity proxy. Following Corwin and Schultz (2012), we adjust the overnight price changes in the estimation of HLS ratio as follows. If the low (high) of day $t+1$ (today) was above (below) the close price of day t (yesterday), then the high and low of $t+1$ day are reduced (increased) by the amount of overnight changes. We also set all negative daily spread to zero before making monthly averages as it gives higher degree of accuracy of the estimates instead of including and deleting negative spread (Corwin and Schultz, 2012). TV, ILLIQ, and HLS represent trading frequency, price impact, and transaction-cost aspects of liquidity, respectively. We compute the three liquidity variables using daily data from the aforementioned country-specific equity indices. Consistent with Schmeling (2009), and Lemmon and Portniaguina (2006), for our panel estimation, we use orthogonalized Consumer Confidence Index (CCI) data as a country-specific sentiment proxy ($SENT_{CCI}$). Following Fernández-Amador et al. (2013) and Chordia et al. (2001), our country-specific macroeconomic control variables are inflation rate (INF), industrial production growth (IIP), broad money growth rate (BM), and term spread (TS). Panel (A) of Table-1 provides descriptive statistics of sentiment and liquidity variables. Panel (B) of Table-1 reports descriptive statistics of macroeconomic control variables.

Following Schmeling (2009), we employ panel Granger-Causality test and panel fixed-effect model to investigate the impact of sentiment ($SENT_{CCI}$) on ESMs' liquidity. The use of panel regression helps to increase the power of our tests and to investigate whether there is a significant sentiment-liquidity relationship exists across countries. The use of panel fixed-effect estimation in equations (1), (2), and (3) allows the intercept to vary over the individual country (j), while the slope coefficients remain constant.

$$TV_{jt} = c_j + \alpha_1 TV_{jt-1} + \alpha_2 SENT_{CCI_{jt-1}} + \alpha_3 INF_{jt-1} + \alpha_4 IIP_{jt-1} + \alpha_5 BM_{jt-1} + \alpha_6 TS_{jt-1} + e_{jt} \quad (1)$$

$$ILLIQ_{jt} = c_j + \alpha_1 ILLIQ_{jt-1} + \alpha_2 SENT_{CCI_{jt-1}} + \alpha_3 INF_{jt-1} + \alpha_4 IIP_{jt-1} + \alpha_5 BM_{jt-1} + \alpha_6 TS_{jt-1} + e_{jt} \quad (2)$$

$$HLS_{jt} = c_j + \alpha_1 HLS_{jt-1} + \alpha_2 SENT_{CCI_{jt-1}} + \alpha_3 INF_{jt-1} + \alpha_4 IIP_{jt-1} + \alpha_5 BM_{jt-1} + \alpha_6 TS_{jt-1} + e_{jt} \quad (3)$$

Consistent with Schmeling (2009), we also estimate equations (1), (2), and (3) separately for each of the 12 ESMs in our sample to test the country-specific sentiment-liquidity relationship. If a significant sentiment-liquidity relationship exists in our sample, we expect to reject the null hypothesis, i.e., $\alpha_2 = 0$, in equations (1), (2), and (3).

Table-1 Descriptive Statistics of Sentiment, Liquidity and Macroeconomic Control Variables: Panel Estimation

Panel (A): Sentiment and Liquidity Variables																
Countries	$SENT_{CCI}$				TV				ILLIQ				HLS			
	Mean	St. Dev.	Min.	Max.	Mean	St. Dev.	Min.	Max.	Mean	St. Dev.	Min.	Max.	Mean	St. Dev.	Min.	Max.
Brazil	100.8	1.23	97.98	102	16.52	2.24	12.07	19.73	0.07	0.08	0.016	0.63	0.04	0.02	0.009	0.86
China	99.1	1.65	96.78	101	17.25	2.08	13.22	20.11	0.05	0.09	0.021	0.96	0.01	0.01	0.010	0.71
India	98.5	0.99	95.67	99.9	17.02	1.61	14.39	19.87	0.18	0.18	0.08	1.04	0.11	0.04	0.003	0.83
Indonesia	99.9	0.97	96.9	103	19.95	1.41	17.00	22.00	0.01	0.02	0.00	0.40	0.06	0.02	0.001	1.02
Mexico	100.0	1.58	98	105	16.63	0.71	15.53	19.64	0.05	0.04	0.01	0.52	0.02	0.01	0.001	0.38
Philippines	93.6	1.22	97.5	104	15.56	1.02	14.99	18.86	0.01	0.01	0.00	0.23	0.05	0.03	0.002	0.53
Poland	99.9	1.05	96.1	101	17.77	0.74	16.10	20.67	0.08	0.05	0.02	0.39	0.02	0.08	0.001	0.62
Russia	100.6	2.32	96.8	102	18.31	0.31	17.00	21.00	0.11	0.06	0.05	0.98	0.03	0.15	0.001	0.45
South Africa	100.6	1.27	98.3	104	18.99	0.67	17.00	23.00	0.03	0.05	0.01	0.62	0.03	0.01	0.001	0.49
South Korea	100.0	1.30	97.7	103	21.07	0.41	20.00	25.00	0.02	0.06	0.01	0.99	0.04	0.02	0.001	0.32
Thailand	91.4	4.14	88	95	16.64	0.67	16.00	20.56	0.09	0.07	0.03	0.88	0.02	0.05	0.001	0.25
Turkey	100.5	2.31	93	105	15.03	1.53	14.50	17.87	0.12	0.10	0.09	1.45	0.03	0.01	0.001	0.31

Panel (B): Macroeconomic Control Variables																
Countries	INF				IIP				BM				TS			
	Mean	St. Dev.	Min.	Max.	Mean	St. Dev.	Min.	Max.	Mean	St. Dev.	Min.	Max.	Mean	St. Dev.	Min.	Max.
Brazil	0.53	0.40	0.11	1.23	0.87	1.83	0.07	0.96	0.01	0.02	-0.13	0.05	1.23	1.04	-0.71	4.15
China	0.22	0.63	0.06	0.98	0.03	2.43	0.03	1.01	0.01	0.03	-0.19	0.03	1.27	0.83	-0.56	3.89
India	0.59	0.79	0.12	2.23	0.66	5.61	0.005	1.77	0.56	0.34	0.01	0.98	0.92	1.16	-0.33	2.45
Indonesia	0.57	0.84	0.17	1.56	0.49	0.68	0.03	0.99	0.01	0.07	-0.00	0.09	1.37	1.58	0.34	3.33
Mexico	0.34	0.34	0.21	0.89	0.14	0.77	0.06	1.21	0.01	0.03	-0.03	0.11	1.96	1.16	0.21	2.23
Philippines	0.34	0.30	0.11	1.11	0.41	2.56	0.31	1.34	0.08	0.04	-0.05	0.22	0.64	1.91	0.11	1.88
Poland	0.18	0.35	0.07	0.78	0.48	1.75	0.22	0.98	0.10	0.23	0.07	0.66	0.55	1.23	-0.34	1.23
Russia	0.82	0.61	0.33	2.66	0.64	3.67	0.27	1.89	0.10	0.10	0.06	0.77	0.41	3.21	0.33	0.88
South Africa	0.43	0.46	0.22	1.28	0.10	2.08	0.26	1.58	0.08	0.03	-0.07	0.44	3.67	2.22	-2.09	5.88
South Korea	0.23	0.36	0.17	0.99	0.45	2.34	0.31	1.78	0.07	0.06	-0.04	0.25	0.95	0.81	0.11	1.55
Thailand	0.22	0.54	0.08	1.22	0.82	4.05	0.52	2.02	0.05	0.09	-0.00	0.87	1.76	1.07	0.97	2.97
Turkey	0.78	0.89	0.45	2.98	0.50	2.41	0.36	1.33	0.15	0.06	0.10	0.98	3.67	5.22	2.22	7.77

Notes: This table shows mean, standard deviation (St. Dev.), minimum (Min.), and Maximum (Max.) values of sentiment proxy ($SENT_{CCI}$), liquidity variables (TV, ILLIQ, HLS) and other macroeconomic control variables (INF, IIP, BM, TS). TV, ILLIQ, and HLS represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio respectively. Following Corwin and Schultz (2012), we adjust the overnight price changes in the estimation of HLS ratio as follows. If the low (high) of day $t+1$ (today) was above (below) the close price of day t (yesterday), then the high and low of $t+1$ day are reduced (increased) by the amount of overnight changes. We also set all negative daily spread to zero before making monthly averages as it gives higher degree of accuracy of the estimates instead of including and deleting negative spread (Corwin and Schultz, 2012). Macroeconomic control variables are inflation rate (INF), industrial production growth (IIP), broad money growth rate (BM), and term spread (TS). CCI data for India have been collected from Reserve Bank of India (Sample period 2011-2015). Country-specific equity indices used for liquidity proxy calculations are; Brazil (Bovespa Index), China (Shanghai Composite index), India (NSE Nifty 50 index), Indonesia (Jakarta Stock Exchange Composite Index), Mexico (S&P/BMV Mexico Index), Philippines (Philippines Stock Exchange PSEi Index), Poland (Warsaw Stock Exchange Index), South Africa (FTSE South Africa Index), South Korea (Korea Composite Stock Price Index), Russia (RTS Standard Index), Thailand (Stock Exchange of Thailand Index), Turkey (Borsa Istanbul 100 Index). Sample period spans from April-2002 to March-2015 (156 monthly observations).

2.2 Data, Variables, and Empirical Approach for Time-Series Analysis

Time-series data have been used to examine the sentiment-liquidity relationship at the aggregate market level by considering two aggregate ESM indices, the MSCI emerging-market index and the S&P Asia-50 index. To maintain consistency in our analysis, we computed the same three liquidity proxies (TV, ILLIQ, HLS) for each emerging-market index. For instance, MSCITV, MSCILLIQ, and MSCIHLS represent traded value, Amihud's (2002) illiquidity measure, and high-low spread of the MSCI emerging-market index, respectively. Similarly, S&PTV, S&PILLIQ, and S&PHLS are three liquidity proxies for the S&P Asia-50 index. Baker and Wurgler's (2006) sentiment index (BWSI) and the Eurozone Sentix Investor Confidence Index (EUROSI) are foreign IS proxies for the U.S. and European markets, respectively. The aggregate emerging-market sentiment index ($EMSENT_{CCI}$) is constructed using the third principal component of orthogonal CCI data from the abovementioned 12 ESMs. $EMSENT_{CCI}$ captures the aggregate emerging-market domestic or local sentiment. The global market factor (GMER), size factor (GSMB), value factor (GHML), U.S. Fed rate (FED), change in global economic policy uncertainty index ($\Delta GEPU$), lag index returns ($MSCIRET_{t-1}$, $S\&PRET_{t-1}$), and index volatility (MSCISTDV, S&PSTDV) are control variables. The data for GMER, GSMB, GHML, and FED are collected from Professor Kenneth-French's website. The Economic Policy Uncertainty website provides policy-uncertainty index data (Baker et al., 2016). Table-2 reports the descriptive statistics of all variables used in the time-series analysis. -For brevity, we do not report stationarity test results. Equations (4) and (5) are estimated using the OLS method for the two emerging-market indices (i), and Newey and West's (1987) robust standard errors are used.

$$LIQ_{it} = \beta_0 + \beta_1 EMSENT_{CCI,t-1} + \beta_2 BWSI_{t-1} + \beta_3 FED_{t-1} + \beta_4 GMER_t + \beta_5 GSMB_t + \beta_6 GHML_t + \beta_7 \Delta GEPU_t + \beta_8 STDV_t + \beta_9 RET_{t-1} + \varepsilon_1 \quad (4)$$

$$LIQ_{it} = \beta_0 + \beta_1 EMSENT_{CCI,t-1} + \beta_2 EUROSI_{t-1} + \beta_3 FED_{t-1} + \beta_4 GMER_t + \beta_5 GSMB_t + \beta_6 GHML_t + \beta_7 \Delta GEPU_t + \beta_8 STDV_t + \beta_9 RET_{t-1} + \varepsilon_1 \quad (5)$$

Where LIQ_{it} indicates the liquidity proxies of MSCI emerging-market index (MSCITV, MSCILLIQ, MSCIHLS) and S&P Asia-50 index (S&PTV, S&PILLIQ, S&PHLS). $STDV_t$ indicates the daily returns standard deviation of two emerging market indices computed on a monthly basis (MSCISTDV, S&PSTDV). RET_{t-1} is the lag monthly return of MSCI Emerging Market Index and S&P Asia 50 Index ($MSCIRET_{t-1}$, $S\&PRET_{t-1}$). The time-series analysis examines the null hypotheses that, $\beta_1 = 0$ and $\beta_2 = 0$.

To understand the sentiment-liquidity relationship regarding their variation over the sample period, we also present time-series graphs of liquidity and sentiment proxies in Appendix-1. In all the figures we use the TV as liquidity proxy. Figure 1 of Appendix 1 presents the time-series plots of

three sentiment proxies ($EMSENT_{CCI}$, BWSI, EUROSII). Figure 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 presents liquidity and sentiment proxy variation of Brazil, China, India, Indonesia, Mexico, Philippines, Poland, Russia, South Africa, South Korea, Thailand, Turkey and MSCI emerging-market index respectively.

Table-2 Descriptive Statistics of Sentiment, Liquidity and Control Variables: Time-series Estimation

Variables	Mean	Standard Deviation	Minimum	Maximum
MSCITV	16.35	0.68	14.67	18.29
MSCI ILLIQ	0.07	0.06	0.02	0.34
MSCIHLS	0.09	0.02	0.01	0.13
S&PTV	14.17	0.32	12.56	14.78
S&PILLIQ	0.30	0.14	0.11	0.97
S&PHLS	0.02	0.01	0.01	0.08
$EMSENT_{CCI}$	9.49	17.47	-25.01	35.58
BWSI	-0.05	0.38	-0.87	0.85
EUROSII	4.10	12.50	-26.7	42
FED	0.11	0.14	0.00	0.44
GMER	0.73	4.63	-19.54	11.45
GSMB	0.15	1.69	-5.30	5.94
GHML	0.30	1.63	-5.46	4.79
Δ GEPV	0.40	20.38	-60.97	83.83
$MSCIRET_{t-1}$	7.78	4.76	-6.33	18.66
$S\&PRET_{t-1}$	5.66	12.22	-8.45	10.55
MSCISTDV	9.99	--	8.48	12.44
S&PSTDV	6.96	--	2.67	10.56

Notes: This table reports descriptive statistics of all variables used in the time-series analysis. MSCITV, MSCILLIQ, and MSCIHLS represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio of MSCI emerging-market index. Similarly, S&PTV, S&PILLIQ, S&PHLS indicate three liquidity proxies related to traded value, Amihud (2002) illiquidity measure and high-low spread ratio of S&P Asia-50 index. We adjust the overnight price changes in the estimation of HLS ratio as follows. If the low (high) of day $t+1$ (today) was above (below) the close price of day t (yesterday), then the high and low of $t+1$ day are reduced (increased) by the amount of overnight changes. We also set all negative daily spread to zero before making monthly averages as it gives higher degree of accuracy of the estimates instead of including and deleting negative spread (Corwin and Schultz, 2012). $EMSENT_{CCI}$ is the aggregate emerging market sentiment index constructed through principal component analysis of orthogonal consumer confidence index (CCI) data of 12 emerging stock-markets (Brazil, China, India, Indonesia, Mexico, Philippines, Poland, Russia, South Africa, South Korea, Thailand, Turkey). BWSI is the Baker and Wurgler (2006) sentiment index. EUROSII is the Eurozone Sentix sentiment index. FED, GMER, GSMB, GHML, Δ GEPV, indicate US Fed rate, global market factor, global value factor, global value factor and change in global economic policy uncertainty index respectively. $MSCIRET_{t-1}$ and $S\&PRET_{t-1}$ indicate lag index return of two emerging market indices. MSCISTDV and S&PSTDV are daily return volatility of two emerging market indices. Sample period is from April-2002 to March-2015. Sample period for S&P Asia-50 index is from July-2004 to March-2015.

3. Results

This section examines the empirical results in two parts. The first deals with the empirical findings of sentiment-liquidity relationship across countries in a panel-data framework. The second part discusses the results obtained from time-series analysis at an aggregate emerging-market level.

3.1. Panel Estimation Results

The Panel Granger-Causality test results reported in Table-3 reveal that causality runs from sentiment ($SENT_{CCI}$) to illiquidity proxies (ILLIQ, HLS). However, no reverse causality is observed from liquidity (illiquidity) to sentiment. The first hand impression from the causality test indicates that IS and stock-market illiquidity are related.

Table-3 Panel Granger-Causality Test Results

Panel (A) Causality test from Sentiment to Liquidity

Variables			Coefficients
$SENT_{CCI}$	Does not Granger cause	TV	3.22
$SENT_{CCI}$	Does not Granger cause	ILLIQ	7.27**
$SENT_{CCI}$	Does not Granger cause	HLS	9.22**
Panel (B) Causality test from Liquidity to Sentiment			
TV	Does not Granger cause	$SENT_{CCI}$	1.29
ILLIQ	Does not Granger cause	$SENT_{CCI}$	3.39
HLS	Does not Granger cause	$SENT_{CCI}$	2.29

Notes: This table reports pairwise Granger-causality tests for sentiment ($SENT_{CCI}$) and liquidity variables (TV, ILLIQ, HLS). TV, ILLIQ, HLS represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio respectively. $SENT_{CCI}$ is measured through consumer confidence index. Sample period spans from April-2002 to March-2015. ** indicate significance at 5% level.

Table-4 Panel Estimation Results: Impact of Investor Sentiment on Liquidity

Coefficients	TV	ILLIQ	HLS
$SENT_{CCI,t-1}$	0.024** (2.47)	-0.006 (-1.14)	-0.556*** (-8.13)
TV_{jt-i}	0.335*** (19.15)		
$ILLIQ_{jt-i}$		0.453*** (22.35)	
HLS_{jt-i}			0.254*** (15.65)
INF_{jt-i}	-0.030 (-0.54)	0.161** (2.18)	0.001 (1.31)
IIP_{jt-i}	0.001 (0.26)	-0.005 (-1.29)	-0.009 (-1.29)
BM_{jt-i}	0.039** (2.92)	-0.051*** (-3.10)	-0.114*** (-9.77)
TS_{jt-i}	-0.131*** (-4.15)	0.17*** (5.30)	0.02 (1.56)
Likelihood Ratio Test [$\chi^2(11)$]	92*** {0.00}	101*** {0.00}	122*** {0.00}
Lagrange Multiplier Test [$\chi^2(1)$]	63*** {0.00}	34*** {0.00}	48*** {0.00}
Hausman Test [$\chi^2(6)$]	121*** {0.00}	92*** {0.00}	165*** {0.00}
Adj. R ²	0.48	0.29	0.51
D-W Statistics	3.32	2.22	1.55
F-statistics F(11, 1889)	164.50*** {0.00}	94.20*** {0.00}	121*** {0.00}

Notes: This table reports panel estimation results of equation (1), (2) and (3). Dependent variables TV, ILLIQ and HLS represent traded value, Amihud (2002) illiquidity measure and high-low spread measures respectively. $SENT_{CCI}$ is measured through consumer confidence index. INF (inflation rate), IIP (industrial production growth), BM (broad money growth rate), TS (term spread) are country-specific macroeconomic control variables. Likelihood Ratio test (Gourieroux et al., 1982) identifies the existence of individual firm specific effects in the data set. Lagrange Multiplier test (Breusch and Pagan, 1980) examines the acceptability of panel data models over the classical regression models. The Hausman (1978) test has been used to determine the preferred model (i.e., fixed effect model or random effect model). Sample period spans from April-2002 till March-2015 (156 monthly observations) and includes data from 12 emerging stock-markets. t-values in parenthesis. p-values are in curly brackets. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

The fixed-effect model results reported in Table-4 indicate that $SENT_{CCIj}$ is priced significantly for TV and HLS. Consistent with Liu (2015), we find that an increase (decrease) in sentiment enhances market liquidity (illiquidity). It has been observed that when sentiment is positive, stock-market liquidity (TV) increases significantly. The coefficient on $SENT_{CCI,t-1}$ for TV (0.024, $t = 2.47$), indicates that an increase in the sentiment index of 1 percentage point, increases the market liquidity by 0.024 percent or 2.4 basis point. However, the impact of sentiment is more prominent for illiquidity. The observed sentiment coefficient (-0.556, $t = -8.13$) in the case of HLS suggests that pessimistic sentiment can cause illiquidity to rise significantly (0.556 percent or 55.6 basis point). There is no statistically significant impact of sentiment on the ILLIQ measure, though the negative sign of the coefficient is consistent with the theoretical argument. Results indicate that an expansionary monetary policy (an increase in BM) increases stock-market liquidity (Fernández-Amador et al., 2013). Consistent with Chordia et al. (2001), the negative INF coefficient of indicates that higher inflation is attributable to a decrease in stock-market liquidity.

Table-5 Results for the Predictive Power of Sentiment in Individual Countries Liquidity

Countries	Coefficient	TV	ILLIQ	HLS
Brazil	$SENT_{CCIt-1}$	0.141 (1.23)	-0.021** (-2.12)	-0.002 (-1.78)
China	$SENT_{CCIt-1}$	0.152 (1.11)	-0.004 (-1.39)	-0.001 (-1.11)
India	$SENT_{CCIt-1}$	0.833 (1.26)	-0.011 (-0.66)	-0.035*** (-2.89)
Indonesia	$SENT_{CCIt-1}$	0.971*** (2.58)	-0.018*** (-6.18)	-0.125*** (-3.38)
Mexico	$SENT_{CCIt-1}$	0.181*** (2.95)	-0.015** (-2.14)	-0.098** (-5.02)
Philippines	$SENT_{CCIt-1}$	0.008 (1.08)	-0.001 (-0.21)	-0.001 (-0.56)
Poland	$SENT_{CCIt-1}$	0.203*** (4.67)	-0.161*** (-4.36)	-0.215*** (-9.66)
Russia	$SENT_{CCIt-1}$	0.015 (1.17)	-0.001 (-1.51)	-0.004 (-1.44)
South Africa	$SENT_{CCIt-1}$	0.181*** (3.43)	-0.003 (-1.15)	-0.021** (-2.66)
South Korea	$SENT_{CCIt-1}$	0.068** (2.15)	-0.001 (-0.91)	-0.003 (-1.55)
Thailand	$SENT_{CCIt-1}$	0.032*** (8.05)	-0.034*** (-4.25)	-0.002 (-1.25)
Turkey	$SENT_{CCIt-1}$	0.195*** (8.65)	-0.002* (-1.96)	-0.101*** (-3.62)

Notes: This table shows results for predictive regressions with liquidity variables (TV, ILLIQ, HLS) as dependent variable and sentiment ($SENT_{CCI}$) as well as several control variables (not shown in the tables) as predictive variables (equations 1, 2, and 3). TV, ILLIQ and HLS represent traded value, Amihud (2002) illiquidity measure and high-low spread measures respectively. $SENT_{CCI}$ is measured through consumer confidence index. Sample period spans from April-2002 till March-2015 (156 monthly observations) and includes data from 12 emerging stock-markets. t-values in parenthesis. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

Results reported in Table-5 suggest a strong relationship between sentiment ($SENT_{CCIt-1}$) and stock-market liquidity across countries. The sentiment-liquidity relationship is prominent for all three measures of stock-market liquidity (TV, ILLIQ, HLS) for countries such as Indonesia, Mexico, Poland, and Turkey. Likewise, at least one of the liquidity measures appears to be significant for 11 out of 12 ESMs. Overall results indicate that sentiment is an essential factor for stock-market liquidity, despite the fact that the magnitude of this effect varies across countries. Our results are consistent with the argument by Schmeling (2009) and Chui et al. (2010) that cross-country cultural differences can play a significant role in attenuating or intensifying the impact from sentiment on financial markets. Therefore, the observed significant sentiment coefficient ($SENT_{CCIj}$) in Table-4 may not hold the same level of statistical significance for individual countries. Nevertheless, our empirical findings are consistent with the theoretical proposition (Liu, 2015; Baker and Stein, 2004) that optimistic (pessimistic) sentiment leads to higher stock-market liquidity (illiquidity). Furthermore, we check the consistency of sentiment-liquidity relationship observed in Table-4 and Table-5 by analysis whether the relationship change over time? In recent years, following the 2008-2009 global financial crisis, an extant body of literature highlights the impact of the stock-markets turmoil on market liquidity. Especially financial crisis and uncertain market environment considered to be one of the critical factors for creating severe liquidity disruptions and exacerbating its consequences in the stock-market (Huang and Wang, 2008). We, therefore, estimate the equations (1), (2) and (3) by dividing our sample concerning pre-crisis (April-2002 to July-2007) and post-crisis (August-2007 to March-2015) periods. Researchers adopt the crisis period definition in many ways, ad-hoc (based on the economic event only), statistical approach, and both (Baur, 2012;

Table-6 Panel Estimation Results: Impact of Investor Sentiment on Liquidity during Pre-crisis and Post-crisis Period

Panel (A) Pre-crisis Period: Impact of Investor Sentiment on Liquidity (April-2002 to July-2007)				Panel (B) Post-crisis Period: Impact of Investor Sentiment on Liquidity (August-2007 to march-2015)			
Coefficients	TV	ILLIQ	HLS	Coefficients	TV	ILLIQ	HLS
$SENT_{cct-1}$	0.028*** (4.46)	-0.000 (-0.13)	-0.36*** (-5.55)	$SENT_{cct-1}$	0.011* (1.86)	-0.001 (-0.57)	-0.09* (-1.89)
TV_{jt-i}	0.381*** (16.11)			TV_{jt-i}	0.27*** (13.44)		
$ILLIQ_{jt-i}$		0.33*** (17.35)		$ILLIQ_{jt-i}$		0.42*** (23.46)	
HLS_{jt-i}			0.305*** (12.22)	HLS_{jt-i}			0.22*** (8.77)
INF_{jt-i}	-0.037** (-2.98)	0.001 (1.12)	0.021 (2.21)	INF_{jt-i}	-0.19*** (-9.26)	0.047*** (4.91)	0.035*** (6.67)
IIP_{jt-i}	0.002 (0.67)	-0.000 (-0.22)	-0.002 (-0.79)	IIP_{jt-i}	0.029*** (4.85)	-0.032** (-2.54)	-0.000 (-0.27)
BM_{jt-i}	0.007 (0.32)	-0.021* (-1.88)	-0.14*** (-10.56)	BM_{jt-i}	0.004 (0.29)	-0.054*** (-3.22)	-0.003 (-0.49)
TS_{jt-i}	-0.84*** (-6.85)	0.001 (1.21)	0.38** (2.56)	TS_{jt-i}	-0.001 (-0.88)	0.019*** (4.21)	0.26** (2.11)
Likelihood Ratio Test $[\chi^2(11)]$	81*** {0.00}	95*** {0.00}	101*** {0.00}	Likelihood Ratio Test $[\chi^2(11)]$	69*** {0.00}	55*** {0.00}	88*** {0.00}
Lagrange Multiplier Test $[\chi^2(1)]$	44*** {0.00}	29*** {0.00}	52*** {0.00}	Lagrange Multiplier Test $[\chi^2(1)]$	54*** {0.00}	31*** {0.00}	68*** {0.00}
Hausman Test $[\chi^2(6)]$	92*** {0.00}	86*** {0.00}	113*** {0.00}	Hausman Test $[\chi^2(6)]$	117*** {0.00}	72*** {0.00}	98*** {0.00}
Adj. R ²	0.51	0.24	0.46	Adj. R ²	0.59	0.26	0.50
D-W Statistics	2.12	1.67	1.12	D-W Statistics	2.77	2.07	1.96
F-statistics F(11, 865)	124.23*** {0.00}	114*** {0.00}	96*** {0.00}	F-statistics F(11, 896)	98*** {0.00}	87*** {0.00}	109*** {0.00}

Notes: This table reports panel estimation results of equation (1), (2) and (3) during pre-crisis (April-2002 to July-2007) and post-crisis (August-2007 to march-2015) periods for the 12 ESMs data. Dependent variables TV, ILLIQ and HLS represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio respectively. $SENT_{cct}$ is measured through consumer confidence index. INF (inflation rate), IIP (industrial production growth), BM (broad money growth rate), TS (term spread) are country-specific macroeconomic control variables. Likelihood Ratio test (Gourieroux et al., 1982) used to identify the existence of individual firm specific effects in the data set. Lagrange Multiplier test (Breusch and Pagan, 1980) helps to examine the acceptability of panel data models over the classical regression models. The Hausman (1978) test has been used to determine the preferred model (i.e., fixed effect model or random effect model). t-values in parenthesis. p-values are in curly brackets. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

Dimitriou and Kenourgios, 2013). Our approach of crisis period identification is ad-hoc based on major economic and financial events during the 2008-2009 financial crisis and consistent with Dimitriou and Kenourgios (2013) and Hudson and Green (2015). Reported results in Table 6 show that positive (negative) impact of sentiment on stock-market liquidity (illiquidity) is persistent in both pre-crisis and post-crisis period. Overall panel estimation results reveal a significant sentiment-liquidity relationship for the whole sample period and also for pre-crisis and post-crisis sub-periods.

Table-7 Granger-Causality Tests: Foreign Investor Sentiment and Emerging Market Liquidity

Panel (A) Causality test: Sentiment Proxies and MSCI Emerging Market Index Liquidity			
Variables			Coefficients
$EMSENT_{CCI}$	Does not Granger cause	MSCITV	15.76***
$EMSENT_{CCI}$	Does not Granger cause	MSCI ILLIQ	14.26**
$EMSENT_{CCI}$	Does not Granger cause	MSCIHLS	16.88***
BWSI	Does not Granger cause	MSCITV	11.56*
BWSI	Does not Granger cause	MSCI ILLIQ	12.50**
BWSI	Does not Granger cause	MSCIHLS	15.88***
EUROSI	Does not Granger cause	MSCITV	12.66*
EUROSI	Does not Granger cause	MSCI ILLIQ	6.52
EUROSI	Does not Granger cause	MSCIHLS	4.36
Panel (B) Causality test: MSCI Emerging Market Index Liquidity and Sentiment Proxies			
MSCITV	Does not Granger cause	$EMSENT_{CCI}$	4.79
MSCI ILLIQ	Does not Granger cause	$EMSENT_{CCI}$	6.39
MSCIHLS	Does not Granger cause	$EMSENT_{CCI}$	5.66
MSCITV	Does not Granger cause	BWSI	5.23
MSCI ILLIQ	Does not Granger cause	BWSI	11.29*
MSCIHLS	Does not Granger cause	BWSI	6.14
MSCITV	Does not Granger cause	EUROSI	3.64
MSCI ILLIQ	Does not Granger cause	EUROSI	2.22
MSCIHLS	Does not Granger cause	EUROSI	4.88
Panel (C) Causality test: Sentiment Proxies and S&P Asia 50 Index Liquidity			
$EMSENT_{CCI}$	Does not Granger cause	S&PTV	13.37**
$EMSENT_{CCI}$	Does not Granger cause	S&PILLIQ	9.21*
$EMSENT_{CCI}$	Does not Granger cause	S&PHLS	12.55**
BWSI	Does not Granger cause	S&PTV	3.59
BWSI	Does not Granger cause	S&PILLIQ	10.11*
BWSI	Does not Granger cause	S&PHLS	6.22
EUROSI	Does not Granger cause	S&PTV	2.99
EUROSI	Does not Granger cause	S&PILLIQ	6.52
EUROSI	Does not Granger cause	S&PHLS	5.77
Panel (D) Causality test: S&P Asia 50 Index Liquidity and Sentiment Proxies			
S&PTV	Does not Granger cause	$EMSENT_{CCI}$	3.21
S&PILLIQ	Does not Granger cause	$EMSENT_{CCI}$	4.32
S&PHLS	Does not Granger cause	$EMSENT_{CCI}$	2.89
S&PTV	Does not Granger cause	BWSI	6.11
S&PILLIQ	Does not Granger cause	BWSI	1.35
S&PHLS	Does not Granger cause	BWSI	4.77
S&PTV	Does not Granger cause	EUROSI	3.33
S&PILLIQ	Does not Granger cause	EUROSI	2.71
S&PHLS	Does not Granger cause	EUROSI	5.44

Notes: This table reports pairwise Granger-causality tests for sentiment and liquidity variables. MSCITV, MSCILLIQ, MSCIHLS represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio of MSCI Emerging Market Index. Similarly, S&PTV, S&PILLIQ, S&PHLS indicate three liquidity proxies related to S&P Asia 50 Index. $EMSENT_{CCI}$ is the aggregate emerging market sentiment index constructed through principal component analysis of orthogonal consumer confidence index (CCI) data of 12 emerging markets (Brazil, China, India, Indonesia, Mexico, Philippines, Poland, Russia, South Africa, South Korea, Thailand, Turkey). BWSI is the Baker and Wurgler (2006) sentiment index. EUROSI is the Eurozone Sentix sentiment index. Sample period spans from April-2002 till March-2015 (156 monthly observations). Data for S&P Asia 50 index is

from July-2004 to March-2015. This is due to the unavailability of consistent data to construct liquidity proxies for S&P Asia 50 index. ***, **, * indicate significance at 1%, 5% and 10% level respectively.

3.2 Time-Series Estimation Results

Time-series Granger-Causality test results reported in Table-7 show that causality runs from sentiment to liquidity (illiquidity). Panel (A) results suggest that apart from $EMSENT_{CCI}$, unidirectional causality also exists between foreign sentiment proxies (BWSI, EUROSII) and ESM liquidity. Reported results in Panel (C) of Table-7 indicate a significant flow of causality from $EMSENT_{CCI}$ to S&P Asia 50 liquidity measures. However, we gather very little evidence of foreign sentiment measures Granger-causing S&P Asia 50 liquidity.

Time-series estimation results (equations 4 and 5) reported in Table-8 further corroborate our findings regarding the positive (negative) impact of sentiment on liquidity (illiquidity). BWSI is having have a significant effect on MSCITV (0.613, $t = 5.33$) and MSCIHLS (-0.042, $t = 1.98$). EUROSII appears to be significant for MSCILLIQ (-0.018, $t = -8.26$). We also observe a positive (negative) impact of the aggregate emerging-market sentiment ($EMSENT_{CCI}$) on ESMs' liquidity (illiquidity) (coefficient for MSCITV is 0.005, $t = 2.65$; coefficient for MSCILLIQ is -0.011, $t = -4.57$; coefficient for S&PHLS is -0.056, $t = -2.14$). Our time-series estimation also extends to pre-crisis (April-2002 to July-2007) and post-crisis (August-2007 to March-2015) period analysis. Table-9 reports time-series of estimation results of equations (4) and (5) during the pre-crisis period. Table-10 encompasses time-series of estimation results of equations (4) and (5) for post-crisis period. Reported results in Table-9 and Table-10 suggest that impact of $EMSENT_{CCI}$ is more prominent during the pre-crisis and post-crisis period for MSCIHLS and S&PHLS. Results presented in the Panel (A) and (B) of Table-10 indicate that the positive (negative) impact of foreign country sentiment (BWSI and EUROSII) increasingly crucial for emerging-market liquidity (illiquidity) during post-crisis periods.

4. Robustness Tests

A few recent articles suggest that securities law, market surveillance, trading rules, and market microstructure play an essential role in the development of stock-markets (Brockman and Chung 2003; Cumming et al., 2011; La Porta et al., 1998; Lesmond, 2005). We also examined whether the positive (negative) effect of sentiment on stock-market liquidity (illiquidity) is robust after controlling for country-specific stock-market development indicators. Specifically, we control for government effectiveness (GEEF), regulatory quality (RQ), the rule of law (RL), economic freedom (EF), financial market efficiency (FME), size of the stock-market, i.e., the ratio of market capitalization to gross domestic product (MCGP). We also control for other macroeconomic factors, such as inflation rate (INF), gross domestic product growth rate (GDPG), broad money

growth rate (MS), and private credit to gross domestic product (PCG). As most of the control variables are

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Table-8 Time-series Estimation Results: Impact of Foreign Investor Sentiment on Emerging Market Liquidity

Panel (A) Impact of Foreign Investor Sentiment on MSCI Emerging Market Index Liquidity						
	MSCITV		MSCILLIQ		MSCIHLS	
$EMSENT_{CCIt-1}$	0.005*** (2.65)	0.017*** (4.15)	-0.011*** (-4.57)	-0.001 (-0.24)	-0.058** (-2.01)	-0.001 (-0.99)
$BWSI_{t-1}$	0.613*** (5.33)		-0.003 (-1.14)		-0.042* (1.98)	
$EUROSI_{t-1}$		0.002 (1.68)		-0.018*** (-8.26)		-0.004 (-1.35)
FED_{t-1}	-2.910*** (-8.77)	-1.22*** (-4.56)	0.286*** (5.86)	0.017* (1.96)	0.208*** (3.13)	0.012 (1.69)
$GMER_t$	0.003 (0.78)	0.001 (0.94)	-0.002 (-0.88)	-0.054** (-2.48)	-0.008 (-1.11)	-0.022** (-2.15)
$GSMB_t$	-0.031 (-1.08)	-0.055** (-2.05)	0.014*** (2.18)	0.027*** (3.25)	0.039*** (4.98)	0.005 (1.78)
$GHML_t$	-0.011 (-1.47)	-0.044*** (-2.14)	0.001 (0.12)	0.003 (0.92)	0.004 (1.55)	0.001 (0.23)
$\Delta GEPU_t$	-0.021*** (-2.35)	-0.033*** (-3.33)	0.077*** (4.22)	0.040*** (3.31)	0.042*** (3.88)	0.002 (1.21)
$MSCISTDV_t$	-0.049*** (-4.19)	-0.001 (-1.11)	0.021** (2.78)	0.002 (1.32)	0.011* (1.89)	0.003 (1.56)
$MSCIRET_{t-1}$	0.032** (2.88)	-0.031** (-2.14)	0.049*** (5.01)	0.055*** (3.47)	0.005 (1.87)	0.058*** (5.95)
Adj. R ²	0.72	0.70	0.69	0.75	0.79	0.68
Panel (A) Impact of Foreign Investor Sentiment on S&P Asia-50 Index Liquidity						
	S&PTV		S&PILLIQ		S&PHLS	
$EMSENT_{CCIt-1}$	0.001 (1.55)	0.009 (0.51)	-0.433*** (-3.67)	-0.091*** (-3.03)	-0.001 (-0.44)	-0.056** (-2.14)
$BWSI_{t-1}$	0.002 (1.49)		-0.061 (-1.34)		-0.211*** (-4.64)	
$EUROSI_{t-1}$		0.006 (0.72)		-0.019** (-2.19)		-0.005 (-1.74)
FED_{t-1}	-0.344*** (-3.66)	-1.88*** (-11.40)	0.762*** (9.50)	0.87*** (9.41)	0.388*** (4.25)	0.144** (2.11)
$GMER_t$	0.004 (0.66)	0.012 (1.25)	-0.002 (-0.31)	-0.004 (-1.46)	-0.014* (-1.96)	-0.004 (-1.51)
$GSMB_t$	-0.035 (-1.28)	-0.079 (-1.67)	0.001 (0.41)	0.002 (1.11)	0.19*** (3.34)	0.001 (1.08)
$GHML_t$	-0.004 (-1.06)	-0.111*** (-3.88)	0.002 (0.77)	0.001 (0.79)	0.001 (0.88)	0.008 (1.22)
$\Delta GEPU_t$	-0.039*** (-4.11)	-0.055*** (-5.11)	0.092*** (12.84)	0.077*** (9.91)	0.002 (1.19)	0.018*** (2.14)
$S\&PSTDV_t$	-0.033*** (-4.00)	-0.001 (-1.08)	0.033*** (3.39)	0.028*** (3.22)	0.022*** (2.44)	0.004 (1.55)
$S\&PRET_{t-1}$	0.015*** (3.88)	0.044*** (4.27)	0.011*** (3.55)	-0.005 (-1.77)	-0.056** (-4.41)	0.039*** (3.88)
Adj. R ²	0.49	0.51	0.64	0.65	0.71	0.68

Notes: This table reports time-series estimation results of equations (4) and (5). The liquidity variables of two aggregate emerging market indices (MSCI Emerging Market Index, S&P Asia-50 Index) are the dependent variables. Investor sentiment proxies ($EMSENT_{CCIt}$, $BWSI$, $EUROSI$) and other control variables (FED , $GMER$, $GSMB$, $GHML$, $\Delta GEPU$, $EMRET_{t-1}$, $EMSTDV$) are independent variables. $MSCITV$, $MSCILLIQ$ and $MSCIHLS$ represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio of MSCI Emerging Market Index. Similarly, $S\&PTV$, $S\&PILLIQ$, $S\&PHLS$ indicate three liquidity proxies (traded value, Amihud (2002) illiquidity measure and high-low spread ratio) for S&P Asia-50 Index. $EMSENT_{CCIt}$ is the aggregate emerging market sentiment index constructed through principal component analysis of orthogonal consumer confidence index data of 12 emerging markets. $BWSI$ is the Baker and Wurgler (2006) sentiment index. $EUROSI$ is the Eurozone Sentix sentiment index. $BWSI$, $EUROSI$ represent foreign investor sentiment. FED , $GMER$, $GSMB$, $GHML$, $\Delta GEPU$, indicate US Fed rate, global market factor, global size factor, global value factor and change in global economic policy uncertainty index respectively. $MSCIRET_{t-1}$ and $S\&PRET_{t-1}$ indicate lag index return of two indices. $MSCISTDV$ and $S\&PSTDV$ are daily return volatility of two indices. Sample period spans from April-2002 till March-2015. S&P Asia-50 index sample period is from July-2004 to March-2015. This is due to the unavailability of consistent data to construct three liquidity proxies for S&P Asia-50 index. The t-statistics (reported in parentheses) have been corrected for the effects of heteroscedasticity and autocorrelation using the method of Newey and West (1987). ***, **, * indicate significance at 1%, 5% and 10% level respectively.

Table-9 Time Series Estimation Results: Impact of Foreign Investor Sentiment on Emerging Market Liquidity during Pre-crisis Period

Panel (A) Impact of Foreign Investor Sentiment on MSCI Emerging Market Index Liquidity (Pre-crisis Period: April 2002 to July 2007)						
	MSCITV		MSCILLIQ		MSCIHLS	
$EMSENT_{CCIt-1}$	0.009*** (4.37)	0.02*** (6.89)	-0.008* (-1.97)	-0.001 (-0.24)	-0.003 (-1.11)	-0.021** (-2.11)
$BWSI_{t-1}$	0.613*** (5.33)		-0.001 (-0.34)		-0.033* (1.82)	
$EUROSI_{t-1}$		0.002 (1.55)		-0.011** (-1.99)		-0.003 (-0.98)
FED_{t-1}	-1.7*** (-6.55)	-1.55*** (-5.68)	0.007 (1.35)	0.019* (2.01)	0.25*** (6.97)	0.010 (1.38)
$GMER_t$	0.002 (0.49)	0.001 (1.23)	-0.011* (-1.88)	-0.055** (-2.66)	-0.007 (-0.99)	-0.001 (-0.25)
$GSMB_t$	-0.068*** (-3.11)	-0.005 (-1.15)	0.0155** (2.22)	0.028*** (3.25)	0.003 (0.88)	0.009* (1.99)
$GHML_t$	-0.056** (-2.49)	-0.004 (-1.55)	0.001 (0.21)	0.003 (1.11)	0.002 (1.22)	0.001 (0.35)
$\Delta GEPU_t$	-0.023** (-2.44)	-0.035*** (-3.77)	0.007 (1.22)	0.042*** (3.88)	0.03*** (3.12)	0.002 (1.01)
$MSCISTDV_t$	-0.05*** (-5.33)	-0.02** (-2.08)	0.001 (1.38)	0.002 (1.40)	0.014* (1.99)	0.022** (2.56)
$MSCIRET_{t-1}$	0.001 (0.78)	-0.027* (-1.94)	0.05*** (5.22)	0.015* (1.97)	0.000 (0.33)	0.018* (1.98)
Adj. R ²	0.66	0.61	0.58	0.55	0.60	0.63
Panel (B) Impact of Foreign Investor Sentiment on S&P Asia-50 Index Liquidity (Pre-crisis Period: April 2002 to July 2007)						
	S&PTV		S&PILLIQ		S&PHLS	
$EMSENT_{CCIt-1}$	0.001 (0.85)	0.009 (0.51)	-0.34*** (-3.11)	-0.091*** (-3.03)	-0.001 (-0.44)	-0.056** (-2.14)
$BWSI_{t-1}$	0.041** (2.09)		-0.05 (-1.12)		-0.25*** (-5.31)	
$EUROSI_{t-1}$		0.004 (0.55)		-0.044*** (-4.55)		-0.003 (-1.51)
FED_{t-1}	-0.025 (-1.66)	-0.88*** (-4.50)	0.002 (1.30)	0.89*** (9.98)	0.005 (1.23)	0.15** (2.44)
$GMER_t$	0.004 (0.75)	0.010 (1.19)	-0.002 (-0.29)	-0.001 (-1.03)	-0.019** (-2.11)	-0.003 (-1.44)
$GSMB_t$	-0.04 (-1.58)	-0.059 (-1.38)	0.001 (0.67)	0.22** (2.22)	0.26*** (3.56)	0.001 (0.98)
$GHML_t$	-0.044** (-2.26)	-0.011** (-2.33)	0.002 (0.89)	0.002 (1.29)	0.004 (1.33)	0.027* (1.99)
$\Delta GEPU_t$	-0.004 (-1.22)	-0.06*** (-6.55)	0.10*** (14.01)	0.007 (1.65)	0.002 (1.19)	0.028** (2.44)
$S\&PSTDV_t$	-0.035*** (-4.34)	-0.001 (-1.28)	0.000 (0.33)	0.029*** (3.52)	0.015** (2.11)	0.003 (1.44)
$S\&PRET_{t-1}$	0.011*** (2.98)	0.004 (1.29)	0.011*** (3.65)	-0.002 (-1.23)	-0.042** (-3.65)	0.001 (0.58)
Adj. R ²	0.45	0.48	0.55	0.52	0.67	0.64

Notes: This table reports time series estimation results of equation (4) and (5) during pre-crisis periods April 2002 to July 2007. The liquidity variables of two aggregate emerging market indices (MSCI Emerging Market Index, S&P Asia-50 Index) are the dependent variables. Investor sentiment proxies ($EMSENT_{CCIt}$, $BWSI$, $EUROSI$) and other control variables (FED , $GMER$, $GSMB$, $GHML$, $\Delta GEPU$, $EMRET_{t-1}$ and $EMSTDV$) are independent variables. $MSCITV$, $MSCILLIQ$ and $MSCIHLS$ represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio of MSCI emerging-market index. $S\&PTV$, $S\&PILLIQ$, $S\&PHLS$ indicate three liquidity proxies (traded value, Amihud (2002) illiquidity measure and high-low spread ratio) for S&P Asia-50 Index. $EMSENT_{CCIt}$ is the aggregate emerging market sentiment index constructed through principal component analysis of orthogonal consumer confidence index data of 12 emerging markets. $BWSI$ is the Baker and Wurgler (2006) sentiment index. $EUROSI$ is the Eurozone Sentix sentiment index. $BWSI$, $EUROSI$ represent foreign investor sentiment. FED , $GMER$, $GSMB$, $GHML$, $\Delta GEPU$, indicate US Fed rate, global market factor, global size factor, global value factor and change in global economic policy uncertainty index respectively. $MSCIRET_{t-1}$ and $S\&PRET_{t-1}$ indicate lag index return of two indices. $MSCISTDV$ and $S\&PSTDV$ are daily return volatility of two indices. Sample period spans from April-2002 till July-2007. S&P Asia-50 index sample period is from July-2004 to July-2007. The t-statistics (reported in parentheses) have been corrected for the effects of heteroscedasticity and autocorrelation using the method of Newey and West (1987). ***, **, * indicate significance at 1%, 5% and 10% level respectively.

Table-10 Time Series Estimation Results: Impact of Foreign Investor Sentiment on Emerging Market Liquidity during Post-crisis Period

Panel (A) Impact of Foreign Investor Sentiment on MSCI Emerging Market Index Liquidity (Post-crisis Period: August-2007 to March-2015)								
	MSCITV		MSCILLIQ		MSCIHLS			
$EMSENT_{CCT-1}$	0.001 (1.44)	0.008* (1.88)	-0.001 (-1.33)	-0.001 (-1.55)	-0.003 (-0.99)	-0.011*** (-4.54)		
$BWSI_{t-1}$	0.63*** (5.78)		-0.023** (-2.35)		-0.075*** (3.82)			
$EUROSI_{t-1}$		0.028*** (3.88)		-0.014** (-2.09)		-0.015** (-2.18)		
FED_{t-1}	-0.017 (-1.56)	-0.05* (-1.78)	0.007 (1.39)	0.009 (1.31)	0.029*** (2.97)	0.010 (1.38)		
$GMER_t$	0.024** (2.39)	0.001 (1.45)	-0.019** (-2.22)	-0.005 (-1.64)	-0.034** (-1.99)	-0.000 (-0.91)		
$GSMB_t$	-0.001 (-1.66)	-0.015* (-1.85)	0.003 (1.61)	0.008 (1.29)	0.035* (1.98)	0.003* (1.56)		
$GHML_t$	-0.058** (-2.46)	-0.004 (-1.61)	0.001 (0.55)	0.013* (1.71)	0.012* (1.82)	0.001 (0.58)		
$\Delta GEPU_t$	-0.025*** (-3.04)	-0.038*** (-3.99)	0.017** (2.12)	0.043*** (4.10)	0.01* (1.92)	0.021*** (2.21)		
$MSCISTDV_t$	-0.000 (-0.35)	-0.003 (-1.08)	0.011* (1.78)	0.019** (2.42)	0.004 (1.61)	0.025*** (2.96)		
$MSCIRET_{t-1}$	0.011* (1.77)	-0.002 (-1.34)	0.005 (1.22)	0.017** (2.27)	0.020** (2.33)	0.007 (0.94)		
Adj. R ²	0.75	0.69	0.64	0.67	0.72	0.68		
Panel (B) Impact of Foreign Investor Sentiment on S&P Asia-50 Index Liquidity (Post-crisis Period: August-2007 to March-2015)								
	S&PTV		S&PILLIQ		S&PHLS			
$EMSENT_{CCT-1}$	0.001 (1.11)	0.093* (1.77)	-0.009 (-1.41)	-0.094*** (-3.52)	-0.001 (-0.44)	-0.006 (-1.44)		
$BWSI_{t-1}$	0.045** (2.29)		-0.055** (-2.46)		-0.022* (-1.83)			
$EUROSI_{t-1}$		0.014* (1.75)		-0.05*** (-4.85)		-0.003 (-1.55)		
FED_{t-1}	-0.022 (-1.59)	-0.06 (-1.50)	0.32** (2.30)	0.001 (0.99)	0.018* (1.83)	0.006 (1.44)		
$GMER_t$	0.002 (0.66)	0.019* (1.79)	-0.002 (-0.39)	-0.051** (-1.93)	-0.019** (-2.25)	-0.007 (-1.57)		
$GSMB_t$	-0.031 (-1.47)	-0.059 (-1.38)	0.001 (0.67)	0.22** (2.22)	0.26*** (3.56)	0.001 (0.98)		
$GHML_t$	-0.044*** (-2.26)	-0.001 (-1.44)	0.022* (1.89)	0.002 (1.40)	0.009 (1.54)	0.03** (2.18)		
$\Delta GEPU_t$	-0.04** (-2.22)	-0.012* (-1.75)	0.09*** (6.11)	0.005 (1.55)	0.015* (1.88)	0.029*** (2.84)		
$S\&PSTDV_t$	-0.005* (-1.34)	-0.011* (-1.68)	0.002 (0.85)	0.033*** (3.89)	0.005 (1.31)	0.035** (2.44)		
$S\&PRET_{t-1}$	0.001 (0.78)	0.009* (1.99)	0.041*** (4.66)	-0.002 (-1.37)	-0.055*** (-3.88)	0.001 (0.77)		
Adj. R ²	0.55	0.49	0.52	0.45	0.60	0.58		

Notes: This table reports time series estimation results of equation (4) and (5) during post-crisis period August-2007 to March-2015. The liquidity variables of two aggregate emerging market indices (MSCI Emerging Market Index, S&P Asia-50 Index) are the dependent variables. Investor sentiment proxies ($EMSENT_{CCT}$, $BWSI$, $EUROSI$) and other control variables (FED , $GMER$, $GSMB$, $GHML$, $\Delta GEPU$, $EMRET_{t-1}$ and $EMSTDV$) are independent variables. $MSCITV$, $MSCILLIQ$ and $MSCIHLS$ represent traded value, Amihud (2002) illiquidity measure and high-low spread ratio of MSCI Emerging Market Index. Similarly, $S\&PTV$, $S\&PILLIQ$, $S\&PHLS$ indicate three liquidity proxies (traded value, Amihud (2002) illiquidity measure and high-low spread ratio) for S&P Asia-50 Index. $EMSENT_{CCT}$ is the aggregate emerging market sentiment index constructed through principal component analysis of orthogonal consumer confidence index data of 12 emerging markets. $BWSI$ is the Baker and Wurgler (2006) sentiment index. $EUROSI$ is the Eurozone Sentix sentiment index. $EUROSI$ represent foreign investor sentiment. FED , $GMER$, $GSMB$, $GHML$, $\Delta GEPU$, indicate US Fed rate, global market factor, global size factor, global value factor and change in global economic policy uncertainty index respectively. $MSCIRET_{t-1}$ and $S\&PRET_{t-1}$ indicate lag index return of two indices. $MSCISTDV$ and $S\&PSTDV$ are daily return volatility of two indices. Sample period spans from August-2007 to March-2015. The t-statistics (reported in parentheses) have been corrected for the effects of heteroscedasticity and autocorrelation using the method of Newey and West (1987). ***, **, * indicate significance at 1%, 5% and 10% level respectively.

available in annual frequency, our robustness test follows panel estimation using annual data of 12 ESMs during the 2002-2015 sample period. We take annual CCI data as our country-specific sentiment indicator ($SENT_{CCI}$) and we estimate the following three models for the three liquidity proxies (TV, ILLIQ, HLS) :

$$TV_{jt} = c_j + \alpha_1 TV_{jt-1} + \alpha_2 SENT_{CCI_{jt-1}} + \alpha_3 INF_{jt-1} + \alpha_4 GDPG_{jt-1} + \alpha_5 MS_{jt-1} + \alpha_6 MCGP_{jt-1} + \alpha_7 GEEF_{jt-1} + \alpha_8 RQ_{jt-1} + \alpha_9 RL_{jt-1} + \alpha_{10} EF_{jt-1} + \alpha_{11} FME_{jt-1} + \alpha_{12} PCG_{jt-1} + e_{jt} \quad (6)$$

$$ILLIQ_{jt} = c_j + \alpha_1 ILLIQ_{jt-1} + \alpha_2 SENT_{CCI_{jt-1}} + \alpha_3 INF_{jt-1} + \alpha_4 GDPG_{jt-1} + \alpha_5 MS_{jt-1} + \alpha_6 MCGP_{jt-1} + \alpha_7 GEEF_{jt-1} + \alpha_8 RQ_{jt-1} + \alpha_9 RL_{jt-1} + \alpha_{10} EF_{jt-1} + \alpha_{11} FME_{jt-1} + \alpha_{12} PCG_{jt-1} + e_{jt} \quad (7)$$

$$HLS_{jt} = c_j + \alpha_1 HLS_{jt-1} + \alpha_2 SENT_{CCI_{jt-1}} + \alpha_3 INF_{jt-1} + \alpha_4 GDPG_{jt-1} + \alpha_5 MS_{jt-1} + \alpha_6 MCGP_{jt-1} + \alpha_7 GEEF_{jt-1} + \alpha_8 RQ_{jt-1} + \alpha_9 RL_{jt-1} + \alpha_{10} EF_{jt-1} + \alpha_{11} FME_{jt-1} + \alpha_{12} PCG_{jt-1} + e_{jt} \quad (8)$$

All variables used in these models (equations 6,7, and 8) entail annual frequency. The annual stock-market liquidity variables, such as TV, ILLIQ, and HLS, are constructed as the weighted average of monthly observations. We collect data for INF, GDPG, MS, PCG, MCGP from World Bank world development indicators. FME data has been obtained from International Monetary Fund financial development index database. World Bank Worldwide Governance Indicators database is the source for GEEF, RQ, RL. The Heritage Foundation index of economic freedom is the source for EF data.

Table-11 Annual Panel Estimation Results: Impact of Investor Sentiment on Liquidity

	TV	ILLIQ	HLS
$SENT_{CCI_{jt-1}}$	0.016* (1.97)	-0.0002 (-0.41)	-0.021*** (-3.86)
TV_{jt-1}	0.328*** (11.28)		
$ILLIQ_{jt-1}$		0.024*** (9.45)	
HLS_{jt-1}			0.076*** (18.99)
INF_{jt-1}	-0.016 (-1.35)	0.002 (1.21)	0.012** (2.38)
$GDPG_{jt-1}$	0.031 (1.11)	-0.013 (-1.55)	-0.001 (-0.81)
MS_{jt-1}	0.021 (1.62)	-0.41*** (-3.78)	-0.22* (-1.97)
$MCGP_{jt-1}$	0.091** (2.26)	0.065** (2.36)	0.0004 (0.23)
$GEEF_{jt-1}$	0.019 (0.66)	-0.0031 (-0.54)	-0.0029 (-0.49)
RQ_{jt-1}	0.49*** (3.13)	-0.38** (-2.14)	-0.016* (-1.99)
RL_{jt-1}	-0.067 (-1.42)	0.023 (1.19)	0.003 (0.79)
EF_{jt-1}	-0.711 (-0.98)	-0.521 (-0.77)	-0.448 (-0.64)
FME_{jt-1}	0.388** (2.33)	-0.088 (-1.33)	-0.331*** (3.35)
PCG_{jt-1}	-0.012 (-1.51)	0.003 (1.08)	0.011 (1.77)
Likelihood Ratio Test [$\chi^2(11)$]	67*** {0.00}	79*** {0.00}	92*** {0.00}
Lagrange Multiplier Test [$\chi^2(1)$]	88*** {0.00}	74*** {0.00}	122*** {0.00}
Hausman Test [$\chi^2(12)$]	91*** {0.00}	56*** {0.00}	139*** {0.00}
Adj. R ²	0.59	0.51	0.68
D-W Statistics	1.39	2.67	1.09
F-statistics F(11, 149)	24*** {0.00}	19*** {0.00}	37*** {0.00}

Notes: This table presents the annual panel fixed effect model estimations (equations 6,7, and 8). The sample period spans from 2002 to 2015 (14 annual observations). The stock-market liquidity variables such as traded value (TV), Amihud's (2002) illiquidity ratio (ILLIQ) and high-low spread (HLS) are constructed as the weighted average of monthly observations. Control variables used in the analysis are inflation rate (INF), growth rate of gross domestic product (GDPG), broad money growth rate (MS), market capitalisation to gross domestic product ratio (MCGP), Economic freedom (EF), private credit to gross domestic product (PCG) and financial market efficiency (FME). Governance quality is approximated by Government effectiveness (GEEF), regulatory quality (RQ), and rule of law (RL). p-values are in curly brackets. t-values are given in the parenthesis. Likelihood

Ratio test (Gourieroux et al., 1982) shows the existence of individual firm specific effects in the data set. Lagrange Multiplier test (Breusch and Pagan, 1980) suggests the acceptability of panel data models over the classical regression models. The Hausman (1978) test has been used to determine the preferred model (i.e., fixed effect model or random effect model). *, ** and *** denote 10%, 5% and 1% significance level respectively.

Table-11 presents estimation results of equations 6, 7, and 8. Reported results reveal that even after controlling the stock-market development indicators, sentiment has a positive (negative) effect on stock-market liquidity (illiquidity). The coefficient of $SENT_{CCI}$ is statistically significant for TV and HLS. We also observe a positive and significant impact of regulatory quality (RQ) and market efficiency (FME) on stock-market liquidity (Cumming et al., 2011; Chordia et al., 2008).

5. Conclusion

Taking an international perspective with 12 emerging markets data, this study finds empirical support for the positive impact of investor sentiment on stock-market liquidity. Our findings further strengthen the argument that investor sentiment can be a possible source of liquidity variation (Liu, 2015; Baker and Stein, 2004). Consistent with Baker et al. (2012) and Karolyi et al. (2012) claim towards contagious sentiment effect, we find supportive evidence for the potential positive (negative) impact of foreign country sentiment for emerging market liquidity (illiquidity). Our results are also consistent with the theoretical framework which suggests that due to disposition effect (Shefrin and Statman, 1985) during bullish sentiment trading volume and hence stock-market liquidity tends to grow (Ritter, 2003). On the other hand, liquidity tends to fall when the market turns south due to pessimism.

Appendix 1 Time-series Plots of Liquidity (TV) and Sentiment (EUROSI, BWSI, $EMSENT_{CCI}$)

Figure 1 Times series plot: three sentiment indices

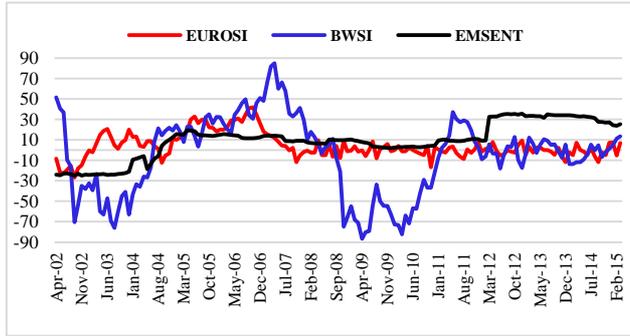


Figure 2 Brazil: Liquidity (TV) and three sentiment indices

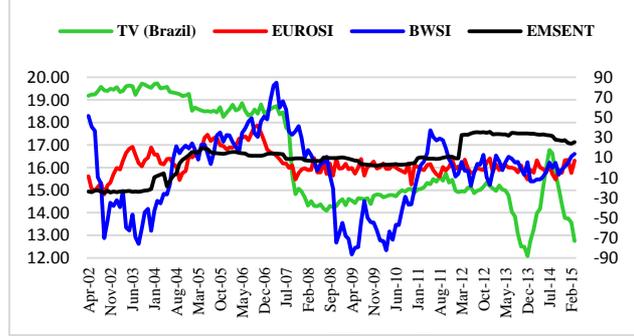


Figure 3 China: Liquidity (TV) and three sentiment indices

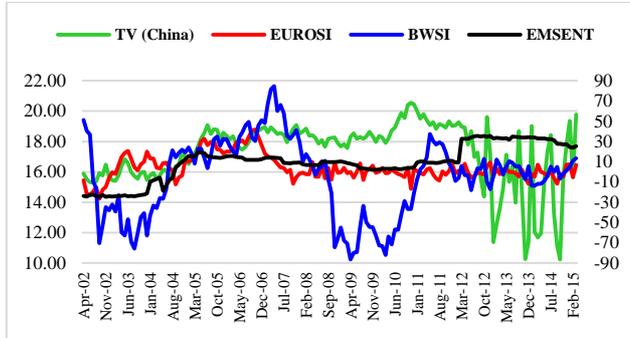


Figure 4 India: Liquidity (TV) and three sentiment indices

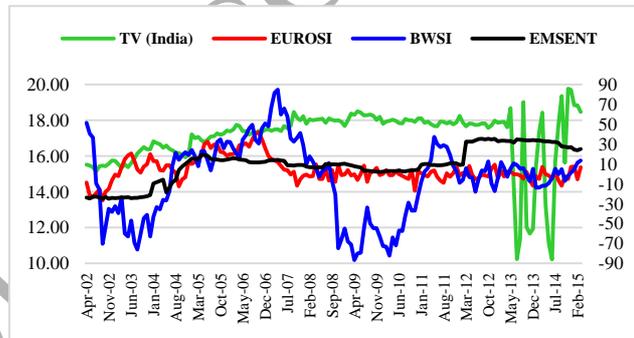


Figure 5 Indonesia: Liquidity (TV) and three sentiment indices

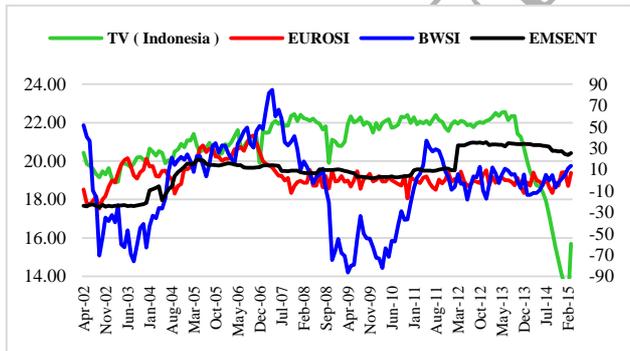


Figure 6 Mexico: Liquidity (TV) and three sentiment indices

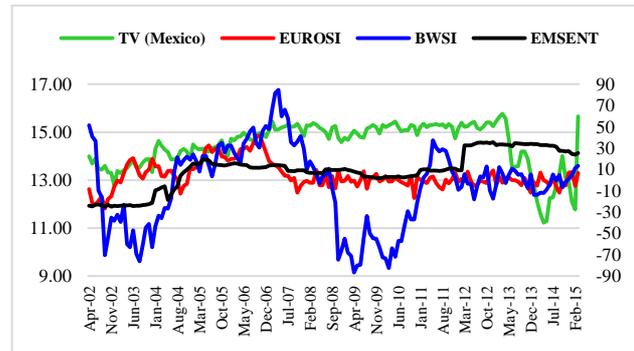


Figure 7 Philippines: Liquidity (TV) and three sentiment indices

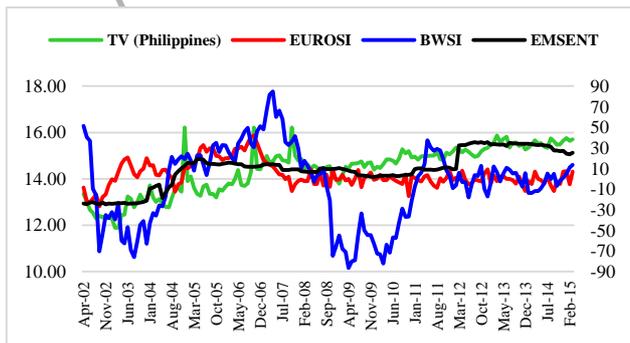


Figure 8 Poland: Liquidity (TV) and three sentiment indices

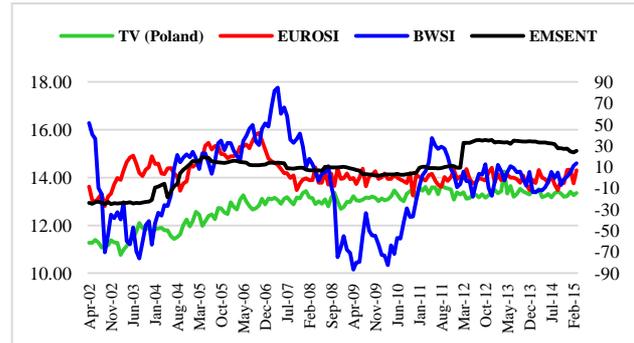


Figure 9 Russia: Liquidity (TV) and three sentiment indices

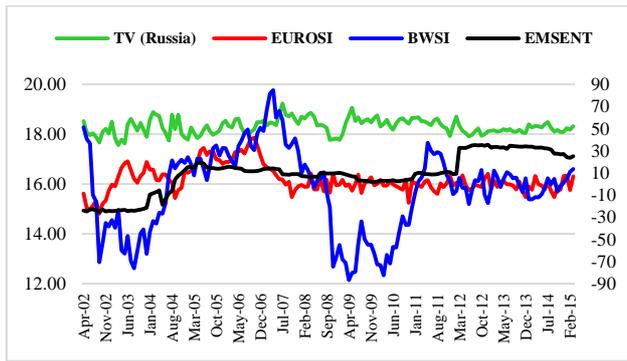


Figure 10 South Africa: Liquidity (TV) and three sentiment indices

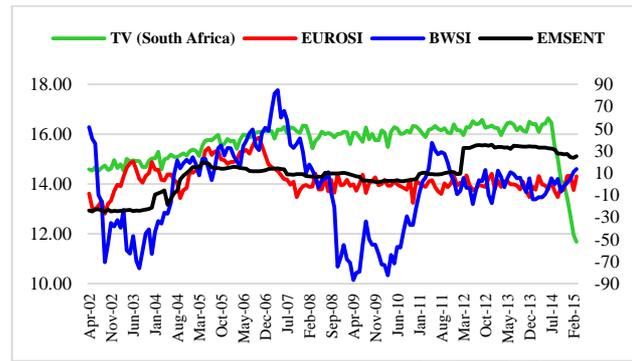


Figure 11 South Korea: Liquidity (TV) and three sentiment indices

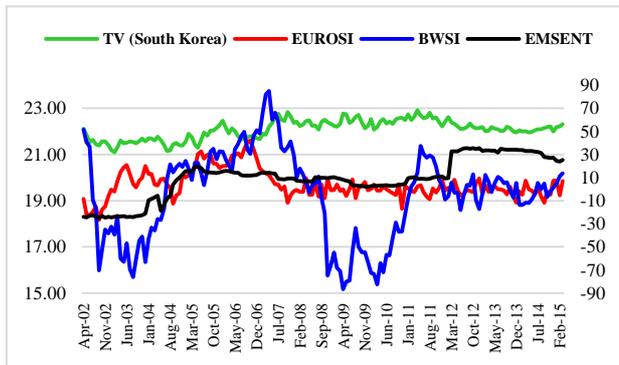


Figure 12 Thailand: Liquidity (TV) and three sentiment indices

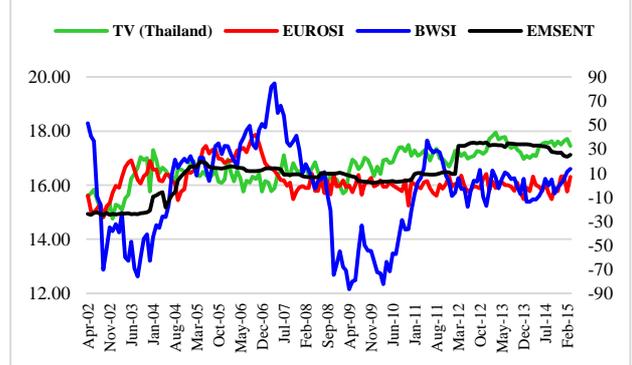


Figure 13 Turkey: Liquidity (TV) and three sentiment indices

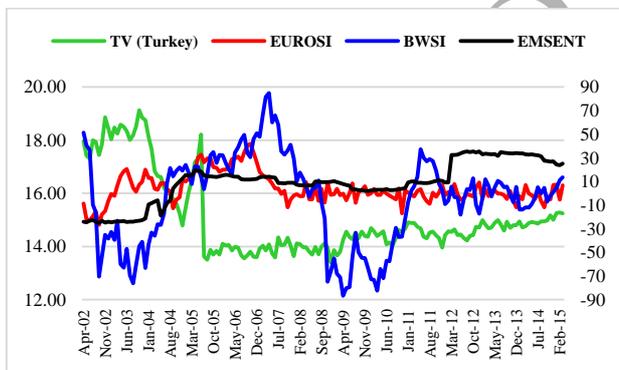
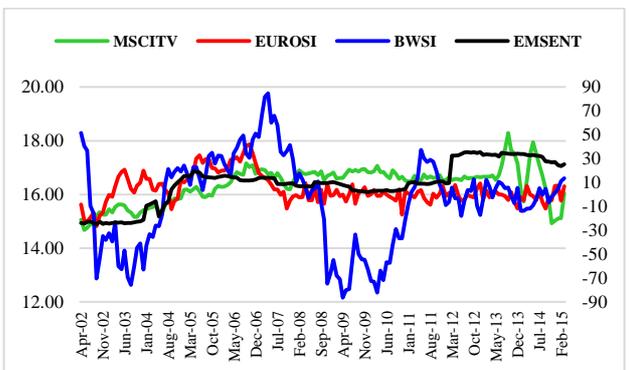


Figure 14 MSCI Index: Liquidity (TV) and three sentiment indices



Notes: Figure 1 of Appendix 1 presents the time-series plots of three sentiment proxies ($EMSENT_{CCI}$, BWSI, EUROSI). For scaling convenience in the secondary axis the Baker and Wurgler (2006) sentiment index (BWSI) has been multiplied with hundred. EUROSI is the Eurozone Sentix sentiment index. $EMSENT$ is the aggregate emerging market sentiment index ($EMSENT_{CCI}$) constructed through principal component analysis of orthogonal consumer confidence index (CCI) data of 12 emerging markets (Brazil, China, India, Indonesia, Mexico, Philippines, Poland, Russia, South Africa, South Korea, Thailand, Turkey). Figure 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 presents liquidity and sentiment proxy variation of Brazil, China, India, Indonesia, Mexico, Philippines, Poland, Russia, South Africa, South Korea, Thailand, Turkey respectively. Figure 14 presents liquidity and sentiment proxy variation of MSCI Emerging Market Index. In all the figures we use TV as liquidity proxy. The primary axis is used for TV. The secondary axis is used for three sentiment proxies ($EMSENT_{CCI}$, BWSI, EUROSI). Sample period spans from April-2002 to March-2015.

References:

- Amihud, Y. (2002). Illiquidity and stock returns: cross-section and time-series effects. *Journal of Financial Markets*, 5(1):31-56.
- Baker, M., and Stein, J.C. (2004). Market liquidity as a sentiment indicator. *Journal of Financial Markets*, 7(3):271-299.
- Baker, M., and Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4):1645-1680.
- Baker, M., Wurgler, J., and Yuan, Y. (2012). Global, local, and contagious investor sentiment. *Journal of Financial Economics*, 104(2):272-287.
- Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4):1593-1636.
- Baur, D. G. (2012). Financial contagion and the real economy. *Journal of Banking & Finance*, 36(10), 2680-2692.
- Bekaert, G., Harvey, C.R., and Lundblad, C. (2007). Liquidity and expected returns: lessons from emerging markets. *Review of Financial Studies*, 20(6):1783-1831.
- Breusch, T.S., and Pagan, A.R. (1980). The Lagrange Multiplier test and its applications to model specification in econometrics, *Review of Economic Studies*, 47(1):239-253.
- Brockman, P., and Chung, D. Y. (2003). Investor protection and firm liquidity. *The Journal of Finance*, 58(2):921-937.
- Brockman, P., Chung, D. Y., and Pérignon, C. (2009). Commonality in liquidity: A global perspective. *Journal of Financial and Quantitative Analysis*, 44(4):851-882.
- Chordia, T., Roll, R., and Subrahmanyam, A. (2001). Market liquidity and trading activity. *The Journal of Finance*, 56(2):501-530.
- Chordia, T., Roll, R., and Subrahmanyam, A. (2008). Liquidity and market efficiency. *Journal of Financial Economics*, 87(2):249-268.
- Chui, A. C., Titman, S., and Wei, K. J. (2010). Individualism and momentum around the world. *The Journal of Finance*, 65(1):361-392.
- Corwin, S. A., and Schultz, P. (2012). A simple way to estimate bid-ask spreads from daily high and low prices. *The Journal of Finance*, 67(2):719-760.
- Cumming, D., Johan, S., & Li, D. (2011). Exchange trading rules and stock market liquidity. *Journal of Financial Economics*, 99(3):651-671.
- Datar, V.T., Naik, Y.N., and Radcliffe, R. (1998). Liquidity and stock returns: an alternative test. *Journal of Financial Market*, 1(2):203-219.
- De Long, J.B., Shleifer, A., Summers, L.H., and Waldmann, R.J. (1990). Noise trader risk in financial markets. *Journal of political Economy*, 98(4):703-738.
- Dimitriou, D., and Kenourgios, D. (2013). Financial crises and dynamic linkages among international currencies. *Journal of International Financial Markets, Institutions and Money*, 26, 319-332.
- Fernandez-Amador, Octavio, G., M., Larch, M., and Perter, G. (2013). Does monetary policy determine stock market liquidity? New evidence from the euro zone. *Journal of Empirical Finance*, 21:54-68.
- Gourieroux, C., Holly, A., and Monfort, A. (1982). Likelihood ratio test, Wald test, and Kuhn-Tucker test in linear models with inequality constraints on the regression parameters. *Econometrica*, 50(1):63-80.
- Hausman, J.A. (1978). Specification tests in econometrics. *Econometrica*, 46(6):1251-1271.
- Huang, J., and Wang, J. (2008). Liquidity and market crashes. *The Review of Financial Studies*, 22(7), 2607-2643.
- Huberman, G., and Halka, D. (2001). Systematic liquidity. *Journal of Financial Research*, 24(2):161-178.

- Hudsona, Y., and Green, C. J. (2015). Is investor sentiment contagious? International sentiment and UK equity returns. *Journal of Behavioral and Experimental Finance*, 5:46-59.
- Karolyi, G.A., Lee, K.H., and Van Dijk, M.A. (2012). Understanding commonality in liquidity around the world. *Journal of Financial Economics*, 105(1):82-112.
- Kim, K.A., and Nofsinger, J. R. (2008). Behavioral finance in Asia. *Pacific-Basin Finance Journal*, 16(1):1-7.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., and Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106(6):1113-1155.
- Lemmon, M., and Portniaguina, E. (2006). Consumer confidence and asset prices: some empirical evidence. *The Review of Financial Studies*, 19(4):1499-1529.
- Lesmond, D. A. (2005). Liquidity of emerging markets. *Journal of Financial Economics*, 77(2):411-452.
- Liu, S. (2015). Investor sentiment and stock market liquidity. *Journal of Behavioral Finance*, 16(1):51-67.
- Moshirian, F., Qian, X., Wee, C. K. G., and Zhang, B. (2017). The determinants and pricing of liquidity commonality around the world. *Journal of Financial Markets*, 33:22-41.
- Newey, W.K. and West, K.D. (1987). A simple positive semi-definite heteroskedasticity and autocorrelation-consistent covariance matrix. *Econometrica*, 55(3):703-708.
- Philips, C.B., and Kinniry, Jr. F. M. (2012). Evaluating global benchmarks. Vanguard Research, The Vanguard Group Inc., Pennsylvania, United States. Available at: <https://personal.vanguard.com/pdf/icregb.pdf>.
- Ritter, J. R. (2003). Behavioral finance. *Pacific-Basin Finance Journal*, 11(4):429-437.
- Schmeling, M. (2009). Investor sentiment and stock returns: some international evidence. *Journal of Empirical Finance*, 16(3):394-408.
- Shefrin, H., and Statman, M. (1985). The disposition to sell winners too early and ride losers too long: theory and evidence. *The Journal of Finance*, 40(3):777-790.
- Statman, M., Thorley, S., and Vorkink, K. (2006). Investor overconfidence and trading volume. *Review of Financial Studies*, 19(4):1531-1565.
- Shleifer, A., and Summers, L. H. (1990). The noise trader approach to finance. *The Journal of Economic Perspectives*, 4(2):19-33.
- Vanguard Group (2017). Vanguard emerging markets stock index fund, Vanguard Asset Management Limited. Available at: <https://personal.vanguard.com/us/FundsHoldings?FundId=0533&FundIntExt=INT>.
- Verma, R., and Soydemir, G. (2006). The impact of U.S. individual and institutional investor sentiment on foreign stock markets. *Journal of Behavioral Finance*, 7(3):128-144.