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Emerging Market Liquidity and Crises

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Abstract

Whereas conventional wisdom argues that markets shut down during crises, with sellers struggling to find buyers, we find that markets continue to operate during financial turmoil, even in narrow and volatile emerging economies. Simple event studies indicate that both trading volume and trading costs increase in crisis times. Prices change more with each dollar transacted (pushing the Amihud illiquidity measure up) and bid-ask spreads widen. More generally, econometric estimates show that large price downturns, typical of crises, are associated with higher trading activity and increased trading costs, with trading activity declining only later as crises progress. Thus, while trading activity tends to be negatively related to trading costs during tranquil times (and across securities), this relation appears to break down during crises. These results are consistent with the analytical literature on portfolio rebalancing by heterogeneous agents in times of crises.

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1.Introduction

As conventional wisdom has it, markets shut down during financial crises, as sellers struggle to find their buyers.[1] However, an empirical assessment of what really goes on with secondary market liquidity in periods of financial distress is far from trivial, as a quick survey of the related literature illustrates. Whereas the relation between liquidity and market returns in the United States has been studied extensively in both directions, the results differ according to the measures of liquidity in use (which include indicators of trading activity and trading costs). Moreover, much less is known about the behavior of secondary-market liquidity (in its different dimensions) in periods of financial turmoil, a critical test to evaluate both the functioning of financial markets and the mechanics of financial crises. This paper contributes to fill in this gap, conducting the first systematic empirical study of secondary-market liquidity under stress across emerging market crises.

A generally accepted theoretical argument relating liquidity and market returns is the collateral-based view: Pronounced falls in asset prices reduce the value of financial intermediaries' capital and increase their margin calls, forcing them to liquidate their positions, thereby inducing wider bid-ask spreads and increasing the price response to trading.[2] Since net withdrawals are a function of the intermediaries' performance, when the value of assets drop, the short-term inflow of funds decreases or even reverses, forcing financial intermediaries to sell, adding to the price downturn, and generating a

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[1] "…[M]arkets in stuff that is normally traded all the time … have shut down because there are no buyers," notes Paul Krugman in the New York Times of Aug. 11, 2007, describing the most recent liquidity crisis in the developed world. Many other similar quotes can be found in major newspapers describing, for example, the LTCM, Russian, and Mexican crises, in the context of both developed and emerging markets.

[2] In addition to margin calls due to trade losses, margins are often raised during market illiquidity periods because margin-setting financiers cannot determine whether price changes are due to transient liquidity shocks or to more permanent fundamental news.

spiraling fall in some liquidity measures.[3] Therefore, market liquidity is closely related to intermediaries' funding needs, and this mutually reinforcing relation can generate sudden spikes in illiquidity indicators. While collateral-based theories assume that outside capital does not enter the market during downturns, fire-sale theories highlight precisely the role of outside capital: Lower asset prices reward liquid outside buyers who profit from illiquid asset holders.[4] Fire sales (namely, forced widespread selling from distressed funds when investors redeem their capital en masse) put downward pressure on prices, as outside buyers demand additional compensation for providing needed liquidity.

Another strand of the literature has elaborated other models with heterogeneous investors (due, for example, to asymmetric information, heterogeneous investment opportunities, and/or government interference) that provide a possible explanation for the positive relation between trading volume and absolute changes in asset prices. If trading volume reflects disagreement between traders upon receiving new information, the greater the degree of disagreement, the higher the level of the trading volume, which could explain why volume is found to be positively correlated with market volatility and with sharp price fluctuations in particular.[5] Broner et al. (2006 and 2007) explore the role of secondary markets in helping solve problems of enforcement and repayment by redistributing assets to favored investors. They predict that turnover increases in periods of financial turbulence, when enforcement problems and default probabilities increase.

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[3] See Vayanos (2004) and Brunnermeier and Pedersen (2007).

[4] See Acharya and Schaefer (2005) for several explanations. In one such model, Coval and Stafford (2006) argue that mutual funds that experience capital outflows are forced to execute their positions, generating a significant price pressure on commonly-held assets, with price falling far from fundamental value and turning attractive for outside liquidity providers. As a result, their model offers no unambiguous prediction regarding the level of liquidity after a significant fall in asset prices.

[5] See Karpoff (1986), Gallant et al. (1992), Campbell et al. (1993), Hiemstra and Jones (1994), Wang (1994), and He and Wang (1995).

Empirically, the literature has used two types of measures as proxies of secondary-market liquidity: (i) measures related to trading activity (such as volume and turnover) and (ii) measures related to trading costs (such as the price reaction to trading and bid-ask spreads).[6] These two types of indicators jointly characterize what is typically called a liquid market: "a market where participants can rapidly execute *large-volume transactions* with a *small impact on prices*," that is, at a low cost (BIS 1999).

Although they are often assumed (and shown) to be related, trading activity and trading cost capture different aspects of secondary markets and do not need to behave similarly. In tranquil times and across securities, higher volume is associated with lower transaction costs. In other words, all liquidity proxies move in the same direction.[7] But the behavior changes in periods of financial turbulence, when shocks are of different nature. For example, a sudden increase in trading activity as investors rush to the exit might signal an increased trading demand for a given market depth, congesting the market and raising transaction costs. In fact, Chordia et al. (2001) show that bid-ask spreads and trading-activity variables respond differently during up and down markets. While trading-activity variables increase both in rising and falling markets, bid-ask spreads respond asymmetrically by increasing significantly in down markets and decreasing only marginally in up markets.[8]

In emerging markets, where crises abound, liquidity has not received much attention. One exception is Lesmond (2005), who looks at bid-ask spreads as well as

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[6] The price reaction to trading is captured by the Amihud ratio (Amihud, 2002). In addition, several other measures have been proposed, such as the Roll measure (Roll, 1984), the LOT measure (Lesmond et al. 1999), and the Amivest measure (Cooper et al., 1985; Khan and Baker, 1993).

[7] See, for example, Stoll (1978) and Chordia et al. (2000).

[8] An up (down) market is defined as a positive (negative) CRSP (Center for Research in Security Prices) daily index return. Chordia et al. (2005) also find that crises and returns raise trading costs, while Hameed et al. (2006) report that bid-ask spreads fall after significant negative market returns when controlling for demand effects (order imbalances), supporting the collateral-based view.

several alternative measures of liquidity (turnover, and the already-mentioned Amihud, Amivest, LOT, and Roll measures) for 31 emerging markets over 1987–2000. While he does not perform any econometric test, he shows a significant within-country correlation between all liquidity proxies (with the exception of turnover) and a sharp increase during the crisis period 1997:Q3 to 1998:Q3 (again, with the exception of turnover, which appears unaffected). This type of casual evidence provides the most natural motivation for a deeper econometric study of the kind presented here.[9]

The rest of the paper is organized as follows. Section 2 discusses the data. Section 3 presents the methodology and findings. Section 4 concludes.

2. Data

We focus on a variety of emerging markets and crisis episodes over the period April 1994-June 2004. We use stock data rather than bond data, which is usually harder to collect and, when available, covers shorter time spans. The data come from Bloomberg and the Emerging Market Database (EMDB).

High-frequency (daily) financial data for emerging economies is often plagued by missing or, worse, misreported data and their accuracy cannot be taken for granted. We spent considerable time in the selection process to include only the most liquid stocks for each country, in order to minimize the effect of mismeasurement on our results. Indeed,

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[9] In a recent paper, Chen and Poon (2007) find that return volatility Granger-causes a widening of the Amihud ratio, and argue that it is not illiquidity that leads to sharp price declines, but vice versa. For more analysis on emerging market liquidity, see for example Levine and Schmukler (2006).

what is particularly interesting about the behavior documented in this paper is that there are significant effects on trading costs even for the most liquid stocks.[10]

In selecting stocks, we require a number of strict qualifying conditions: (i) a stock has to account for at least 1% of the total value traded in the country (measured by the average value traded in the six months prior to the beginning of the crisis); (ii) the stock has to be traded at least 2 years prior and after the crisis (except in Mexico and Russia where no information was available for any stock more than 1 year prior to the start of their respective crises). We include for each stock the series from the first moment the stock is traded until June 2004 (or earlier if the stock stopped trading prior to June 2004). Note that some stocks have shorter bid-ask spread series (or none at all) but are still included in the portfolio.[11]

We use three alternative liquidity measures to capture the two aspects implicit in the standard definition of market liquidity, computed as averages of qualifying daily data at weekly and monthly frequencies. These are: (i) trading volume (to reflect trading activity), $\ln(1/T \, \Sigma^T_{t=1} \, Vol_t)$; (ii) the Amihud ratio (which measures trading costs through the price impact of trades): $1/T \, \Sigma^T_{t=1} |R_t|/Value_t$;[12] and (iii) bid-ask spreads (as a second measure of trading costs): $1/T \, \Sigma^T_{t=1} \, (Ask_t - Bid_t)/Bid_t$. Vol_t ($Value_t$) is the number of

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[10] Less liquid stocks present patterns that are comparable to those of liquid stocks in terms of the evolution of trading activity and trading costs over time, albeit of different magnitude. In addition, there might be a flight to quality to the most liquid stocks at times of crises, which could also affect their relative behavior. See Levy Yeyati et al. (2006) for a discussion of these issues.

[11] Additionally, special care was placed in correcting the remaining inconsistencies found in the raw data, which are seldom cleaned by the data sources. Among other things, we excluded ostensible outliers and corrected for unexplained regime shifts in trading volume during non-crisis periods (in which case the series was used only until or after the break, depending on whether the shift took place after or before the crisis period).

[12] The Amihud ratio is interpreted in the literature as a measure of the reaction of prices to changes in value traded. Given that prices and quantities lie on some supply and demand schedules and the relation between them is not necessarily unidirectional, the ratio may capture both a shift in the supply curve (more people selling), or in the demand curve (less people buying).

shares (U.S. dollar value) traded in the day, and R_t in the Amihud ratio is the daily (percentage) price change during the day.[13] To construct these measures we use a total of 21,900 weekly observations based on 105,000 original daily observations, covering seven emerging markets: Argentina (7 stocks), Brazil (8), Indonesia (7), South Korea (5), Mexico (12), Russia (5), and Thailand (8).[14]

As crisis dating is to some extent arbitrary, we employ two different criteria to define crisis periods in order to verify the robustness of our findings. We define *SM crises* based on the local stock market index: SM crises begin when the stock market index starts a decline of at least five consecutive weeks that reach a cumulative drop in excess of 25%, and end on the first date after which the index grows for at least four consecutive weeks. Alternatively, we use an exchange rate market pressure (EMP) index of daily changes in interest rates and exchange rates (referred to as *EMP crises)*. EMP crises begin when the volatility of EMP (its 15-day rolling standard deviation) exceeds a threshold level (set equal to the mean EMP volatility plus one standard deviation), and ends on the first date after which the EMP volatility stays below the threshold level for at

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[13] Volume is made missing (not zero) on days when the stock market is closed. If the stock is not traded on a certain day, the price is also made missing (to avoid carrying over the price of the previous day and miscomputing returns) as is the Amihud ratio; volume is zero on those days. Since we work only with liquid stocks, non-trading days are infrequent.

[14] The stocks used for each country are the following. Argentina: Banco Frances del Rio de la Plata, Grupo Financiero Galicia S.A., Irsa-Inversiones y Representaciones S.A., Petrobras Energia Participaciones, Siderar S.A., Telecom Argentina, and Transportadora de Gas Sur S.A. Brazil: Aracruz Celulosa S.A., Banco Bradesco S.A., Companhia Brasileira de Distribuicao Grupo Pao de Acucar, Companhia Siderurgica Nacional, Companhia Vale do Rio Doce, Electrobras (Centrais Eletricas Brasileiras S.A.), and Unibanco (Uniao de Bancos Brasileiros S.A.). Indonesia: Astra International, Gudang Garam, Hanjaya Mandala Sampoerna, Indah Kiat Pulp & Paper Corp, Indofood Sukses Makmur, Indosat TBK, and Telekomunikasi Indonesia. Mexico: Alfa S.A., Cemex S.A., Empresas ICA Sociedad Controladora S.A., Fomento Economico Mexicano, Grupo Industrial Maseca, Grupo Televisa S.A., Holcim Apasco S.A., Kimberly Clark de Mexico S.A., Savia S.A., Telefonos de Mexico, Vitro S.A., and Wal-Mart de Mexico S.A. South Korea: Hyundai Engineering & Construction Company, Korea Electric Power Corporation, Pohang Iron & Steel Company, Samsung Electronics Company, and SK Telecom. Russia: Mosenergo, Oil Company LUKOIL, Rostelecom, Tatneft, and Unified Energy System. Thailand: Bangkok Bank, Bank of Ayudhya, Kasikornbank, Krung Thai Bank Public Company, Thai Military Bank Public Company, Thanachart Capital Public Company, True Corp, and Siam Commercial Bank.

least three consecutive months.[15] We also capture crises and price downturns with other variables.

3. Methodology and Findings

We approach the data from two angles, using event studies and more standard econometric techniques. First, we conduct event studies to examine in a more straightforward way whether our liquidity variables display a different behavior during crises. In particular, we define the event (time zero) as the beginning of a crisis, and look at the average deviations of liquidity variables during the crisis period relative to the pre-crisis mean over an equal length period. For each liquidity variable X_t, we compute the estimated post-crisis (*) deviations from the pre-crisis mean $\hat{\varepsilon}_t^* = X_t^* - \hat{\mu}$. We then test the hypothesis $H_0 : \bar{\varepsilon}^* = \sum_t \hat{\varepsilon}_t^* / N = 0$, where N is the number of post-crisis trading days, with $t_{N-1} = \bar{\varepsilon}^* / \sqrt{2 S_e^2 / N}$.[16]

Figure 1 provides a summary of the results. The 3-panel chart illustrates the behavior of the typical stocks, showing the average across the stocks included in our sample, around the corresponding crisis events, for an arbitrary 110-day window.[17] The table at the bottom reports the results of the event study tests, where events are defined as sharp stock market downturns (SM crises) and typically include more than one event per country. Both charts and table suggest a common preliminary pattern: all three measures appear to increase during crises. In particular, as in the existing literature, the Amihud

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[15] EMP is computed as the weighted average of the daily changes in the interest rate and the log difference of the exchange rate, with weights equal to the reciprocal of the standard deviation of the respective variables. See Levy Yeyati et al. (2006) for a list of EMP crises and a detailed account of their determination. The SM crisis dates are available upon request.

[16] See Campbell et al. (1997).

[17] The window corresponds to the shortest crisis event (55 days) and was chosen for the sake of presenting the data. The actual window used for the event study tests depends on the (varying) length of the different crises.

ratio and bid-ask spreads widen despite the increase in trade volume, which in this case reaches 26%.

After a first glance at the data applying these simple tests, we resort to more standard econometric techniques to have a closer look: we regress each liquidity measure on a number of controls, using dynamic panel models with fixed effects. In addition, to check for potential bias associated with the inclusion of the lagged dependent variable in the panel regressions, we run stock-by-stock AR(1) regressions to compare the results (we report the mean group estimators for these tests).[18]

The baseline specification, which we report in Table 1, is based on weekly data. It includes as controls the average price change during the current week, splitting positive and negative changes to measure stock market downturns directly (rather than through the SM crisis dummy) and to study the asymmetric behavior documented in previous work. In addition, a separate crisis dummy (based on EMP crises) is included, which we split into an early and late crisis dummy to account for the fact that financial distress is often accompanied by intense but short-lived portfolio reallocations and fire sales.[19] Furthermore, we include month dummies (to control for seasonality), the log change in the local currency-dollar nominal exchange rate (to control for the fact that most of these crises are associated with sharp exchange rate realignments), the lagged dependent

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[18] Nickell (1981) shows that in the AR(1) case the bias in estimating a dynamic fixed effects model becomes less important as T grows, and estimates this bias to be of $O(1/T)$, a finding confirmed by Hahn and Kuersteiner (2002) and Alvarez and Arellano (2003) for panels with large N and large T. In addition, Judson and Owen (1999) show that the bias introduced by including a lagged dependent variable is larger for the parameter estimate of the AR term than for the parameter estimates of the other regressors. Kiviet (1995) uses asymptotic expansion techniques to approximate the small sample bias of the fixed-effects estimator.

[19] Early crisis is defined as the first 2 crisis weeks. The EMP crisis dummy is based on data from markets other than the stock exchange. The SM dummy is used as an alternative in our robustness tests.

variable (to control for delayed effects), and stock fixed effects. More formally, denoting

stocks by i and countries by c, we estimate:

$$Liquidity_{i,c,t} = \alpha_1 \mid Ret > 0_{i,c,t} \mid + \alpha_2 \mid Ret < 0_{i,c,t} \mid + \alpha_3 Crisis\ Early_{c,t} + \alpha_4 Crisis\ Late_{c,t}$$
$$+ \alpha_5 \Delta FX_{c,t} + \alpha_6 Liquidity_{i,c,t-1} + \beta Month_t + \gamma Stock_{i,c} + \varepsilon_{i,c,t}.$$

Table 1 reports the results of the seven country panels. In addition, it shows the

mean group estimators from the stock-by-stock regressions (and the percentage of stocks

for which the coefficient is significant and of the "expected" sign), and the results of a

single panel regression including all stocks in our sample.

As can be seen in the top panel of Table 1, after controlling for returns, the trading

volume tends to remain stable at the beginning of crises, to decline later on, suggesting a

drop in activity after portfolio reallocations have been completed. In line with the

evidence previously reported in the empirical literature, contemporaneous price

fluctuations, both up and down, appear to be associated with an increase in volume. That

is, large price downturns during crises are associated with higher trading activity. The

Amihud ratio remains stable early in the crisis and increases later on (middle panel). On

the other hand, the link with price fluctuations exhibits an asymmetric pattern: whereas

price jumps (when significant) are accompanied by lower Amihud ratios (greater

liquidity), price declines are generally linked to important increases in the ratio. This

pattern is confirmed by the bottom panel: bid-ask spreads widen significantly during

crises and with price drops, but barely react to price increases. Importantly, the relevant

coefficients are comparable not only across countries, but also to those obtained from

stock-by-stock or single-panel regressions (which we show in the last two columns of the table).

In Table 2, we test the robustness of these results to the inclusion of alternative crisis measures (for which we use our SM crisis dummy and the EMBI sovereign bond spread index compiled by J.P. Morgan, a broader country-specific proxy of financial distress), and the evolution of the local stock market index, to control for systemic factors. For the sake of conciseness, we report only the results corresponding to a single panel regression including all stocks.[20] The results are reassuring: the coefficients of the new variables, when significant, are of the expected sign, and the ones of the baseline variables largely retain their explanatory power. The only exception is the early crisis dummy, which when measured using SM crises is no longer positively correlated with volume, although it shows an early widening of the bid-ask spread, possibly reflecting differences in the way it dates the start of crises. In addition, our findings are not altered by a change in data frequency, as can be seen from the results based on a monthly sample reported in columns (4), (8), and (12).[21]

4. Conclusions

Our tests reveal two types of stylized facts. First, they document for emerging markets the asymmetric response to price fluctuations previously reported for developed markets: market downturns are positively correlated with volume traded and negatively correlated with trading costs. Second, they highlight a strong link between crisis episodes and liquidity measures. Specifically, we find no evidence of market "paralysis" at the

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[20] Comparable country-panel and stock-by-stock regression results are available upon request.
[21] As another robustness test, regressions that control for market capitalization gave similar results.

beginning of crises (secondary market activity does not appear to break down): if anything, trading activity increases as prices fall abruptly, to decline only later as the crisis progresses. However, the cost of making transactions increases sharply; prices change more with each dollar transacted (pushing the Amihud illiquidity measure up) and bid-ask spreads widen. Thus, while trading activity tends to be negatively related to trading costs during tranquil times (and across securities), this relation appears to break down during a crisis.

The results in this paper are consistent with many of the insights proposed by the analytical literature including, most notably, the view that crises are associated with portfolio reallocation among heterogeneous agents that do not fully anticipate crises (hence, volume increases *during* market downturns, rather than before) and with fire sales by liquidity-constrained investors paying a hefty premium to bring in outside capital. We leave for future research the task to elucidate the extent to which these complementary and mutually consistent stories explain the empirical findings reported here.

Two additional preliminary implications can be derived from the previous exercises. First, distressed reallocations between liquid and illiquid investors are feasible, but costly to those wanting to liquidate their positions.[22] Second, the liquidity risk of a stock (e.g., as captured by the Amihud ratio) tends to increase at times of systemic illiquidity (e.g., as capture by EMP crises), a pattern that should increase the stock volatility and be ultimately reflected in its risk-adjusted price. Naturally, the behavior documented here is not unique to stock markets and, to a large degree, reflects

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[22] This would also apply to investors with different information sets, or with different degrees of implicit or explicit risk profiles.

developments in the financial system in general.[23] The way in which liquidity measures interact between different asset markets is a natural next step in this research agenda.

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[23] See Levy Yeyati et al. (2004) for an analysis in this direction.

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Figure 1. Event Studies

Log Volume

Pre-crisis mean = 13.463   Post-crisis mean = 13.722

Mean change = .259

Amihud Ratio

Pre-crisis mean = 0.058   Post-crisis mean = 0.131

Mean change = 0.073

Bid-Ask Spreads

Pre-crisis mean = 0.017   Post-crisis mean = 0.026

Mean change = 0.009
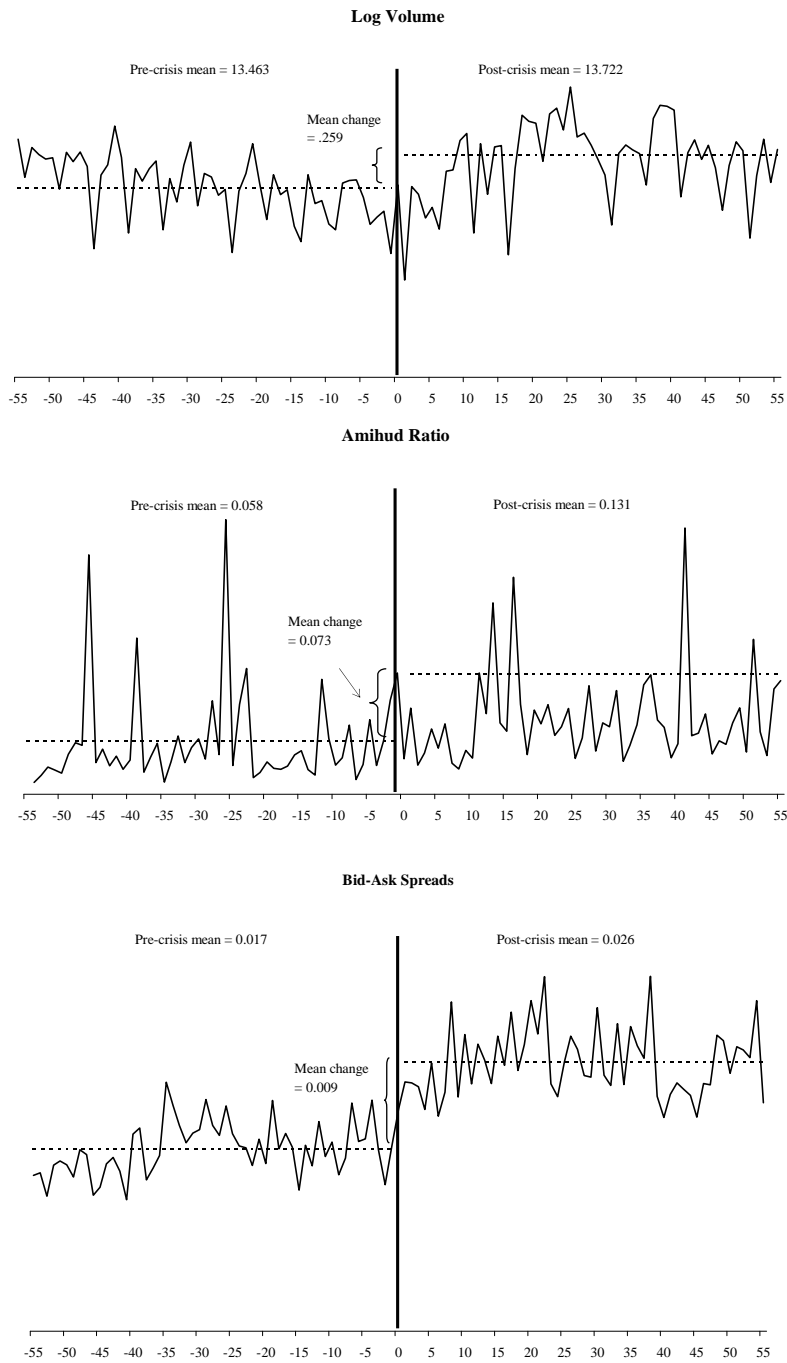
Number of Countries and Crisis Events			
Number of Countries	7		
Number of Crisis Events	12		
	Log Volume	**Amihud Ratio**	**Bid-Ask Spread**
Number of Stocks-Events Tested	90	89	80
Number Significantly ≠ 0	57	71	65
Percentage Negative (of Significant)	25%	15%	17%
Percentage Positive (of Significant)	75%	85%	83%

The event date, marked as time zero, is defined as the beginning of a crisis period. The average changes reported here correspond to the entire crisis period, not just the 110-day window displayed in the graphs. The table at the bottom reports the results of the event study tests. The crisis dates are based on the stock market crisis criteria.

Table 1. Weekly Estimates - EMP Crisis

Weekly Log Volume

	Argentina	Brazil	Indonesia	Mexico	Russia	South Korea	Thailand	All Countries	All Countries
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	OLS Mean Group Estimator	Panel
Absolute Positive Returns	2.807***	1.613***	1.935***	2.769***	1.659***	2.191***	4.172***	2.681	2.643***
	(10.78)	(6.00)	(6.29)	(12.36)	(6.66)	(9.36)	(16.35)	92.2%	(20.53)
Absolute Negative Returns	2.055***	0.779**	1.731***	1.690***	1.798***	1.438***	2.210***	1.696	1.804***
	(6.16)	(2.48)	(4.88)	(6.09)	(5.62)	(6.03)	(10.01)	62.7%	(15.44)
Crisis (EMP) - Early	-0.243*	0.308	-0.187	0.869***	0.051	0.056	0.005	0.203	0.145**
	(1.66)	(1.33)	(1.25)	(5.40)	(0.49)	(0.40)	(0.03)	17.6%	(2.18)
Crisis (EMP) - Late	-0.216***	-0.263*	-0.077*	-0.064	-0.252***	-0.151**	-0.253***	-0.168	-0.158***
	(3.75)	(1.87)	(1.85)	(1.43)	(3.43)	(2.56)	(7.45)	(45.1%)	(8.41)
Volume Lagged	0.587***	0.486***	0.691***	0.514***	0.645***	0.859***	0.767***	0.600	0.675***
	(29.28)	(22.47)	(41.49)	(34.44)	(21.26)	(81.54)	(84.27)	-	(104.73)
Log Change in Exchange Rate	6.225*	2.764	-1.282	-4.765*	-4.782***	-2.676	5.228*	-0.013	-1.536*
	(1.93)	(0.95)	(0.96)	(1.82)	(3.12)	(1.11)	(1.81)	-	(1.74)
Observations	2,623	3,643	2,405	5,116	1,782	2,368	4,048	431	21,985
R-squared	0.78	0.84	0.75	0.77	0.92	0.93	0.77	0.50	0.89

Weekly Amihud Illiquidity Ratio

	Argentina	Brazil	Indonesia	Mexico	Russia	South Korea	Thailand	All Countries	All Countries
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	OLS Mean Group Estimator	Panel
Absolute Positive Returns	0.021	0.299	-0.032***	-0.015*	-0.235*	-0.004	-0.044***	0.047	-0.012
	(0.11)	(1.46)	(2.70)	(1.72)	(1.90)	(1.55)	(4.34)	(27.5%)	(0.32)
Absolute Negative Returns	0.853***	0.614***	0.086***	0.034***	0.308	0.004	0.081***	0.349	0.245***
	(2.73)	(3.08)	(2.72)	(2.92)	(1.10)	(1.59)	(3.59)	52.9%	(3.90)
Crisis (EMP) - Early	0.082	0.204	0.120	-0.005	0.003	0.003	0.000	0.069	0.026
	(0.67)	(0.90)	(1.54)	(0.83)	(0.18)	(0.96)	(0.03)	(0.0%)	(0.68)
Crisis (EMP) - Late	0.238***	-0.014	0.030***	0.009***	0.158***	0.002**	0.017***	0.058	0.059***
	(3.04)	(0.35)	(5.85)	(3.68)	(3.39)	(2.44)	(5.36)	64.7%	(5.56)
Amihud Illiquidity Ratio Lagged	0.609***	0.266***	0.334***	0.518***	0.717***	0.673***	0.560***	0.516	0.504***
	(9.98)	(5.29)	(4.57)	(10.39)	(6.53)	(13.14)	(10.69)	-	(11.77)
Log Change in Exchange Rate	-2.960	-1.558	0.236**	0.251**	-0.226	0.081**	-0.050	-0.554	0.077
	(0.89)	(1.42)	(1.97)	(1.98)	(0.19)	(2.29)	(0.19)	-	(0.18)
Observations	2,607	3,595	2,363	5,104	1,757	2,353	4,038	428	21,817
R-squared	0.48	0.18	0.29	0.42	0.51	0.57	0.47	0.45	0.36

Weekly Bid-Ask Spreads

	Argentina	Brazil	Indonesia	Mexico	Russia	South Korea	Thailand	All Countries	All Countries
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	OLS Mean Group Estimator	Panel
Absolute Positive Returns	0.003	0.01	-0.001	0.019***	-0.017**	0.001	-0.001	0.007	0.004**
	(0.81)	(1.06)	(0.94)	(3.07)	(2.12)	(1.33)	(0.53)	(6.3%)	(2.28)
Absolute Negative Returns	0.019***	0.055***	0.011**	0.037***	0.014	0.001	0.002*	0.023	0.022***
	(3.49)	(4.35)	(2.06)	(5.28)	(0.88)	(0.47)	(1.85)	37.5%	(7.00)
Crisis (EMP) - Early	0.005	-0.013**	0.004**	0.006	0.001	0.001	0.000	0.001	0.002
	(1.32)	(2.54)	(2.30)	(1.15)	(0.86)	(0.57)	(0.34)	19.1%	(1.15)
Crisis (EMP) - Late	0.006***	-0.003	0.002***	0.010***	0.007**	0.000	0.000**	0.004	0.003***
	(5.57)	(0.90)	(5.19)	(6.85)	(2.07)	(1.39)	(2.09)	48.9%	(6.96)
Bid-Ask Spreads Lagged	0.444***	0.501***	0.364***	0.465***	0.771***	0.494***	0.865***	0.506	0.527***
	(12.20)	(10.31)	(3.29)	(17.22)	(9.26)	(12.57)	(63.17)	-	(17.28)
Log Change in Exchange Rate	0.056	0.112	0.005	0.114	0.138	-0.007	0.038**	0.068	0.064*
	(0.88)	(1.14)	(0.63)	(1.48)	(1.12)	(0.76)	(2.39)	-	(1.90)
Observations	1,701	2,905	2,216	5,087	1,071	1,925	4,048	395	18,953
R-squared	0.49	0.59	0.45	0.42	0.76	0.35	0.79	0.44	0.63

This table reports weekly estimates for the 7 countries in the sample. The first 7 columns of each panel report fixed-effects panel estimates by country with robust standard errors. The last column reports fixed-effects panel estimates for all countries. The OLS mean group estimator is the simple average of the coefficients of OLS regressions for the individual stocks. For this estimator, the across-stock average coefficient, number of observations, and R-squared are reported, as well as the proportion of significant coefficients with the "expected" sign (at the 10% level) instead of t-statistics. The percentages reported in parentheses (without parentheses) correspond to the percentage of negative (positive) values. Month dummies are included in the regressions but not reported. *, **, *** mean significant at 10%, 5%, and 1%, respectively.

Table 2. Robustness Tests: Panel Estimations, All Countries

	Volume				Amihud Illiquidity Ratio				Bid-Ask Spreads			
	Weekly	Weekly	Weekly	Monthly	Weekly	Weekly	Weekly	Monthly	Weekly	Weekly	Weekly	Monthly
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Absolute Positive Returns	2.568***	2.403***	2.113***	1.241***	-0.010	-0.073**	0.031	-0.004	0.004**	0.003	0.003	0.001
	(20.07)	(19.20)	(13.90)	(16.84)	(0.30)	(1.97)	(0.55)	(0.24)	(2.13)	(1.60)	(1.19)	(0.88)
Absolute Negative Returns	1.735***	1.423***	1.758***	0.458***	0.221***	0.235***	0.220**	0.102***	0.019***	0.023***	0.011***	0.016***
	(14.61)	(11.88)	(10.67)	(4.92)	(3.60)	(3.56)	(2.37)	(3.38)	(6.15)	(7.23)	(2.62)	(7.25)
Crisis - Early (EMP)			0.118*	0.139*			0.026	-0.003			0.001	-0.000
			(1.78)	(1.81)			(0.69)	(0.08)			(0.61)	(0.27)
Crisis - Late (EMP)			-0.179***	-0.154***			0.060***	0.034***			0.003***	0.002***
			(9.41)	(4.73)			(5.60)	(2.93)			(6.28)	(2.65)
Crisis - Early (SM)	-0.074				0.005				0.004***			
	(1.45)				(0.14)				(3.29)			
Crisis - Late (SM)	-0.066***				0.054***				0.004***			
	(4.35)				(6.76)				(7.73)			
EMBI Spreads		-0.026***				0.045***				0.002***		
		(3.35)				(10.02)				(9.09)		
Country's Abs. Positive Returns			1.373***				-0.107				0.005	
			(7.13)				(1.38)				(1.22)	
Country's Abs. Negative Returns			0.298				0.032				0.021***	
			(1.43)				(0.32)				(4.06)	
Lagged Dependent Variable	0.676***	0.634***	0.673***	0.742***	0.502***	0.486***	0.504***	0.735***	0.519***	0.521***	0.527***	0.625***
	(104.82)	(87.94)	(104.62)	(69.75)	(11.71)	(11.38)	(11.76)	(14.57)	(16.64)	(16.87)	(17.23)	(18.45)
Log Change in Exchange Rate	-1.449	-1.712*	-0.927	5.908**	0.031	0.228	-0.002	3.342*	0.059*	0.074***	0.055	0.044
	(1.59)	(1.94)	(1.02)	(2.07)	(0.07)	(0.54)	(0.01)	(1.91)	(1.76)	(2.22)	(1.60)	(0.77)
Observations	21,985	20,527	21,965	5,026	21,817	20,372	21,797	5,017	18,953	17,550	18,934	4,347
R-squared	0.89	0.90	0.89	0.93	0.36	0.37	0.36	0.66	0.64	0.63	0.64	0.77

This table reports weekly and monthly fixed-effects panel estimations for the 7 countries in the sample. Month dummies are included in the regressions but not reported. *, **, *** indicate significance at 10%, 5%, and 1 %, respectively.