Liquidity and trading cost segmentation in Asia Pacific equity markets

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Professor Sangvien Advanced Finance Forum
November 2010

What's important about liquidity and trading costs

Tokyo's Tsukiji Fish Market meets supermarket salmon

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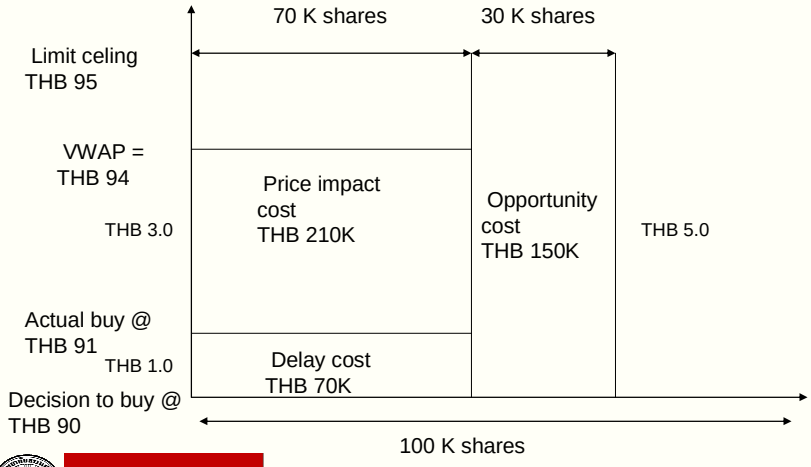
Market attractiveness

- Transaction costs and illiquidity (inverse of liquidity) are positively related
- High transaction costs, high trading costs, leads to less trading
- Trading value and turnover is only one dimension of liquidity

A closer look at liquidity and transaction costs

- A fund manager wishes to buy 100,000 shares of ADVANC.
- Observing last transaction price at THB 90.50, he places a buy order at THB 90.0 at 10.01 am.
- However, ADVANC price kept climbing, at 10.30 am, fund manager revises a limit order to buy from THB 91 (current market price) and not exceeding THB 95.
- By the time the market closed, at 4.30 pm, the fund manager only obtained 70,000 shares. The last trading hour price was THB 96.0 above the limit ceiling.

What are the costs from implementation shortfall?



Trading cost with implementation shortfall

Delay	70,000
Price impact	210,000
Commissions (0.25% of VWAP)	32,900
Opportunity cost	150,000
	462,900

Your VWAP cost = 94 x 70K = 6.58 mn

Which scenario has higher price impact?

Time	Sell	Quantity
10.05	90.5	2,000
	91	4,000
	91.5	6,000

Time	Sell	Quantity
10.05	90.5	5,000
	91	7,000
	91.5	9,000

- You would like to buy 5,000 shares at market prices?
- Top scenario: VWAP = 90.5*2,000 + 91*3,000 = 454 K (THB 90.8 per share)
- Bottom scenario: VWAP = 90.5 * 5000 = 452.5 K (THB 90.5 per share)

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What determines price impact?

- Quantities at best bid prices and best ask prices
- Spread
- Tick sizes

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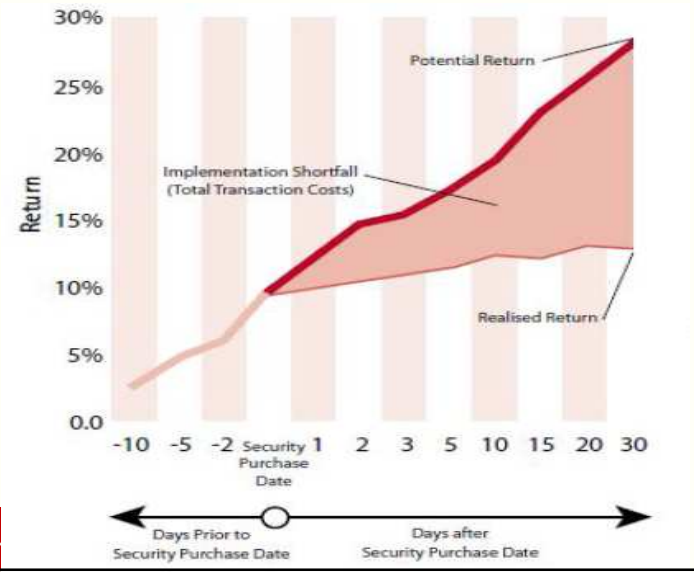
Realized return and potential return



Comparing our work with existing studies

- Cross-country comparisons of ten Asian equity market structure
  - Comerton-Forde and Ryde (2006)
- Cross-country comparisons of explicit and implicit transaction costs
  - Lesmond et al. (2005) and Stoll (2000)
  - Lesmond (2005)
  - Hearn (2009)
- Analysis of relationship between market architecture and transaction costs
  - Domowitz et al. (2000)
  - Jain et al. (2003)
  - Swan et al. (2004)

Special features in the study

- Markets in Asia Pacific grouped into developed and emerging.
  - "Emerging markets" in AP are relatively more developed? So will the generalization about EM and DEV hold in this context?
- Stocks are grouped into those trading below and above market median price.
  - Clientele base of DEV is predominant institutional whereas clientele of EM is mainly retail. Trading range preferences likely to impact trading properties. Amihud et al. (1999), Seppi (1997).
  - Retail investors prefers stocks with small price denomination (Pavabutr and Sirodom (2010)).
  - Stocks in these markets tend to have low price denomination.

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Key findings

- AP markets have a number of design commonality, but developed markets have much higher level of institutional trader participation.
- Wide variation of liquidity and transaction costs within developed and emerging markets.
- In EM, stocks that trade below median prices tend to have higher turnover despite higher spreads and price impact.

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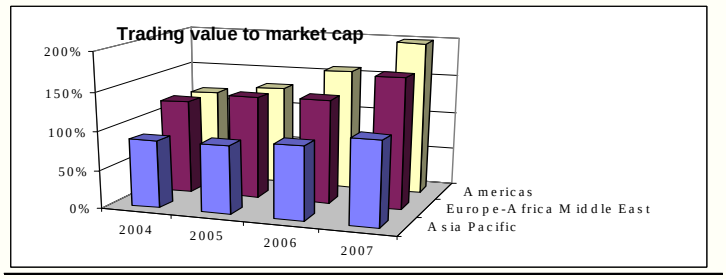
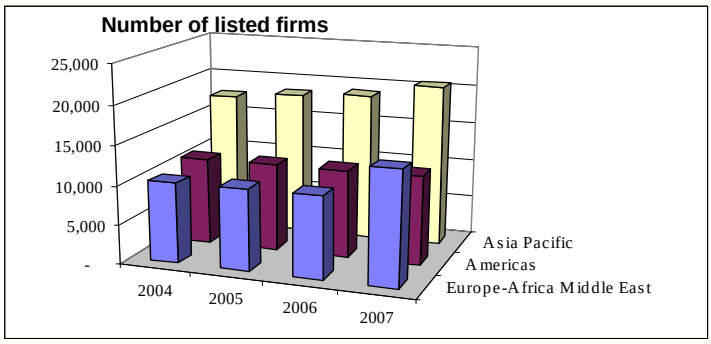
Where Asian markets stand today: Trading value



Trading value in USD billions	2004	2005	2006	2007
Americas	21,797	25,981	35,909	48,363
Asia Pacific	6,890	8,813	12,081	21,460
Europe-Africa Middle East	13,580	16,240	21,839	31,366
Total	42,266	51,034	69,830	101,189
% proportion of trading value				
Americas	52%	51%	51%	48%
Asia Pacific	16%	17%	17%	21%
Europe-Africa Middle East	32%	32%	31%	31%
Total	100%	100%	100%	100%

Where Asian markets stand today: Number of firms



% proportion of firm	2004	2005	2006	2007
Americas	29%	28%	28%	25%
Asia Pacific	45%	46%	46%	44%
Europe-Africa Middle East	26%	26%	26%	31%
Total	100%	100%	100%	100%

Data

- Qualitative – Surveys to exchanges
- Quantitative (Year 2007)
  - Daily data from DATASTREAM
  - Intraday data from SIRCA (Securities Industry Research of Asia-Pacific)

Asia Pacific Markets

Emerging markets

- China (Shanghai Stock Exchange)
- Korea (Korea Stock Exchange)
- Malaysia (Bursa Malaysia)
- Taiwan (Taiwan Stock Exchange)
- Thailand (Stock Exchange of Thailand)

Developed markets

- Australia (Australian Stock Exchange)
- Hong Kong (Hong Kong Stock Exchange)
- Japan (Tokyo stock exchange)
- New Zealand (New Zealand Stock Exchange)
- Singapore (Singapore Stock Exchange)

A market is classified as emerging if it is part of S&P, IFC emerging market index as of 2007.

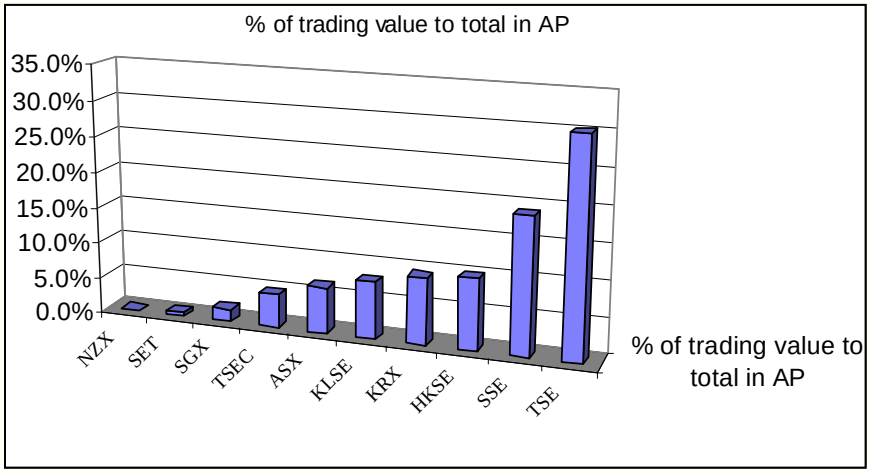
Commonalities in design

- Limit order markets with absence of market makers
- All demutualized (except China SSE, and Thailand SET)
- Trend towards greater transparency and liberalized commissions

Clientele difference

Country	Exchange	Institutions	Retail	Others
Australia	ASX	80%	20%	
Hong Kong	HKSE	65%	35%	
Japan	TSE	74%	15%	11%
New Zealand	NZX	na	na	na
Singapore	SGX	57%	43%	
China	SSE	46%	54%	
Korea	KRX	43%	57%	
Malaysia	KLSE	63%	36%	1%
Taiwan	TSEC	33%	67%	
Thailand	SET	47%	53%	

Variations in trading value in 2007



Trading statistics by country

Market	Mkt capitalization USD billions	Mkt cap to GDP	Trading value USD billions	Trading value to mkt cap
Developed				
Australia (ASX)	1,298	1.66	1,372	106%
Hong Kong (HKSE)	2,654	8.86	2,137	81%
Japan (TSE)	4,331	0.99	6,476	150%
New Zealand (NZX)	48	0.41	24	50%
Singapore (SGX)	539	2.27	381	71%
Average	1,774	283.9%	2,078	91.3%
Emerging				
China (SSE)	3,694	0.52	4,069	110%
Korea (KRX)	1,123	0.94	2,006	179%
Malaysia (KLSE)	325	0.88	170	52%
Taiwan (TSEC)	664	0.95	1,010	152%
Thailand (SET)	197	0.37	118	60%
Average	1,201	73.3%	1,475	110.6%

Trading concentration by price group

Market	% Mkt cap of lower to total market cap	Ratio of lower to upper market cap	% Trading value of lower to total marke	Ratio of lower to upper trading value	Proportion of firms below USD 1	No. of firms in sample
Developed						
Australia (ASX)	47.67%	0.91	54.06%	1.18	69%	1325
Hong Kong (HKSE)	3.80%	0.04	12.36%	0.14	87%	785
Japan (TSE)	7.16%	0.08	9.48%	0.10	2%	2170
New Zealand (NZX)	8.08%	0.09	22.37%	0.29	48%	106
Singapore (SGX)	4.09%	0.04	11.76%	0.13	79%	286
Emerging						
China (SSE)	49.62%	0.99	49.33%	0.97	18%	758
Korea (KRX)	7.16%	0.08	17.11%	0.21	2%	573
Malaysia (KLSE)	6.40%	0.07	17.23%	0.21	82%	586
Taiwan (TSEC)	18.08%	0.22	19.96%	0.25	65%	661
Thailand (SET)	15.45%	0.18	27.03%	0.37	79%	413

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Liquidity measures

- Turnover: Ratio of daily number of shares traded to total number of shares outstanding
- Bid-ask spreads:

  %BAS = (ASK-BID)/[BID+ASK]/2
- Daily price impact $ILLIQ_i = \frac{1}{D_i}\sum_{i=1}^{D}\left|R_{id}\right| / TVAL_{id}$
- Liu (2006) $LMx = \left[NZEROx + \frac{1/TURNx}{Deflator}\right] \times \frac{21x}{NTD}$

  $0 < \frac{1/TURNx}{Deflator} < 1$

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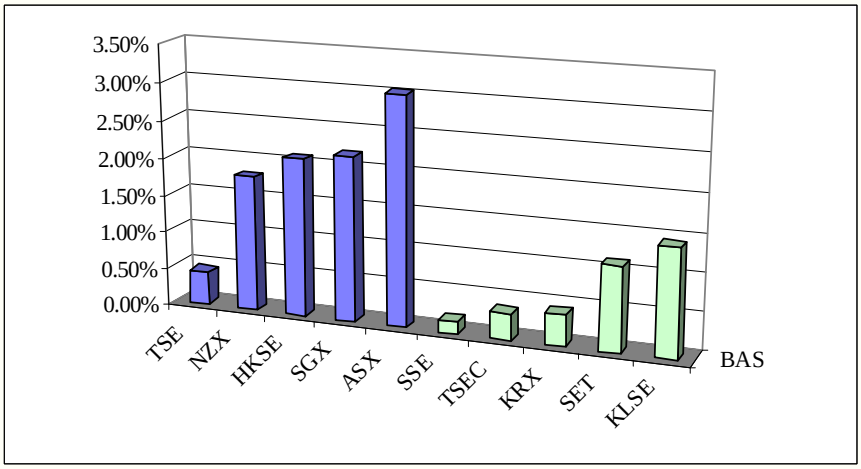
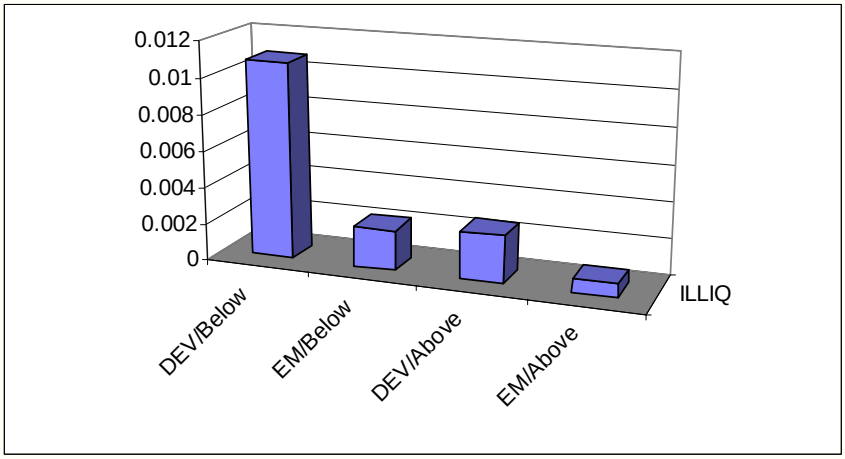
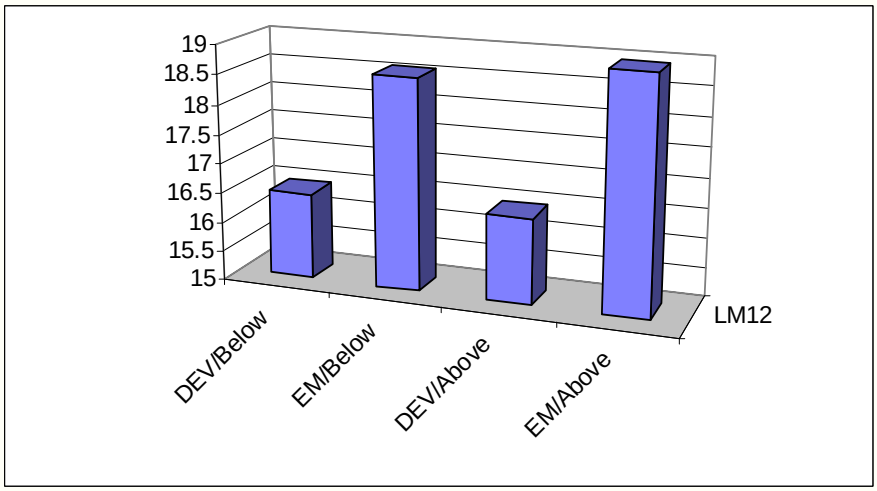
Variation % bid-ask spreads



Variation in ILLIQ



Variation in LM12



Two stage least square specification

$$BAS_i = a_0 + a_1 RTICK_i + a_2 STD_i + a_3 \ln TURN_i + a_4 S_i + \varepsilon_i^1$$

$$\ln TURN_i = b_0 + b_1 BAS_i + b_2 STD_i + b_3 \ln MV_i + b_4 S_i + \varepsilon_i^2$$

$$STD_i = c_0 + c_1 \ln TURN_i + c_2 \ln MV_i + c_3 S_i + \varepsilon_i^3$$

Understanding cross-sectional differences in spreads

	Emerging only		Developed only		Combined	Combined ex-Japan		
Dependent var								
BAS	Estimate	t value	Estimate	t value	Estimate	t value	Estimate	t value
RTICK	-0.030	-0.13	2.315	1.32	-0.241	-0.26	-0.531	-0.94
STD	**1.413**	**14.75**	**1.237**	**7.77**	**2.518**	**12.88**	**1.712**	**15.27**
lnTURN	**-2.508**	**-23.8**	**-7.734**	**-13.42**	**-9.803**	**-17.62**	**-7.182**	**-22.99**
S2	**1.280**	**7.48**	**-1.561**	**-2.05**	**-4.632**	**-5.42**	-0.639	-1.27
DEM	0.168				**2.532**	**3.7**	**3.220**	**6.46**
DEMS2					**9.986**	**8.32**	**4.809**	**7.14**
Adj rsq	0.168		0.060		0.054		0.106	

Small price denominations related to higher relative spreads. This is more notable in emerging Asian markets.

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Understanding cross-sectional differences in turnover

Dependent var	Emerging only		Developed only		Combined	Combined ex-Japan		
lnTURN	Estimate	t value	Estimate	t value	Estimate	t value	Estimate	t value
BAS	**-1.850**	**-17.86**	**-2.167**	**-9.81**	**-2.023**	**-17.55**	**-1.471**	**-17.97**
STD	**0.556**	**7.46**	**0.958**	**6.97**	**0.815**	**10.93**	**0.574**	**10.5**
lnMV	-0.003	-0.05	-0.018	-0.17	-0.016	-0.25	-0.008	-0.15
S2	**1.140**	**6.08**	**1.698**	**3.02**	**1.811**	**4.68**	0.279	0.98
DEM					**-3.138**	**-8.88**	**-3.268**	**-10.08**
DEMS2					**-0.747**	**-1.6**	**0.681**	**1.94**
Adj rsq	0.131		0.040		0.052		0.068	

Small price denominations related to higher turnover. This is more notable in emerging Asian markets.

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Understanding cross-sectional differences in volatility

Dependent var	Emerging only		Developed only		Combined		Combined ex-Japan	
STD	Estimate	t value	Estimate	t value	Estimate	t value	Estimate	t value
lnturn	**1.335**	**24.88**	**1.845**	**13.05**	**2.443**	**21.24**	**3.241**	**20.79**
lnmv	**-0.594**	**-16.7**	**0.184**	**3.49**	**-0.088**	**-2.46**	**-0.842**	**-15.53**
S2	**-0.995**	**-9.48**	**2.047**	**12.58**	**1.868**	**11.26**	0.331	1.46
DEM					**-1.212**	**-6.42**	**-2.154**	**-10.09**
DEMS2					**-2.989**	**-11.06**	**-2.819**	**-10.46**
Adj rsq	0.181		0.042		0.070		0.113	

Low price denomination accompanied by higher turnover results In lower daily price changes (daily price volatility).

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Final remarks

- There is large intramarket liquidity differences within developed and emerging markets.
- Stocks in lower median price range have higher turnover despite their tendency to have higher spreads suggesting that investors are paying a price for liquidity to trade in their preferred trading range.
- Yet some investors such as day traders must be benefiting from larger price impact of trading in stocks with low price denominations.
- The issue of price segmentation needs to be further explored as this is likely to effect clientele composition, participation, strategic behavior, and consequently have an impact on market quality.

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