

The Asymmetry of Price Behavior Around Buy and Sell Trades: New Evidence on the Stock Exchange of Thailand

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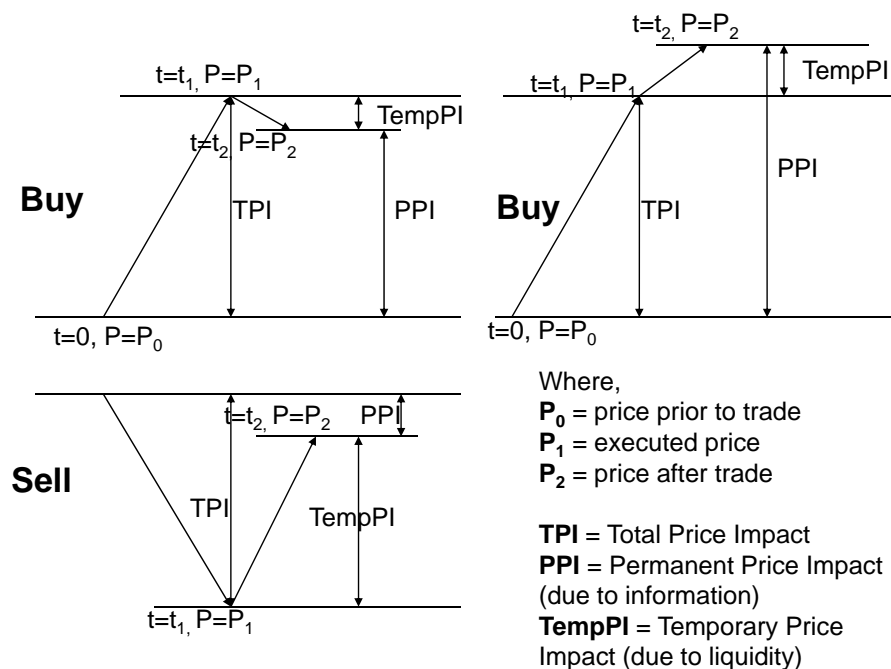
Outline

- Background on price impact asymmetry between buy and sell trades
- Hypotheses
- Data and Methodology
- Empirical Findings
- Conclusion

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Background on Price Impact Asymmetry

- Empirical findings of permanent price impact asymmetry
 - Predominantly permanent (temporary) price increases (decreases) for buyer (seller) initiated block trades (Holthausen et al 1987, 1990; Keim and Madhavan 1996; Kraus and Stoll 1972)
 - Buys are associated with price increases and enjoy a further price continuation, but price drops from sales is nearly fully reversed (Chan and Lakonishok, 1993, 1995)
 - Keim & Madhavan (1995): buy orders take longer time to execute than equivalently-sized sell orders.
 - Escribano & Pascual (2006): the ask-quote changes as a result of buys are larger than the bid-quote changes from similar sales.
- “Buys are usually more informative than sells.”



Background on Price Impact Asymmetry (con't)

- Theoretical prediction about the role of individual stocks' return history
 - Saar (2001) argues that the longer the run of price appreciation a stock experiences, the lower the buy-sell asymmetry of (permanent) price impact.
 - if the price of a stock did not go up recently -> less likely that investors own that stock -> hence the diversification (short sale) constraints is unlikely (more likely) to be binding.
 - If good information day -> prompt investors to buy -> resulting in a high probability of an informed buy.
 - If bad day -> investors do not own the stock, so they cannot sell it -> resulting in a low probability of an informed sell.
 - On the contrary, as a stock experiences a longer period of price appreciation, the situation is reversed.
- “A stock's history of price performance influences the buy-sell asymmetry of (permanent) price impact”
 - Asymmetry in price impacts decreases with the stocks' historical performance. (Saar, 2001) → never been empirically tested.

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Background on Price Impact Asymmetry (con't)

- Empirical evidence on the role of market conditions
 - Chiyachantana, Jain, Jiang and Wood (CJJW), 2004; Keim, 2003; Wagner and Edwards, 1993 argue that because of the existence of positive feedback trading, buy (sell) trades are more expensive to execute (i.e., incur higher total price impact) than sell (buy) trades on bullish (bearish) markets.
- “Price impact asymmetry is related to contemporaneous market conditions”.

Hypotheses

- Asymmetry in *permanent* and *temporary* price impact is determined by *contemporaneous market conditions*.
- There is a greater proportion of informed trades among buys (sells) in a bullish (bearish) market than sells (buys).
- During a bullish (bearish) market, price impact of buys (sells) is mainly permanent, but that of sells (buys) is primarily temporary.
 - **Hypothesis 1:** During a rising (falling) market, buys (sells) have a higher permanent price impact, but lower temporary price impact than sells (buys).
 - **Hypothesis 1.1:** Buys (sells) incur more permanent price impact, with less temporary price impact (i.e., price reversal), during a rising (falling) market than during a falling (rising) market.

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Research Questions

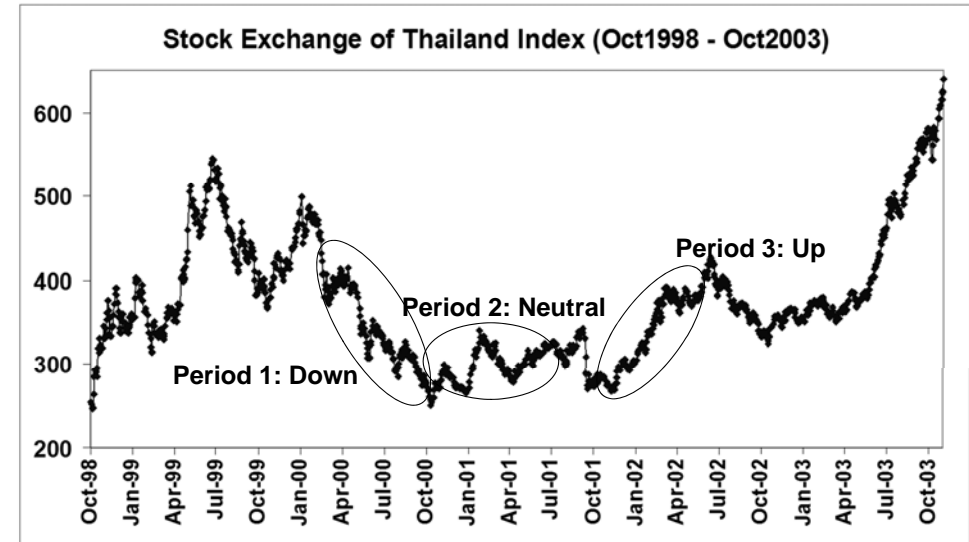
- The existence of asymmetry in permanent/temporary price impacts?
- How and to what extent the notion that buys is more informed than sells is supported?
- How are the permanent/temporary price impacts of buys and sells and the asymmetry in permanent/temporary price impacts related with the market conditions? → H1, H1.1
- How are the permanent price impacts of buys and sells and the asymmetry in price impacts related with the history of individual stocks' performance? → Test Saar (2001)

Data

- Trades and quotes for all stocks on Stock Exchange of Thailand: 2000-2002.
- Sample consists of three periods with different market conditions:
 - Period 1: Mar 2000 to Oct 2000 – bear market
 - Period 2: Nov 2000 to July 2001 – neutral market
 - Period 3: Nov 2001 to Jun 2002 – bull market
- Exclude opening transactions and trades occurring during morning and afternoon pre-opening periods.
- At least 130 *active* trading days in each of the three periods, where an active day is a trading day with minimum of 20 trades.
- **Final sample:** trades for 71 stocks over the three periods from March 2000 to June 2002.
 - There are around 4.7 million trades included in the study.

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Data



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Table 1: Summary Statistics of the Sample
Panel A: Overall Sample

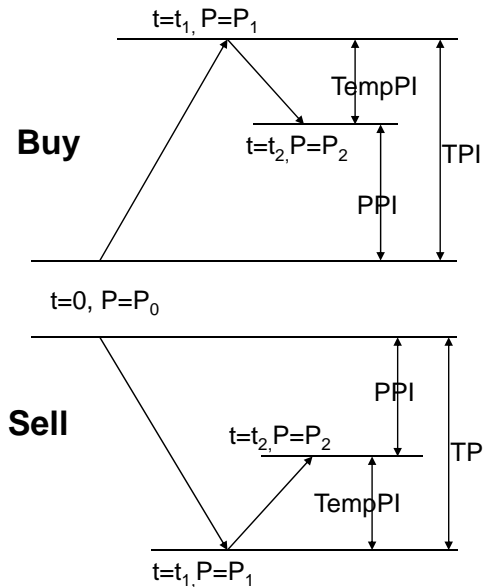
	Period 1 (Mar '00-Oct '00)	Period 2 (Nov '00-Jul '01)	Period 3 (Nov '01-Jun '02)
Number of stocks	71	71	71
Number of trading days (days)	133	177	139
Average market cap (million baht)	19,484	13,309	14,271
Volume-weighted trade price (baht)	14.72	12.64	12.51
Market return	-49.8%	-0.6%	46.3%
Value-weighted 71-stock return	-59.4%	-6.9%	44.7%
Quoted spread (baht)	0.400	0.314	0.188
Relative quoted spread	1.449%	1.458%	0.701%

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Methodology

- Trade side classification: Lee and Ready (1991) procedure
- Price impact
 - Use midquote at trade time as the pre-trade equilibrium stock value, and midquote at 60 minutes later as the post-trade equilibrium stock value.
 - $TPI = \ln(\text{executed price}/\text{midquote})$ for buy.
 - $TPI = \ln(\text{mid-quote}/\text{executed price})$ for sell.
 - $PPI = \ln(\text{mid60}/\text{midquote}) - \ln(\text{SET60}/\text{SET0})$ for buy.
 - $PPI = \ln(\text{midquote}/\text{mid60}) - \ln(\text{SET0}/\text{SET60})$ for sell.
 - $\text{TempPI} = \ln(\text{executed price}/\text{mid60}) + \ln(\text{SET60}/\text{SET0})$ for buy.
 - $\text{TempPI} = \ln(\text{mid60}/\text{executed price}) + \ln(\text{SET0}/\text{SET60})$ for sell.

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P_0 = midquote price prior to trade
 P_1 = executed price
 P_2 = mid60 = midquote price 60 minutes after trade

TPI = Total Price Impact
PPI = Permanent Price Impact (due to information)
TempPI = Temporary Price Impact (due to liquidity)

Trade Size (Percentile)	Price Impact	DOWN Period 1 (Mar 2000 - Oct 2000)			NEUTRAL Period 2 (Nov 2000 - Jul 2001)			UP Period 3 (Nov 2001 - Jun 2002)		
		Buy	Sell	Buy - Sells	Buy	Sell	Buy - Sells	Buy	Sell	Buy - Sells
		All Trade Sizes	Total	0.71	0.72	-0.01	0.72	0.72	0.00	0.35
	Permanent	0.46	0.56	-0.10	0.58	0.38	0.20	0.36	0.07	0.29
	Temporary	0.25	0.16	0.09	0.15	0.34	-0.20	-0.01	0.28	-0.29
< 25	Total	0.71	0.72	-0.01	0.75	0.74	0.01	0.35	0.35	0.00
	Permanent	0.31	0.54	-0.22	0.48	0.32	0.16	0.26	0.04	0.22
	Temporary	0.39	0.18	0.21	0.27	0.42	-0.15	0.09	0.31	-0.22
25 - 50	Total	0.70	0.71	-0.01	0.68	0.69	0.00	0.34	0.34	0.00
	Permanent	0.43	0.50	-0.07	0.51	0.33	0.18	0.31	0.04	0.27
	Temporary	0.27	0.21	0.06	0.17	0.35	-0.18	0.03	0.31	-0.28
90 - 95	Total	0.70	0.71	-0.01	0.74	0.74	0.00	0.35	0.36	-0.01
	Permanent	0.57	0.63	-0.06	0.70	0.43	0.27	0.50	0.11	0.38
	Temporary	0.14	0.09	0.05	0.04	0.31	-0.27	-0.15	0.24	-0.39
95 - 99	Total	0.75	0.75	-0.01	0.71	0.73	-0.02	0.36	0.36	-0.01
	Permanent	0.73	0.70	0.02	0.72	0.48	0.25	0.57	0.13	0.45
	Temporary	0.03	0.05	-0.03	-0.02	0.26	-0.27	-0.22	0.23	-0.45
> 99	Total	0.78	0.78	0.00	0.73	0.74	-0.01	0.39	0.39	-0.01
	Permanent	0.88	0.74	0.14	0.96	0.55	0.40	0.68	0.20	0.48
	Temporary	-0.10	0.04	-0.14	-0.22	0.19	-0.41	-0.30	0.20	-0.49

Table 3
 The relationships between the price impacts of buys versus sells and market conditions

Empirical Results (continued)

Table 4: Correlations between stock conditions and permanent price impact

Return	Period 1 (Mar 2000 - Oct 2000)			Period 2 (Nov 2000 - Jul 2001)			Period 3 (Nov 2001 - Jun 2002)		
	Buy	Sell	Buy - Sells	Buy	Sell	Buy - Sells	Buy	Sell	Buy - Sells
Previous day return	-0.01	-0.05	0.03	-0.05	0.01	-0.04	-0.01	-0.02	0.00
- Monday	-0.07	0.00	-0.04	-0.10	0.06	-0.10	-0.03	0.01	-0.02
- Tuesday	-0.04	-0.03	-0.01	-0.01	-0.05	0.02	-0.03	0.00	-0.02
- Wednesday	0.03	-0.05	0.05	0.03	-0.02	0.01	0.02	0.02	0.00
- Thursday	0.05	-0.11	0.09	0.02	-0.02	0.01	0.02	0.02	0.00
- Friday	-0.01	-0.08	0.04	0.02	-0.02	0.01	0.02	0.02	0.00
Current day return	0.29	-0.32	0.35	0.27	-0.26	0.34	0.53	-0.61	0.59
- Monday	0.21	-0.36	0.32	0.34	-0.40	0.47	0.57	-0.64	0.63
- Tuesday	0.26	-0.22	0.27	0.34	-0.40	0.47	0.57	-0.64	0.63
- Wednesday	0.28	-0.24	0.29	0.34	-0.40	0.47	0.57	-0.64	0.63
- Thursday	0.41	-0.46	0.48	0.38	-0.39	0.46	0.61	-0.63	0.65
- Friday	0.36	-0.40	0.45	0.38	-0.39	0.46	0.61	-0.63	0.65
Previous week return	-0.13	0.00	-0.08	-0.07	0.00	-0.05	-0.04	0.05	-0.05
Current week return	0.30	-0.41	0.43	0.32	-0.36	0.47	0.48	-0.67	0.60
Previous month return	-0.17	0.08	-0.18	-0.04	-0.03	-0.01	-0.03	0.00	-0.02
Current month return	0.20	-0.44	0.41	0.25	-0.29	0.48	0.55	-0.67	0.64

Reject the idea that a stock's history of price performance determines the permanent price impact asymmetry between buys and sells (Saar 2001).

Robustness Checks

- Using midpoint quotes 30 minutes after the trade, instead of 60 minutes
- Trade size classification by absolute number of shares traded (e.g., 0-1,000 shares, 1,000-5,000 shares, 5,000-10,000 shares, 10,000-50,000 shares, and 50,000 shares up)
- The main results are roughly unchanged.

Conclusions

- An out-of-sample test of asymmetry in permanent price impacts documented from block and institutional equity trading in US.
- Most importantly, show the role of market conditions in influencing the asymmetry of *permanent/temporary* price impacts between buys and sells.
- For (very) large trades, show that the asymmetry of permanent/temporary price impacts is consistent with the notion that buys are more informed than sells.
- Show that the history of stocks' price performance is NOT significantly related with the permanent price impacts and asymmetry in permanent price impacts