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Rational Disposition Effect on the TTSE

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Motivations

Rationale

- The **disposition effect** is one of the enduring puzzles in finance and evidence of its has been found in many markets including emerging financial markets
- The literature argues that evidence of disposition behaviour of investors suggests market inefficiency and investors' irrationality
- Similar to Dorn and Strobl (2011), we argue that **disposition effect in emerging markets is a rational outcome of information asymmetry** existing in these markets

Literature Review

Disposition Effect

- The disposition effect is a behavioural phenomenon in which investors “**sell winners too early and ride losers too long**” (Shefrin and Statman, 1985)
- Investors tend to exhibit diminishing sensitivity that is, they are
 - risk averse when their asset position has established a paper profit
 - risk seeking when their position suffers from a paper loss
- The observation that losses matter more than gains is **defined as loss aversion**

Empirical Evidence

Stock Markets

- Choe and Eom (2009)
- Dhar and Zhu (2002)
- Grinblatt and Keloharju (2001)
- Odean (1998)

Experimental Studies

(complex market forces are not present)

- Brooks, et al. (2012)
- Da Costa et al. (2008)
- Weber and Camerer (1998)

Other Markets

- Real estate
- ESOPs
- Sports
- Art
- FX

- Brooks et al. (2012) found that neural insensitivity to upticks in value was associated with the disposition effect
- Disposition behaviour occurs despite evidence that suggests that the strategy is suboptimal in terms of profit earning (Choe and Eom, 2009; Odean, 1998)
- The empirical evidence suggests that the **disposition effect is a common property of decision-making** and not simply a product of the stock market or limited to investors

Behavioural Explanations

Prospect Theory (Kahneman and Tversky, 1979)

- Utility defined over gains or losses relative to a *reference point* rather than final wealth
- Investors' have a **S-shaped utility functions** (concave over gains, but convex over losses)
- **Steeper for losses than for gains**, a feature known as loss aversion

Mental Accounting (Thaler, 1980)

- When a stock is purchase, new mental account is opened
- **Investors may segregate accounts or monies and take risks with their gains** that they would not take with their principal;
- The theory explains why an investor is likely to refrain from re-adjusting his reference point of a stock

Other Behavioural Theories

- The **realisation utility hypothesis** (Barberis and Xiong, 2008)
 - investors receive utility from the act of realising a gain or loss; sell gains to receive positive utility and hold losses to avoid negative utility
- The **quest for pride, and the avoidance of regret** leads to disposition to realised gains and defer losses
 - The asymmetry between the strength of pride and regret leads to inaction to be favoured over action
- Another explanation suggests that investors have an **irrational belief in mean reversion** (Odean, 1998; Barberis and Thaler, 2002)
 - Neurological evidence provided by Brooks, et al. 2012

Informational-based Explanation

- Dorn and Strobl (2011) provide an information-based explanation for the disposition effect
- The **disposition behaviour of investors is a rational response to new information**
 - arise quite naturally in a world of changing information asymmetry
- The theoretical model suggests a **time-series pattern of the disposition effect around information events**
 - disposition effect is low during periods of higher information releases
 - both informed and uninformed investors exhibit disposition behaviour
 - **the disposition behaviour of uninformed (informed) is more pronounced prior to (after) corporate announcements**

Data and Summary Statistics

Microstructure Data

- **Transactions data from the TTSE** that covers the period from **April 1, 2005 to June 3, 2011** (1,232 trading days)
 - information on all trades on individual account executed on the exchange
 - Instrument traded (equities; mutual funds and bonds)
 - Trade details (date and time; price; size; and parties to the transactions)
 - Parties to all trades, we can determine who is buying and who is selling
 - we re-constructed the daily closing portfolio position of all investors
- Our analysis focused on only equities account holders
 - selected only active account (least a buy trade during the sample period)
 - grouped account into informed and uninformed investors based on the median stock holding
 - final sample: **8,541 accounts; 10.5% classified as informed investors**
- **Dividend announcement data** was also obtained from the TTSE

Summary Statistics

Sampled Account Summary Statistics

April 1, 2005-June, 3, 2011

# Brokerage Accounts	8,541
Uninformed	7,647
Informed	894
Stockholdings	
Average	2.65
Minimum	1
Maximum	30
Transactions	
Total	61,129
Avg. Number of Trades	7
Traded Volume	
Total	831,290,278
Mean Trade Size	97,329
Traded Value	
Total	\$13,027,333,615
Mean Trade Size	\$1,525,270

Dividend Announcements Summary Statistics

April 1, 2005-June, 3, 2011

# Stock	31
# Announcements	
Final	129
Interim	201
Special	4
Total	334

Empirical Methodology & Results

Empirical Methodology

- We measure disposition effect similar to Dorn and Strobl (2011)
 - positive difference between proportion of (portfolio) gains realised (PGR) and proportion of losses realised (PLR) or
 - a PGR/PLR ratio greater than one
- We reconstituted the daily portfolio positions of investors and classified the positions of all investors as either:
 - realised gains or losses if positions were sold
 - paper gains or losses if positions were held
- Gains are positions for which the current price is above the share weighted-average purchase price; all other positions are considered losses

Empirical Methodology, cont'd

- We argue that disposition effect is due to changes in information asymmetry

Hypothesis: the disposition behaviour of uninformed (informed) investors is more pronounced prior to (after) corporate announcements

- We examined the dynamics of the disposition effect surrounding information events at the stock-level
 - employed an event study analysis and compared the difference between PGR and PLR during weeks pre- and post-event window
 - event window of one and four weeks

Stock-Level Results

Paper Gain (PG)	2,567,732	Proportion of RG (PRG)	0.22%
Realised Gain (RG)	5,739	Proportion of RL (PLR)	0.10%
Paper Loss (PL)	6,510,138	PGR-PLR	0.12%
Realised Loss (RL)	6,726	PGR/PLR	2.16
Observations	9,090,335		

Type of Trader	PGR	PLR	PGR-PLR	PGR/PLR
Uninformed	0.15%	0.08%	0.08%	1.99
Informed	0.34%	0.17%	0.17%	2.00

Portfolio-Level Results

Paper Gain (PG)	11,194	Proportion of RG (PRG)	33.89%
Realised Gain (RG)	5,739	Proportion of RL (PLR)	33.76%
Paper Loss (PL)	13,195		
Realised Loss (RL)	6,726	PGR-PLR	0.13%
Observations	36,854	PGR/PLR	1.00

Type of Trader	PGR	PLR	PGR-PLR	PGR/PLR
Uninformed	65.18%	61.54%	3.64%	1.06
Informed	25.03%	22.53%	2.50%	1.11

Disposition Effect by Year

Year	PRG	PLR	PRG-PLR	PRG/PLR	Index Returns
2005	0.33%	0.18%	0.14%	1.77	-7.06%
2006	0.40%	0.17%	0.23%	2.31	-9.20%
2007	0.25%	0.13%	0.12%	1.94	1.32%
2008	0.22%	0.14%	0.08%	1.58	-14.16%
2009	0.19%	0.08%	0.11%	2.30	-9.21%
2010	0.17%	0.06%	0.11%	2.77	9.19%
2011	0.15%	0.07%	0.08%	2.28	13.70%

Disposition Effect by Order Type

Marketable Limit Orders

PGR	0.10%
PLR	0.04%
PGR-PLR	0.05%
PGR/PLR	2.26

Non-marketable Limit Orders

PGR	0.13%
PLR	0.06%
PGR-PLR	0.07%
PGR/PLR	2.09

Summary of Findings

- We found evidence of disposition behaviour on the TTSE that is, investors exhibit loss aversion
 - disposition behaviour of investors on the TTSE is significantly higher than the reported results of Dorn and Strobl (2011) for the Finnish stock market
- We also found that both uninformed and informed investors display disposition behaviour but slightly higher for informed investors
- The disposition effect is remarkably consistent across each year of the sample despite the increased in financial information and sophistication
- Consistent with Linnianmaa (2010), the disposition effect is stronger when investors use marketable limit orders but the difference is not as large as found in previous research

Disposition Effect & News

Month	PRG	PLR	PRG-PLR	PRG/PLR	# Dividend News
Jan	0.20%	0.11%	0.09%	1.82	6
Feb	0.24%	0.11%	0.14%	2.30	16
Mar	0.20%	0.09%	0.11%	2.25	27
Apr	0.27%	0.10%	0.17%	2.80	41
May	0.24%	0.09%	0.15%	2.59	53
Jun	0.22%	0.11%	0.11%	2.02	16
Jul	0.18%	0.09%	0.08%	1.93	23
Aug	0.22%	0.10%	0.13%	2.26	51
Sep	0.21%	0.11%	0.10%	1.83	15
Oct	0.22%	0.11%	0.11%	1.94	20
Nov	0.23%	0.12%	0.10%	1.85	53
Dec	0.23%	0.10%	0.14%	2.46	13

Disposition Effect & News, cont'd

1 Week	Before	After
PGR (%)	0.19	0.21
PLR (%)	0.09	0.10
PGR-PLR (%)	0.10	0.12
Difference	0.02	

4 Weeks	Before	After
PGR (%)	0.20	0.21
PLR (%)	0.09	0.11
PGR-PLR (%)	0.11	0.10
Difference	-0.01	

Disposition Effect & News, cont'd

1 Week	Uninformed		Informed	
	Before	After	Before	After
PGR (%)	0.13	0.15	0.28	0.33
PLR (%)	0.07	0.07	0.15	0.17
PGR-PLR (%)	0.06	0.08	0.13	0.16
Difference	-0.02		0.03	

4 Weeks	Uninformed		Informed	
	Before	After	Before	After
PGR (%)	0.16	0.14	0.27	0.32
PLR (%)	0.07	0.07	0.14	0.19
PGR-PLR (%)	0.09	0.07	0.14	0.13
Difference	-0.02		-0.01	

Summary of Findings

- We found that the disposition effect varies considerably over the calendar year
 - highest during the months when companies report annual earnings
- This aggregate pattern is consistent with information-based explanation for the disposition effect of Dorn and Strobl (2011)
- Contrary to Dorn and Strobl (2011), we found that **disposition is higher during weeks after the earnings announcements** than weeks prior to announcements
- Interestingly, we found that **informed investors display greater disposition behaviour** and is consistent with their short-lived information sets

Conclusions

Key Findings

- We empirically examined whether a dynamic rational expectations model with time-varying information asymmetry can explain the disposition effect
- Our results revealed the following:
 - **strong evidence of disposition effect on the TTSE**, which is significantly higher than results reported for other markets
 - weak evidence supporting the information-based explanation for disposition effect
 - **informed investors exhibit higher disposition behaviour**. We argued that this due to the fact that **the value of their information sets have a short-life**

Future Research

Robustness Checks

- Improve and verify findings by using new microstructure data obtained from the TTCSD
- Test different definitions of information events (periods of high turnover and large price movements)
- Examine other approaches to capture different categories of investors (informed vs. uninformed; and different degrees of sophistication)
- Investigate whether or not there is a disposition effect on ex-dividend dates
 - in absence of taxes, the stock price should reflect the discounted value of the dividend and thus, investors would be indifferent to receiving the dividend
 - anecdotal evidence in the media, however, suggests that this is not the case

Q&A

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