SPLITTING AND SHUFFLING: INSTITUTIONAL TRADING MOTIVES AND ORDER SUBMISSIONS ACROSS BROKERS

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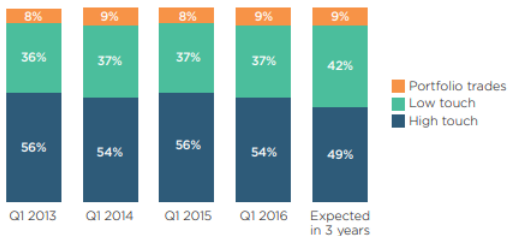[†]Hong Kong Polytechnic University

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MOTIVATION

"One of the biggest changes in trading over the last 10–15 years has been the shift to electronic trading. ... However, the buy side actually executes the majority of their order flow via high-touch channels."

HIGH-TOUCH VS ELECTRONIC MIX OF U.S. EQUITY TRADING COMMISSIONS

	Q1 2013	Q1 2014	Q1 2015	Q1 2016	Expected in 3 years
Portfolio trades	8%	9%	8%	9%	9%
Low touch	36%	37%	37%	37%	42%
High touch	56%	54%	56%	54%	49%

Source: Greenwich Associates 2017

"When traders are sending orders worth millions of dollars, it is important that they have a trust relationship with their executing broker—a phone conversation is a very effective way to ensure that."

MOTIVATION (CONT.)

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MARKETS

'Upstairs' Trading Draws More Big Investors

Big Players Change Tactics in a Fragmented Market

By Bradley Hope
Dec. 8, 2013 6:02 p.m. ET

"It's like trying to fill up your gas tank, but you have to go to 15 gas stations, by the time you get to the 15th one, they've increased the price because they've heard you were coming. Wouldn't someone rather go to two or three stations and fill up the tank in blocks?"

- Andrew Brooks, head of U.S. equity trading at T. Rowe Price

MOTIVATION (CONT.)

▶ No one wants to trade against better informed traders.

▶ In market microstructure models (Glosten and Milgrom (1985), Kyle (1985)), risk-neutral market makers are unable to identify trading motives. Market makers set market prices expecting to lose to informed traders, while breaking even with gains from uninformed, liquidity traders.

MOTIVATION (CONT.)

▶ Uninformed traders can be screened and face lower costs trading blocks in the non-anonymous upstairs market, whereas informed traders would split up blocks into a series of smaller orders and trade downstairs anonymously (Seppi (1990)).

▶ Informed traders would presumably choose to trade as quickly as possible and as much as possible once they have received their information. However, informed traders may be quickly distinguished by their large volume trading and hence they may choose to break up large volume trades to hide their trading motives. (Easley and O'Hara (1987))

MOTIVATION (CONT.)

- ▶ Informed traders face additional risks that their trading motives will be detected and mimicked by other market participants.

  - ✓ High-Frequency Trading: Korajczyk and Murphy (2019), Van Kervel and Menkveld (2019).

  - ✓ Broker Information Leakage Di Maggio et al. (2019)

- ▶ Back-running can be costly for the original informed orders.

- ▶ Yang and Zhu (2019) develop a model in which informed traders can randomize their order flows to prevent other traders from "back-running" on their private information.

HYPOTHESES

H1. Informed traders would **split** and **shuffle** their order flows across brokers to hide their trading motives.

H2. The splitting and shuffling strategies, designed to conceal informed trades from brokers and other market participants, would **lower** institutional trading costs.

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FINDINGS

▶ Institutional investors tend to spread out their orders over more days and across more brokers when they are trading on information.

▶ Institutional investors provide camouflage for their informed orders by sending uninformed orders to the same brokers simultaneously.

▶ Institutional investors not only split their orders but also shuffle their orders across brokers, to a larger extent when trading on private information.

▶ Such splitting and shuffling strategies tend to be effective in terms of lowering trading costs as measured by implementation shortfall.

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DATA

A ANcerno data: institutional daily transactions data between January 1999 through December 2009.

B Directly retrieve both original and amendment 13F filings[1] (forms 13F-HR and 13F-HR/A) from Securities and Exchange Commission (SEC)'s EDGAR system.

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[1]Section 13(f) of the Securities Exchange Act of 1934 requires institutional investment managers with at least $100 million in equity assets under management to disclose their quarterly portfolio holdings to the Securities and Exchange Commission (SEC) on Form 13F.

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HOW TO IDENTIFY INFORMED TRADES

▶ I match institutional managers in the ANcerno database with those in the 13F filings by comparing both the quarterly changes in holdings computed from the two datasets and the manager names. (Hu et al. (2018), Choi et al. (2016))

▶ I merge ANcerno institutional daily transactions with 13F original/amendment filings.

▶ I identify any buy trades as informed (uninformed) if the stocks bought during a quarter can be matched with confidential (original) holdings for that quarter.

PARENT ORDER

▶ Individual Parent Order

✓ Following Anand et al. (2012), I stitch together all orders on the same stock on the same side of the market (buy or sell) by the same client-manager that are executed through multiple brokers and over consecutive multiple days to construct parent orders.

MICRO LEVEL STRATEGIES: INDIVIDUAL PARENT ORDERS

▶ Informed orders tend to be split over more trading days and across more brokers.

▶ Institutional investors tend to camouflage their informed orders by submitting uninformed orders together to the same broker.

▶ The splitting and shuffling strategies tend to reduce trading costs, especially on informed orders

Table 1: Split or Concentrate Large Orders?

Panel A: Baseline

Dependent variable:	Number of Days		Number of Brokers		Broker HHI	
	(1)	(2)	(3)	(4)	(5)	(6)
𝟙(Informed Motivated)	0.64***	0.48***	0.18***	0.18***	−3.53***	−3.14***
	(3.49)	(4.05)	(3.79)	(3.60)	(−3.65)	(−4.13)
Time Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Stock Fixed-effects	No	Yes	No	Yes	No	Yes
Manager × Client Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	214,250	214,250	214,250	214,250	214,250	214,250
Adjusted R²	0.12	0.17	0.13	0.16	0.12	0.15

Panel B: Controlling for Order Size

Dependent variable:	Number of Days		Number of Brokers		Broker HHI	
	(1)	(2)	(3)	(4)	(5)	(6)
𝟙(Informed Motivated)	0.57***	0.36***	0.14***	0.11***	−2.82***	−1.87***
	(4.28)	(7.24)	(7.52)	(9.54)	(−6.25)	(−8.86)
log(Dollar Volume)	0.28***	0.33***	0.17***	0.18***	−3.00***	−3.29***
	(14.16)	(17.51)	(9.33)	(12.22)	(−11.65)	(−16.18)
Time Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Stock Fixed-effects	No	Yes	No	Yes	No	Yes
Manager × Client Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	214,250	214,250	214,250	214,250	214,250	214,250
Adjusted R²	0.23	0.31	0.27	0.31	0.21	0.24

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Table 2: Camouflage Strategies

Panel A: The Number of Stocks

Dependent variable:	log(Number of Stocks)					
	(1)	(2)	(3)	(4)	(5)	(6)
𝟙(Informed Order to Broker)	0.68***	0.72***	0.48***	0.55***	0.57***	0.39***
	(3.76)	(3.68)	(9.80)	(6.03)	(5.90)	(19.78)
log(volume)				0.21***	0.21***	0.19***
				(3.88)	(3.85)	(6.37)
Time Fixed-effects	No	Yes	Yes	No	Yes	Yes
Broker Fixed-effects	No	No	Yes	No	No	Yes
Manager × Client Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142,383	142,383	142,383	142,383	142,383	142,383
Adjusted R^2	0.41	0.42	0.55	0.55	0.56	0.65

Panel B: HHI

Dependent variable:	Stock HHI					
	(1)	(2)	(3)	(4)	(5)	(6)
𝟙(Informed Order to Broker)	−18.78***	−19.80***	−13.82***	−14.56***	−15.16***	−10.88***
	(−4.29)	(−4.22)	(−12.20)	(−8.28)	(−8.15)	(−25.90)
log(volume)				−6.67***	−6.74***	−6.12***
				(−4.85)	(−4.76)	(−8.49)
Time Fixed-effects	No	Yes	Yes	No	Yes	Yes
Broker Fixed-effects	No	No	Yes	No	No	Yes
Manager × Client Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	142,383	142,383	142,383	142,383	142,383	142,383
Adjusted R^2	0.36	0.37	0.46	0.47	0.48	0.54

Table 3: Less Implementation Shortfall with splitting order through Brokers

Panel A: Baseline

Dependent variable:	Implementation Shortfall (%)			
	(1)	(2)	(3)	(4)
$\mathbb{1}$(Split Brokers) $\times$ $\mathbb{1}$(Informed Motivation)	-0.16^{***}	-0.11^{***}	-0.08^{***}	-0.08^{**}
	(-3.61)	(-3.37)	(-2.65)	(-2.36)
$\mathbb{1}$(Informed Motivation)	0.04^{**}	0.05^{***}	0.03^{***}	0.03^{***}
	(2.56)	(3.66)	(2.80)	(2.77)
$\mathbb{1}$(Split Brokers)	-0.005	-0.004	0.03	0.04
	(-0.09)	(-0.06)	(0.61)	(0.79)
Time Fixed-effects	No	Yes	Yes	Yes
Order Sequence Fixed-effects	Yes	Yes	Yes	Yes
Stock Fixed-effects	No	No	Yes	Yes
Broker Fixed-effects	No	No	No	Yes
Manager $\times$ Client Fixed-effects	Yes	Yes	Yes	Yes
Observations	425,219	425,219	425,219	425,219
Adjusted R^2	0.02	0.11	0.13	0.13

Table 4: Less Implementation Shortfall: Dynamics over Parent Order

Panel A: Baseline

Dependent variable:	Implementation Shortfall (%)			
	(1)	(2)	(3)	(4)
$\mathbb{1}$(Order Sent to Different Broker) $\times$ $\mathbb{1}$(Informed Motivation)	-0.06^{***}	-0.05^{**}	-0.05^{***}	-0.05^{***}
	(-2.89)	(-2.46)	(-3.36)	(-3.31)
$\mathbb{1}$(Informed Motivation)	0.01	0.04^{*}	0.04^{*}	0.03^{*}
	(0.48)	(1.92)	(1.85)	(1.91)
$\mathbb{1}$(Order Sent to Different Broker)	0.0003	-0.01	0.003	0.002
	(0.04)	(-1.01)	(0.46)	(0.37)
Time Fixed-effects	No	Yes	Yes	Yes
Order Sequence Fixed-effects	Yes	Yes	Yes	Yes
Stock Fixed-effects	No	No	Yes	Yes
Broker Fixed-effects	No	No	No	Yes
Manager $\times$ Client Fixed-effects	Yes	Yes	Yes	Yes
Observations	295,145	295,145	295,145	295,145
Adjusted R^2	0.02	0.13	0.16	0.16

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MACRO LEVEL STRATEGIES: DAILY PORTFOLIO

I examine institutional investors' order submission strategies on daily portfolios.

▶ I aggregate orders across all stocks by the same fund on a daily basis.

▶ I measure similarity between today's set of brokers used by a client-manager and the core set of brokers used by the same manager (from day t-25 to day t-6), as measured by cosine similarity based on the dollar volume of orders executed by each broker.

✓ A larger degree of shuffling on days with a larger share of informed trading volume.

✓ Such shuffling strategies can help reduce trading costs, especially on informed orders.

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Table 5: Randomizing Order Flows across Brokers

Panel A: Baseline

Dependent variable:	Dissimilarity × 100 (based on cosine similarity)					
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}$(Informed Shares > 0.5)	4.48***	4.88***	3.16***	2.24**	2.31**	2.29**
	(3.83)	(3.83)	(2.79)	(2.04)	(2.12)	(2.10)
log(Dollar Volume)			−2.69***		0.38	
			(−4.69)		(0.66)	
log(volume)						0.51
						(1.03)
log(NStocks)				−7.11***	−7.59***	−7.73***
				(−6.39)	(−7.54)	(−7.00)
Time Fixed-effects	No	Yes	Yes	Yes	Yes	Yes
Manager × Client Fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,625	12,625	12,625	12,625	12,625	12,625
Adjusted R^2	0.43	0.49	0.50	0.52	0.52	0.52

$\mathbb{1}$(Informed Shares > 0.5) = If $\frac{\text{Informed Dollar Volume}}{\text{Dollar Volume}}$ > 0.5 then 1; 0 otherwise.

ROBUSTNESS CHECKS

So far my analysis has been limited to ANcerno client-managers in which ANcerno managers can be matched with 13F managers and to manager-quarters with confidential holdings. As a robustness check, I extend analysis to the full ANcerno sample.

▶ Ex-post performance over the next calendar month (typically 21 trading days) immediately following a trade.

▶ Portfolio managers tend to move informed trades from just before the end of a quarter to the beginning of the subsequent quarter to temporarily delay the release of holding and trading information(Wang (2011)).

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CONCLUSION

▶ Informed large orders tend to be split across more brokers and over more trading days.

▶ Institutional investors tend to camouflage informed orders by sending uninformed orders simultaneously to the same brokers.

▶ A higher degree of shuffling is associated with a larger share of informed trading volume.

▶ The splitting and shuffling strategies, designed to conceal informed trades from brokers and other market participants, tend to lower trading costs, especially on informed orders.