The Effect of Payment for Order Flow on Order Routing to Market Centers

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Research Question

How does payment for order flow affect order routing to market centers?

- Order Routing
  - Brokers direct clients' (retail investors) orders to market centers for execution
  - Legally obligated to get best execution
- Payment for Order Flow
  - Rebates given to brokers by market centers for sending orders their way
  - Usually around \$0.010/share

Approach

- Study differences between "unpaid" and "paid" brokers
  - Lack of data available on specifics of payment for order flow
  - Can look at responsiveness to changes in execution quality
- Hypothesis: Brokers who accept rebates are relatively less reactive to changes in execution quality
  - Assuming they put weight on amount of rebates offered by brokers when routing
  - Might not affect their relative execution quality (?)

Data

606 Disclosures

- Broker reports of order routing data
- Market share by quarter, exchange, and order type (ind. var)

605 Disclosures

- Market Center reports of execution statistics
- Execution quality by stock, order type, and week (dep. var)

Descriptive Statistics

605 Cross Section
(2015Q3, NASDAQ Stocks, Market Orders)

MarketCenter	MktCtrExecShares	PrImp_Pct	PrImp_AvgAmt	All_AvgT
ARCA	40,788,074	43.91%	$0.0445	0.671s
BNYC	187,389,877	62.41%	$0.0072	1.276s
CDRG	1,684,972,233	81.22%	$0.0107	0.161s
G1ES	848,647,217	87.72%	$0.0111	0.217s
SGMA	654,205,209	84.65%	$0.0110	0.212s
UBSS	894,802,777	87.48%	$0.0128	0.309s

Methodology

Current Method

- Regress market share on various measures of execution quality
  - price improvement
  - execution time
  - effective spreads ($\approx$ transaction costs)
- Hausman test between panel models
- Wald Test between unpaid and paid brokers

Table: Rebate-Accepting Brokers (Random Effects)

	Market Share			
	(1)	(2)	(3)	(4)
PrImp_Pct	0.063**		0.053**	
	(0.020)		(0.019)	
PrImp_AvgAmt	1.253*		1.425**	
	(0.536)		(0.536)	
PrImp_ExpAmt		2.921*		3.024*
		(1.249)		(1.284)
PrImp_AvgT	0.016*	0.010		
	(0.007)	(0.006)		
All_AvgT			0.0004	0.0003
			(0.0002)	(0.0002)
AvgEffecSpread	−0.468	−0.285	−0.591	−0.323
	(0.337)	(0.303)	(0.335)	(0.304)
Constant	0.038*	0.077***	0.049**	0.078***
	(0.018)	(0.010)	(0.016)	(0.010)
Observations	706	706	706	706
Adjusted R^2	0.758	0.754	0.757	0.753
F Statistic	23.337***	23.002***	23.233***	22.974***
Note:				*p<0.05, **p<0.01, ***p<0.001

Table: Unpaid Brokers (Random Effects)

	Market Share			
	(1)	(2)	(3)	(4)
PrImp_Pct	0.085**		0.090**	
	(0.031)		(0.028)	
PrImp_AvgAmt	4.360***		3.972***	
	(1.078)		(1.060)	
PrImp_ExpAmt		11.428***		11.007***
		(1.912)		(1.965)
PrImp_AvgT	−0.014	−0.017		
	(0.010)	(0.009)		
All_AvgT			−0.001	−0.001*
			(0.0003)	(0.0003)
AvgEffecSpread	−1.964**	−0.836	−1.748*	−0.807
	(0.761)	(0.669)	(0.758)	(0.670)
Constant	−0.00005	0.018	−0.007	0.015
	(0.030)	(0.018)	(0.026)	(0.018)
Observations	2,567	2,567	2,567	2,567
Adjusted R^2	0.623	0.623	0.623	0.623
F Statistic	16.356***	16.391***	16.374***	16.395***
Note:				*p<0.05, **p<0.01, ***p<0.001

Differences between unpaid and paid brokers

- In all cases, unpaid brokers have higher magnitude weights on execution quality $\Longrightarrow$ unpaid brokers are better
- Most differences between coefficients are significant

	Wald Stat			
	(1)	(2)	(3)	(4)
PrImp_Pct	1.86		7.16**	
PrImp_AvgAmt	4.22*		5.32*	
PrImp_ExpAmt		9.90**		17.63***
PrImp_AvgT	5.36*	4.50*		
All_AvgT			17.58***	18.24***
AvgEffecSpread	2.90	0.34	0.02	0.70
Note:		*p<0.05, **p<0.01, ***p<0.001		

Methods

New Approach (in progress)

- Market orders only
- Semiparametric Tobit
- Use BIC to select regressors
- Differences in marginal effects between paid and unpaid