

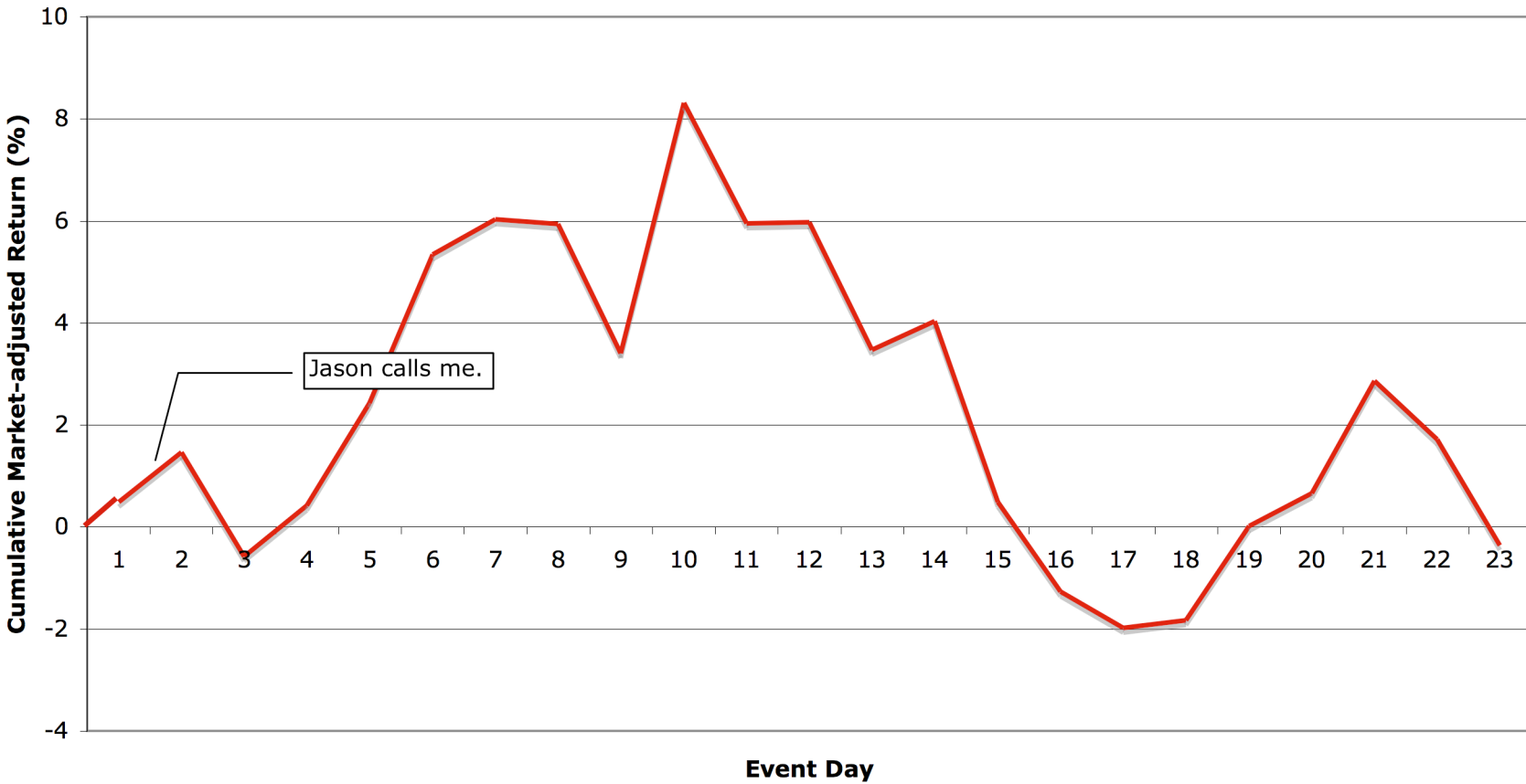
Do Retail Trades Move Markets?

Brad Barber

Terrance Odean

Ning Zhu

Gillette Cumulative Market Adjusted Return subsequent to introduction of Mach3 razor (June 26, 1998 through July 29, 1998)



Do Noise Traders Move Markets?

1. Small trades are proxy for individual investors trades.
2. Individual investors trading is correlated:
 - Across stocks
 - Across months
3. Individual investor trading forecasts returns:
 - Short-term outperformance
 - Medium and long-term underperformance

Theoretical Motivation

1. Informed traders are constrained (limits of arbitrage):

- Costs
- Short Sale Constraints
- Risk aversion

2. Noise traders are biased decision makers.

3. Noise trading is correlated.

4. Noise trading moves prices from fundamental value.

Shleifer & Summers (1990), De Long, Shleifer, Summers, & Waldman (1990, 1991)

5. Informed trading (eventually) pushes prices back to fundamental value.

1. Informed traders are constrained.

- Closed-end funds

Pontiff (1996)

- Short sale constraints

Lamont & Jones (2002)

- S & P 500 additions

Harris & Gurel (1986)

Shleifer (1986)

Wurgler and Zhrauskaya (2002)

2. Noise traders are biased decision makers.

- Overconfidence
 - Odean (1999)
 - Barber & Odean (2000, 2001)
- Disposition effect
 - Shefrin & Statman (1985)
 - Odean (1998)
 - Grinblatt and Keloharju (2001)
- Representativeness
 - DeBondt and Thaler (1985, 1987)
- Limited attention
 - Barber & Odean (2005)

3. Noise trading is cross-sectionally correlated.

- U.S. Brokerage Data (Barber, Odean, and Zhu, 2004)
 - U.S. discount broker, 1991-96
 - U.S. full-service broker, 1997-99
- Australian investors, 1991-2002, (Jackson, 2003)
- All U.S. small trades 1983-2000 (This paper)

Primary Contributions of Paper.

1. Informed traders are constrained (limits of arbitrage):
 - Costs
 - Short Sale Constraints
 - Risk aversion
2. Noise traders are biased decision makers.
3. Noise trading is correlated.
4. **Noise trading moves prices from fundamental value.**
5. **Informed trading (eventually) pushes prices back to fundamental value.**

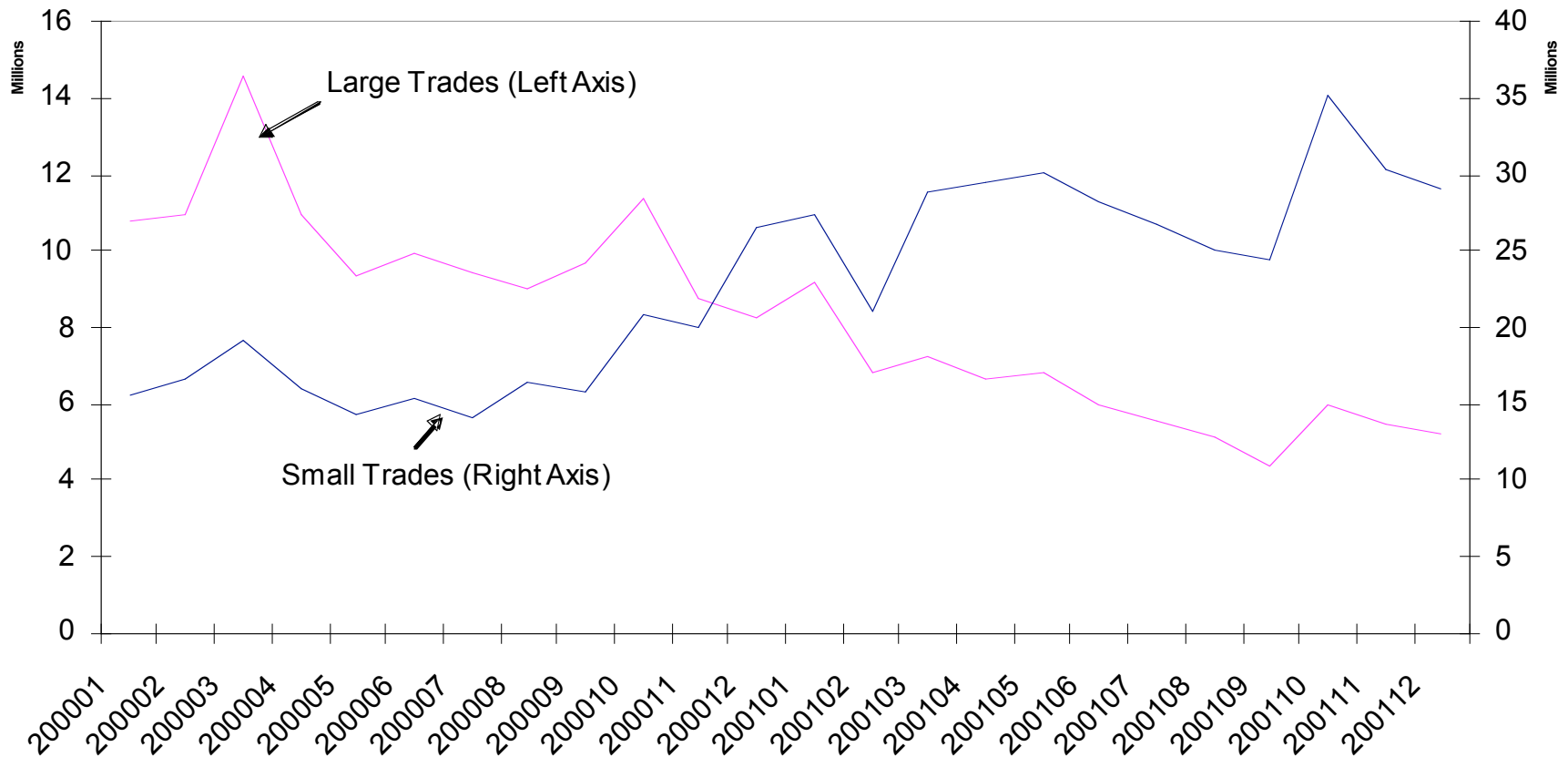
Closely Related Paper

- Hvidkjaer (2005)

Data

- Tick-by-tick transaction data: 1983 to 2000
 - Institute for the Study of Securities Markets (ISSM)
NYSE & ASE 1983-1992; Nasdaq 1987-1992.
 - Trade and Quote (TAQ)
NYSE, ASE, & Nasdaq, 1992-2000
- Decimalization in January 2001
 - Dramatic shift in the distribution of trade size
 - Small trade becomes poor proxy for individual investor trades

Number of Small Trades and Large Trades between 1/2000 and 12/2001



Signing trades

Details

- Quote rule: buyer initiated if above midpoint of quotes.
- Tick rule: buyer initiated if above last executed trade.
 - NYSE and ASE – applied to trades at midpoint
 - Nasdaq – applied to trades within quotes
- Ignore NYSE and ASE opening trades.

Ellis, Michaely, and O'Hara (2000)

Lee and Ready (1991)

Signing trades as buyer or seller initiated

ASK: 10 1/8

Trade
Executes @ \Rightarrow Buyer initiated
10 1/8

Midpoint: 10 1/16

BID: 10

Trade
Executes @ \Rightarrow Seller initiated
10

Trade size as proxy for investor type

- Lee & Radhakrishna (2000)
 1. $T \leq \$5,000$ (Small trades, i.e., individual investors)
 2. $\$5,000 < T \leq \$10,000$
 3. $\$10,000 < T \leq \$20,000$
 4. $\$20,000 < T \leq \$50,000$
 5. $\$50,000 < T$ (Large trades, i.e., institutional investors)
- 1991 dollars indexed to CPI

Measuring Trade Imbalance

$$\frac{\text{value of buyer initiated trades}}{\text{value of all signed trades}}$$

- Calculate ratio by trade value and trade number.
- Calculate separate imbalance measure for each of five trade size quintiles.
- Ignore stocks with less than 10 signed trades.

Are small signed trades a good proxy for individual investor trades?

Calculate monthly proportion buys for:

- U.S. Discount Broker Data
 - 1991 to 1996
 - 78,000 investors
- U.S. Full-Service Broker Data
 - 1997 to 1999
 - 650,000 investors
- Transaction Level Data – Five Trade Size Bins

In each month, calculate correlation across datasets

Average Correlations across months

Small trades as proxy for individual investors

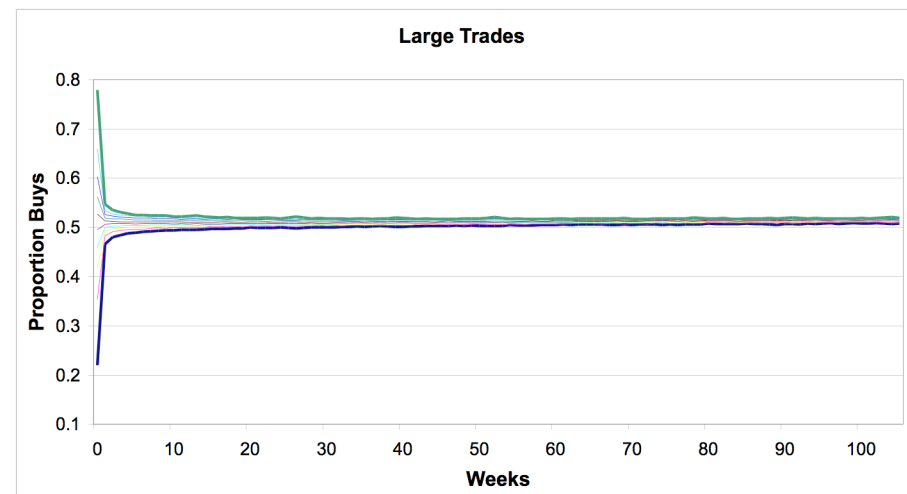
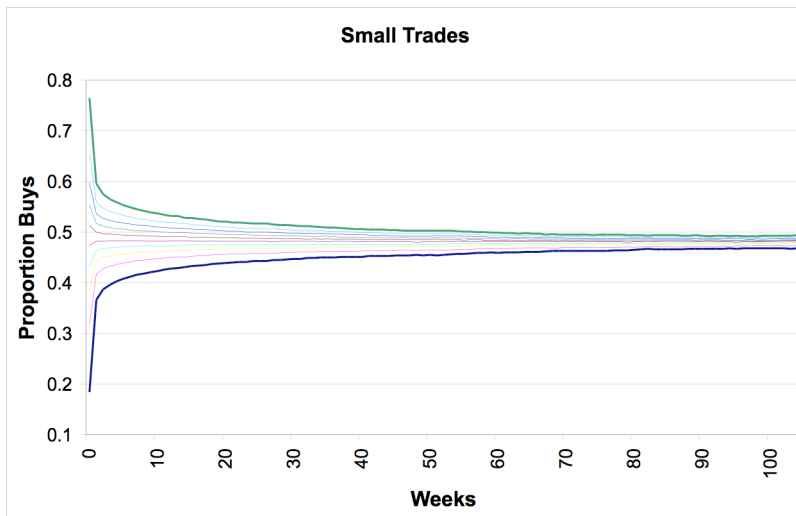
Mean Monthly Correlation in the Proportion of
Trades that are Buyer Initiated across Datasets

	TAQ/ISSM Trade Size Bin:				
	Small Trades	2	3	4	Large Trades
	Panel A: Large Discount Broker				
Mean Monthly Correlation	55.4	57.7	54.5	42.8	-26.5
Standard Deviation	11.8	11.6	11.4	16.2	15.7
<i>t</i> -statistic	39.6	42.0	40.4	22.3	-14.2
Minimum	18.7	9.0	15.3	-2.9	-64.9
Maximum	78.8	78.2	75.7	72.1	16.3
Percent Positive	100.0	100.0	100.0	98.6	5.6
	Panel B: Large Retail Broker				
Mean Monthly Correlation	42.6	44.1	38.1	22.1	-14.5
Standard Deviation	5.9	5.4	7.0	8.3	4.2
<i>t</i> -statistic	39.8	45.0	29.7	14.6	-18.8
Minimum	30.2	34.6	28.4	10.4	-21.5
Maximum	55.8	56.9	52.0	42.9	-4.5
Percent Positive	100.0	100.0	100.0	100.0	0.0

Are the trades of individual investors correlated?

Percentage Spread between Deciles 1 and 10

Week	Small Trades	Large Trades
0	58.1	55.9
1	23.0	8.1
3	16.9	4.7
6	13.7	3.4
12	10.4	2.8



Methods: Distributional Analysis

- Lakonishok, Shleifer, & Vishny (1992) herding measure

$$HM_{it} = |p_{it} - E[p_{it}]| - E|p_{it} - E[p_{it}]|$$

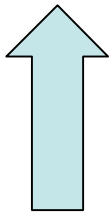
p_{it} is the proportion of all trades in stock i during month t that are purchases.

$E[p_{it}]$ is the proportion of all trades that are purchases in month t .

Are the tails fatter than they should be (under the null)?

LSV Herding Measure

- Small trades: 7 %
- Large trades 10 %
- Discount brokerage 6.8 % (BOZ 2004)
- Full service brokerage 12.8 % (BOZ 2004)
- Pension funds 2.7 % (LSV 1992)
- Mutual funds 1.9 % to 3.4 % (Wermers 1999)



Do Retail Trades Move Prices?

- Calculate Annual Proportion Buys
 - December 1983 to December 2000
 - Separately for Small Trades and Large Trades
- Sort Stocks into Quintiles
- Construct Portfolios based on Quintile Sorts
- Calculate Monthly Portfolio Returns in year following formation

Descriptive Statistics

Proportion Buyer-Initiated Quintile

1 (Heavily Sold)	2	3	4	5 (Heavily Bought)
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PANEL A: Small Trade Quintiles

Proportion of Trades that are Buyer-Initiated by Trade Size:

Small Trades (< \$5,000)	0.345	0.451	0.497	0.538	0.611
Large Trades (> \$50,000)	0.488	0.487	0.482	0.479	0.477

PANEL B: Large Trade Quintiles

Proportion of Trades that are Buyer-Initiated by Trade Size:

Small Trades (< \$5,000)	0.492	0.507	0.506	0.491	0.478
Large Trades (> \$50,000)	0.317	0.446	0.491	0.530	0.630

Abnormal Returns

- Market-Adjusted Returns
- Four-Factor Alphas

$$(r_{pt} - r_{ft}) = \alpha + \beta(r_{mt} - r_{ft}) + sSMB_t + hHML_t + uUMD_t + \varepsilon_t$$

- Market
- Size (SMB)
- Value (HML)
- Momentum (UMD)

Mean Monthly Percentage Abnormal Returns for Portfolios formed on the basis of Annual Proportion of Buyer-Initiated Trades: 1984 to 2001

Proportion Buyer- Initiated Quintile	Equally-Weighted					
	Return			t-statistic		
	Small Trades	Large Trades	Diff.	Small Trades	Large Trades	Diff.
	Market-Adjusted Returns (%)					
1 (Sold)	0.211	-0.255	0.466	0.99	-1.04	3.84
2	0.293	-0.131	0.424	1.22	-0.56	4.13
3	0.116	-0.017	0.133	0.44	-0.08	1.09
4	-0.082	0.017	-0.099	-0.33	0.11	-0.77
5 (Bought)	-0.233	-0.064	-0.169	-1.30	-0.39	-1.71
B-S (5-1)	-0.444	0.191	-0.635	-2.99	1.72	-3.42
	Four-Factor Alphas (%)					
1 (Sold)	0.409	-0.017	0.426	2.98	-0.12	5.27
2	0.572	0.189	0.383	3.85	1.71	4.15
3	0.477	0.303	0.174	3.27	3.67	1.46
4	0.213	0.145	0.068	1.79	2.15	0.70
5 (Bought)	-0.160	0.075	-0.235	-1.50	0.79	-2.53
B-S (5-1)	-0.569	0.093	-0.662	-4.67	1.03	-5.02

Monthly Percentage Abnormal Returns for Portfolios formed from Five-by-Five Partition on Proportion Buyer-Initiated Trades based on Small Trades (columns) and Large Trades (Rows) Equally-Weighted Portfolios

Large Trade Proportion Buyer-Initiated Quintile	Four-Factor Alphas (%)							t-statistics						
	Small Trade Proportion Buyer-Initiated Quintile							Small Trade Proportion Buyer-Initiated Quintile						
	1 (Sold)	2	3	4	5 (Bought)	All Large Trades	Small Trade B-S (5-1)	1 (Sold)	2	3	4	5 (Bought)	All Large Trades	Small Trade B-S (5-1)
1 (Sold)	-0.151	0.254	0.070	-0.077	-0.281	-0.029	-0.130	-0.92	1.29	0.34	-0.37	-1.70	0.19	-0.74
2	0.259	0.165	0.366	0.223	-0.149	0.176	-0.408	1.66	1.14	2.11	1.48	-1.08	1.60	-2.44
3	0.369	0.338	0.538	0.229	-0.126	0.273	-0.495	2.45	2.74	3.94	1.87	-1.03	3.36	-2.70
4	0.222	0.444	0.103	0.122	-0.154	0.129	-0.376	1.78	3.55	0.88	1.13	-1.26	1.85	-2.57
5 (Bought)	0.212	0.409	0.229	-0.037	-0.413	0.059	-0.625	1.60	2.48	1.59	-0.27	-3.35	0.61	-3.92
All Small Trade	0.175	0.333	0.285	0.094	-0.261	n.a.	-0.435	1.52	2.76	2.37	0.96	-2.58	n.a.	-3.90
Large Trade B-S (5-1)	0.363	0.154	0.159	0.040	-0.132	0.088	n.a.	0.96	0.88	0.21	-0.82	0.98	0.37	n.a.

Value Weighted

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Monthly Percentage Abnormal Returns by Idiosyncratic Risk Partitions for Value-Weighted Portfolios formed on the basis of Annual Proportion Buyer-Initiated Trades using Small and Large Trades: 1984 to 2001

Proportion Buyer-Initiated Quintile	Four-Factor Alpha (%)			t-statistic		
	Small Trades	Large Trades	Diff.	Small Trades	Large Trades	Diff.
Panel A: High Idiosyncratic Risk						
1 (Sold)	0.511	-0.139	0.650	1.44	-0.59	1.60
2	0.477	-0.008	0.485	1.57	-0.03	1.64
3	-0.085	0.170	-0.254	-0.32	0.58	-0.93
4	-0.018	-0.047	0.029	-0.07	-0.15	0.14
5 (Bought)	-0.584	0.139	-0.723	-2.08	0.41	-2.05
B-S (5-1)	-1.095	0.278	-1.373	-2.64	0.74	-2.63
Panel B: Medium Idiosyncratic Risk						
1 (Sold)	0.560	0.125	0.435	2.57	0.37	1.66
2	0.049	0.188	-0.138	0.26	0.89	-0.54
3	0.356	0.583	-0.227	1.64	2.49	-0.97
4	0.068	0.153	-0.086	0.47	-0.02	-0.52
5 (Bought)	0.180	0.152	0.028	1.06	0.24	0.16
B-S (5-1)	-0.381	0.027	-0.407	-1.44	-0.22	-1.06
Panel C: Low Idiosyncratic Risk						
1 (Sold)	0.304	0.051	0.253	1.66	0.88	1.19
2	-0.025	0.126	-0.151	-0.21	1.11	-1.02
3	0.031	0.333	-0.303	0.24	3.57	-2.20
4	-0.028	-0.002	-0.026	-0.27	0.88	-0.24
5 (Bought)	0.014	0.020	-0.006	0.13	0.90	-0.06
B-S (5-1)	-0.291	-0.031	-0.260	-1.56	0.12	-1.18

Monthly Percentage Abnormal Returns by Small Trade Turnover for Value-Weighted Portfolios formed on the basis of Proportion Buyer-Initiated Trades using Small and Large Trades

Proportion Buy Quintile	Four-Factor Alpha (%)			t-statistic		
	Small Trades	Large Trades	Diff.	Small Trades	Large Trades	Diff.
High Small Trade Turnover						
1 (Sold)	1.197	0.130	1.067	3.45	0.44	3.09
2	0.895	0.192	0.703	3.01	0.86	2.56
3	0.147	0.595	-0.448	0.65	1.87	-1.52
4	0.649	0.657	-0.008	2.09	2.20	-0.03
5 (Bought)	0.075	0.323	-0.248	0.24	1.16	-0.76
B-S (5-1)	-1.123	0.193	-1.316	-2.58	0.62	-2.51
Mid Small Trade Turnover						
1 (Sold)	0.500	-0.082	0.581	3.24	-0.73	3.23
2	0.441	-0.004	0.446	2.91	-0.04	2.65
3	0.327	0.404	-0.077	1.91	2.50	-0.45
4	0.134	0.153	-0.019	0.93	1.00	-0.15
5 (Bought)	0.020	0.164	-0.144	0.13	1.01	-0.88
B-S (5-1)	-0.480	0.245	-0.725	-2.50	1.31	-2.87
Low Small Trade Turnover						
1 (Sold)	0.267	-0.040	0.307	1.83	-0.33	1.79
2	-0.149	0.258	-0.406	-1.45	1.68	-2.12
3	-0.049	0.388	-0.437	-0.42	3.06	-3.17
4	-0.118	-0.025	-0.092	-1.51	-0.36	-0.85
5 (Bought)	0.059	0.024	0.035	0.68	0.28	0.31
B-S (5-1)	-0.208	0.064	-0.272	-1.28	0.44	-1.25

**Monthly Percentage Four-Factor Abnormal Returns for Value-Weighted Portfolios
formed on the basis of **Weekly** Proportion Buyer-Initiated Trades using
Small and Large Trades: February 1983 to December 2000**

	Monthly Four-Factor Alpha (%)			t-statistic		
Panel A: Contemporaneous Returns						
Proportion Buyer-Initiated Quintile	Small Trades	Large Trades	Diff.	Small Trades	Large Trades	Diff.
1 (Sold)	-2.398	-7.398	5.000	-9.79	-38.96	28.26
2	-1.205	-5.718	4.513	-6.57	-29.36	27.03
3	-0.422	-1.091	0.668	-3.37	-11.73	4.46
4	0.413	4.111	-3.698	4.20	31.91	-25.73
5 (Bought)	1.786	8.062	-6.277	10.92	35.87	-27.95
B-S (5-1)	4.184	15.460	-11.277	11.99	39.37	-37.91
Panel B: Subsequent Returns						
Proportion Buyer-Initiated Quintile	Small Trades	Large Trades	Diff.	Small Trades	Large Trades	Diff.
1 (Sold)	-0.637	0.421	-1.057	-5.16	3.57	-6.34
2	-0.160	0.797	-0.958	-1.87	8.06	-7.35
3	0.161	0.276	-0.115	1.70	3.53	-0.88
4	0.427	-0.219	0.646	4.81	-2.79	5.61
5 (Bought)	0.733	-0.362	1.095	5.22	-3.96	7.37
B-S (5-1)	1.370	-0.782	2.152	6.55	-5.54	8.26

Cross-Sectional Regressions of Weekly Returns

Dependent Variable: Weekly Return

Independent Variables:

Trading Variable

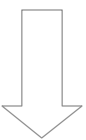
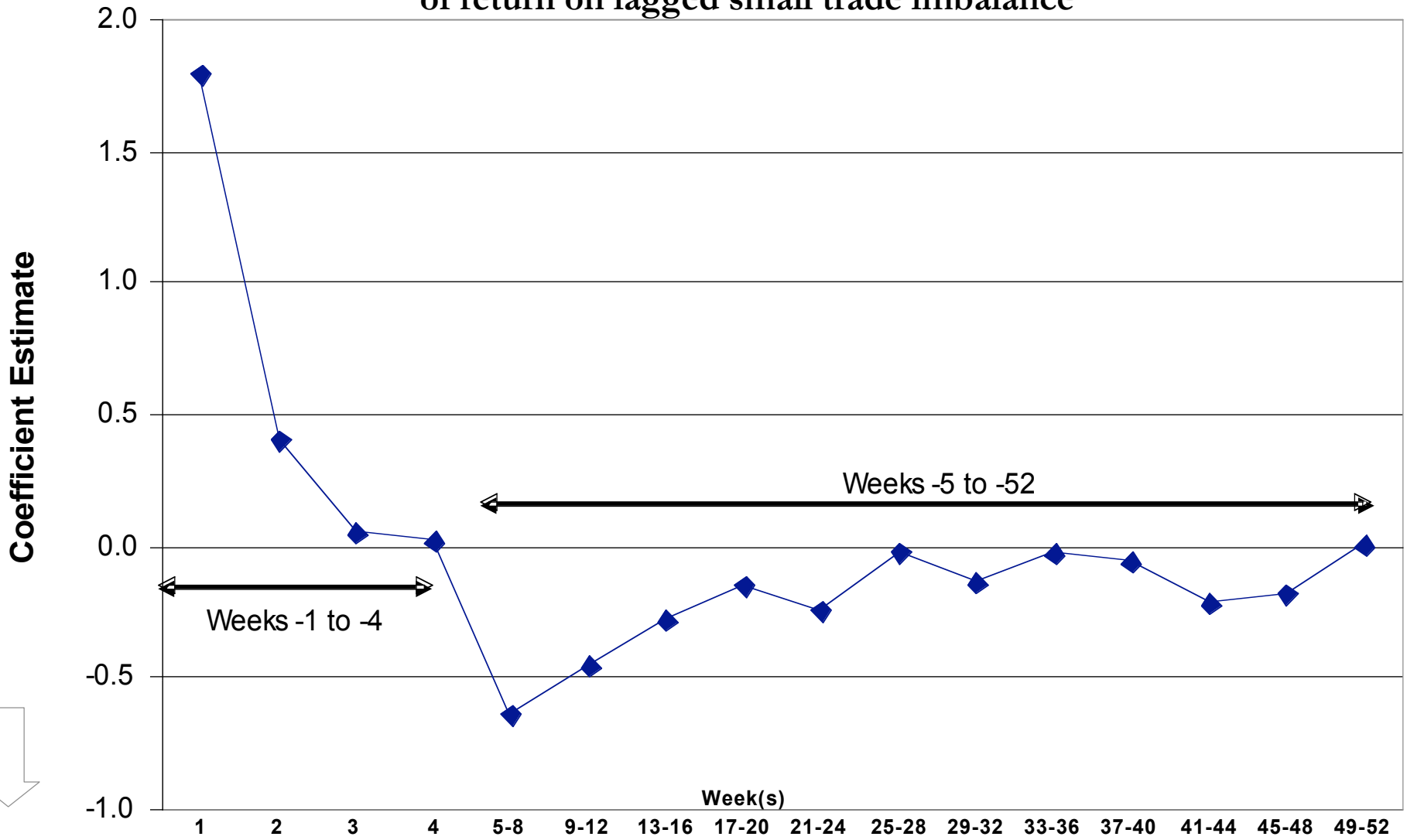
- Weekly Lags of Proportion Buys based on Small Trades (through one year)

Control Variables:

- Size
- Book-to-Market
- Four Lags of Weekly Returns (Short-term Reversals)
- Return from week $t-52$ to $t-5$ (Momentum)

Fama-MacBeth Regressions

Mean coefficient estimates from weekly cross-sectional regressions
of return on lagged small trade imbalance



	1	2	3	4	5-8	9-12	13-16	17-20	21-24	25-28	29-32	33-36	37-40	41-44	45-48	49-52
◆ Coef. Est.	1.799	0.406	0.052	0.018	-0.634	-0.457	-0.277	-0.146	-0.242	-0.018	-0.134	-0.030	-0.057	-0.217	-0.176	0.008
t-stat.	30.06	6.55	0.85	0.29	-6.47	-5.27	-3.16	-1.61	-2.72	-0.21	-1.51	-0.35	-0.67	-2.53	-2.12	0.10

Do Retail Trades Move Markets?

- Push prices in short-term...
 - Weekly Horizon
 - Stocks bought outperform stocks sold in subsequent week
- Leading to poor long-run returns
 - Annual Horizon
 - Stocks bought underperform stocks sold in subsequent year