Which shorts are informed?

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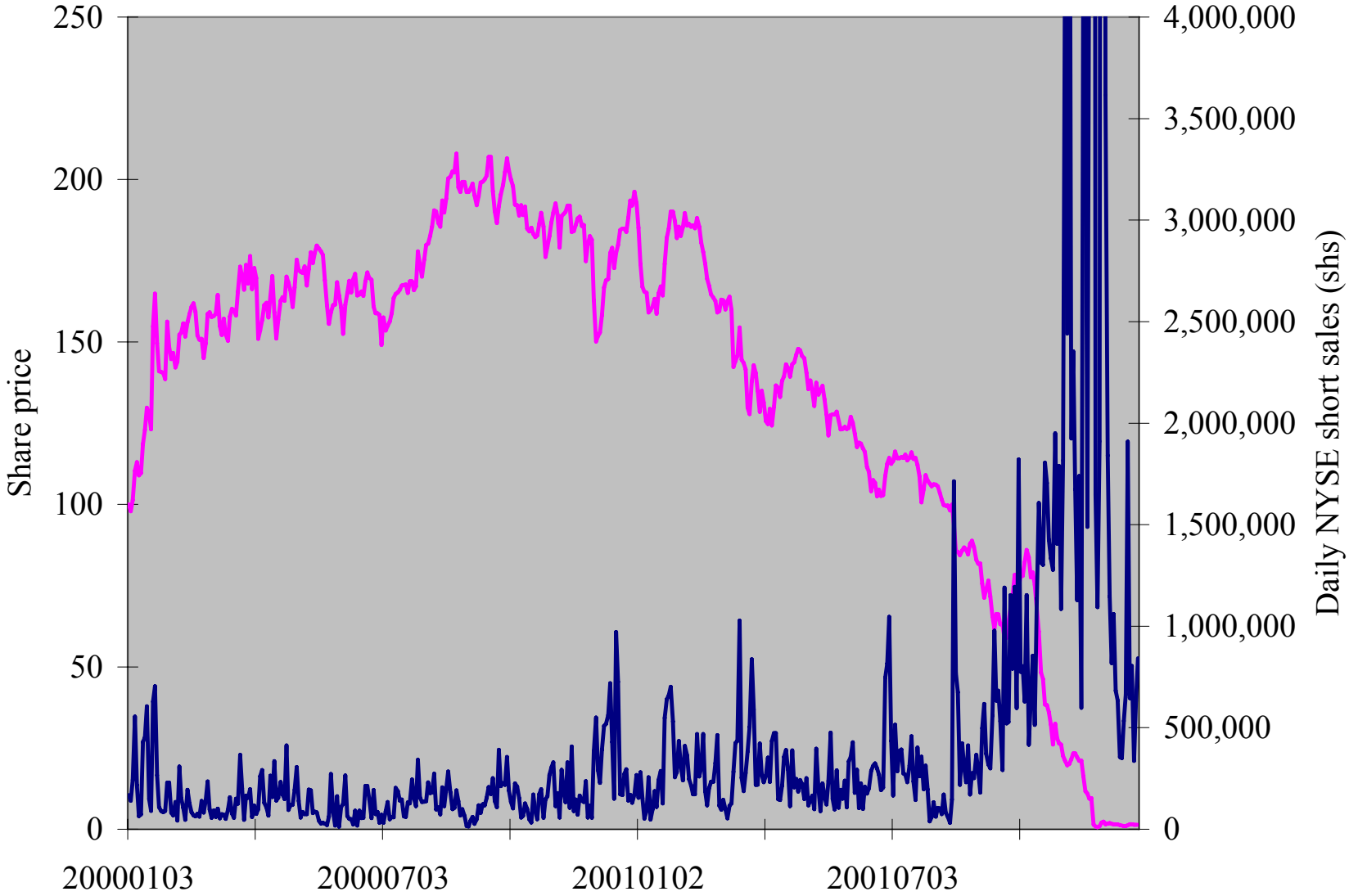
Enron


250
200
150
100
50
0
Share price
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Daily NYSE short sales (shs)
20000103
20000703
20010102
20010703

Motivation

Emerging consensus: if shorting is costly and agents disagree on value, stocks can get overvalued.

Selected theory:

- Diamond and Verrecchia (1987): no upward bias, but slow adjustment to negative news.
- E. Miller (1977), Harrison and Kreps (1978): when shorting is outlawed, only optimists hold stocks. Prices are above aggregated expectations.
- Duffie, Garleanu, and Pedersen (2002): investor heterogeneity plus costly search for shares to borrow → overpricing relative to frictionless case.

What makes shorting costly or hard?

He who sells what isn't his'n
Buys it back or goes to prison.
– 19th century Wall St. adage

- Charter or legal restrictions
- Share locate requirements
- Borrowing fees (low rebate rates)
- Uptick rule
- Recall or squeeze risk
- Mark-to-market risk

Empirical evidence

Uniform results: with impediments to shorting, stocks can become overvalued:

- 1990's tech spinoffs such as Palm/3-Com (Lamont and Thaler, 2003; Mitchell, Pulvino, and Stafford, 2002)
- Late 1990's IPOs (Geczy, Musto, and Reed, 2002)
- Stocks without listed options
  (Danielsen and Sorescu, 2001)
- Stocks whose options violate put-call parity
  (Ofek, Richardson, and Whitelaw, 2002)
- 1920's US stocks that were expensive to borrow
  (Jones and Lamont, 2002)
- 1930's changes in shorting rules (Jones, 2004)

How do we know shorts are bringing prices back into line?

Most of the existing evidence is indirect:

- Aitken et al. (1998): in Australia, some short sales were noted on the tape, and prices immediately fall after a short sale.
- Dechow et al. (2001): short sellers earn abnormal returns by targeting companies that are overpriced based on fundamental ratios such as P/E and market-to-book.
- Diether, Lee, and Werner (2006): shorts pounce after runups
- Jones and Lamont (2002): stocks where shorting becomes expensive underperform for the next few months

What we show

- Heavy short selling predicts relative underperformance at all horizons up to 3 months.
- Biggest effects for institutional trades, large trades.
- This indicates the presence of either:
  - private information
  - shorting constraints
  - or both
- But shorting is substantial even in the smallest NYSE stocks, which suggests that shorting constraints are not very onerous (at least for these firms).

The sample

- All non-exempt short sales in NYSE SOD.
  - January 2000 – April 2004.
  - All US-domiciled common stocks.

- Three daily shorting flow measures for each symbol:
  - Total number of short sale orders executed
  - Total number of shares shorted
  - Shares shorted / NYSE share volume in that stock

Account types

- Each order is identified by member firms for enforcement purposes
- We group short sales into six categories:
  - Individual
  - Institutional program trades
  - Institutional non-program trades
  - Member-firm proprietary program trades
  - Member-firm proprietary non-program trades
  - Other

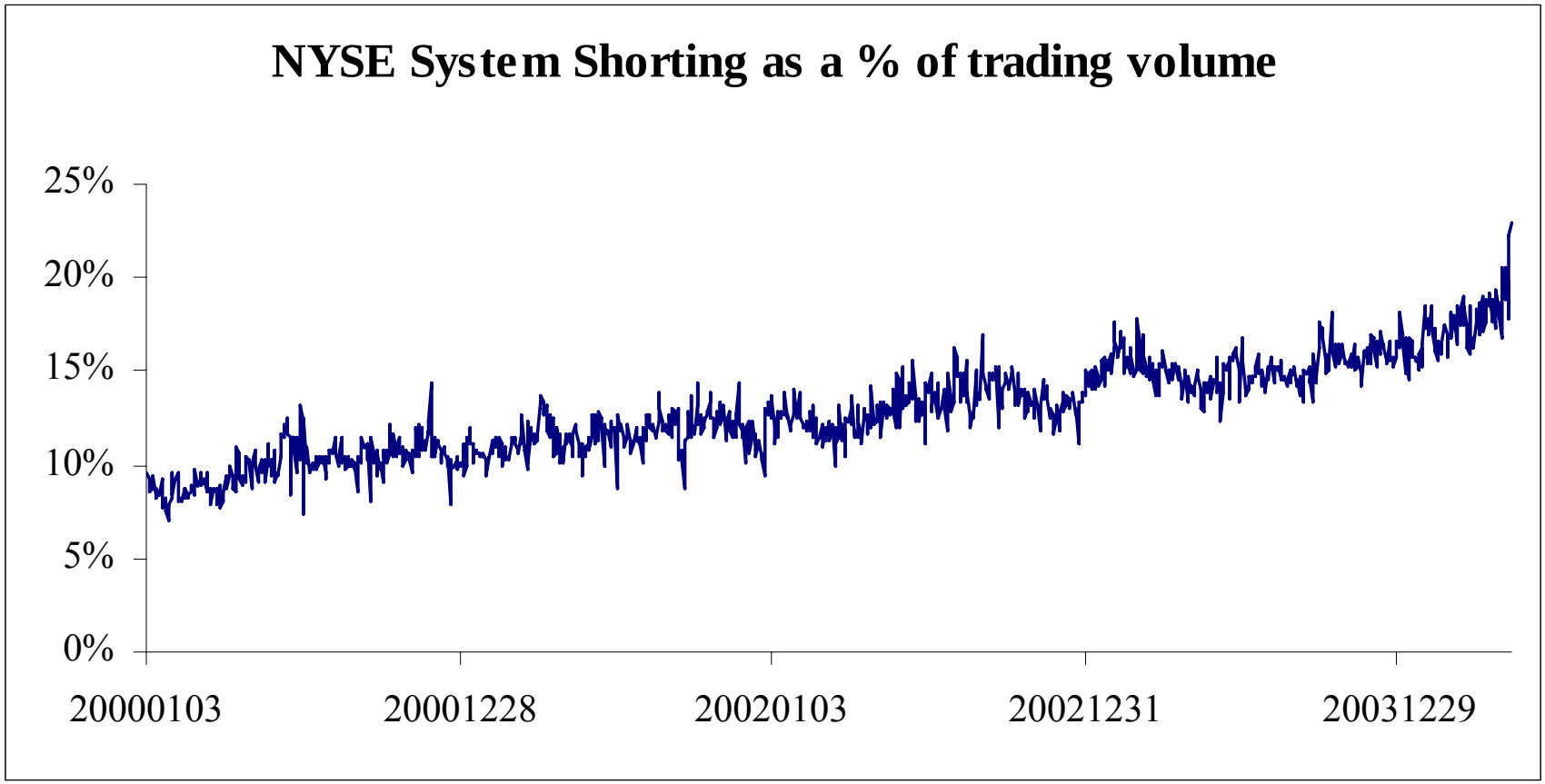
Stock vs. flow measures

- High frequency (daily) flow data vs. monthly stock of short interest.
- Can't reconstruct short interest at intermediate dates:
  - No data on short covering
  - No data on manual short sale executions on the floor.
  - No data on short sales away from the NYSE:
    - Regional exchanges
    - Upstairs market
    - Offshore
    - Synthetic short sales (e.g., total return swaps)

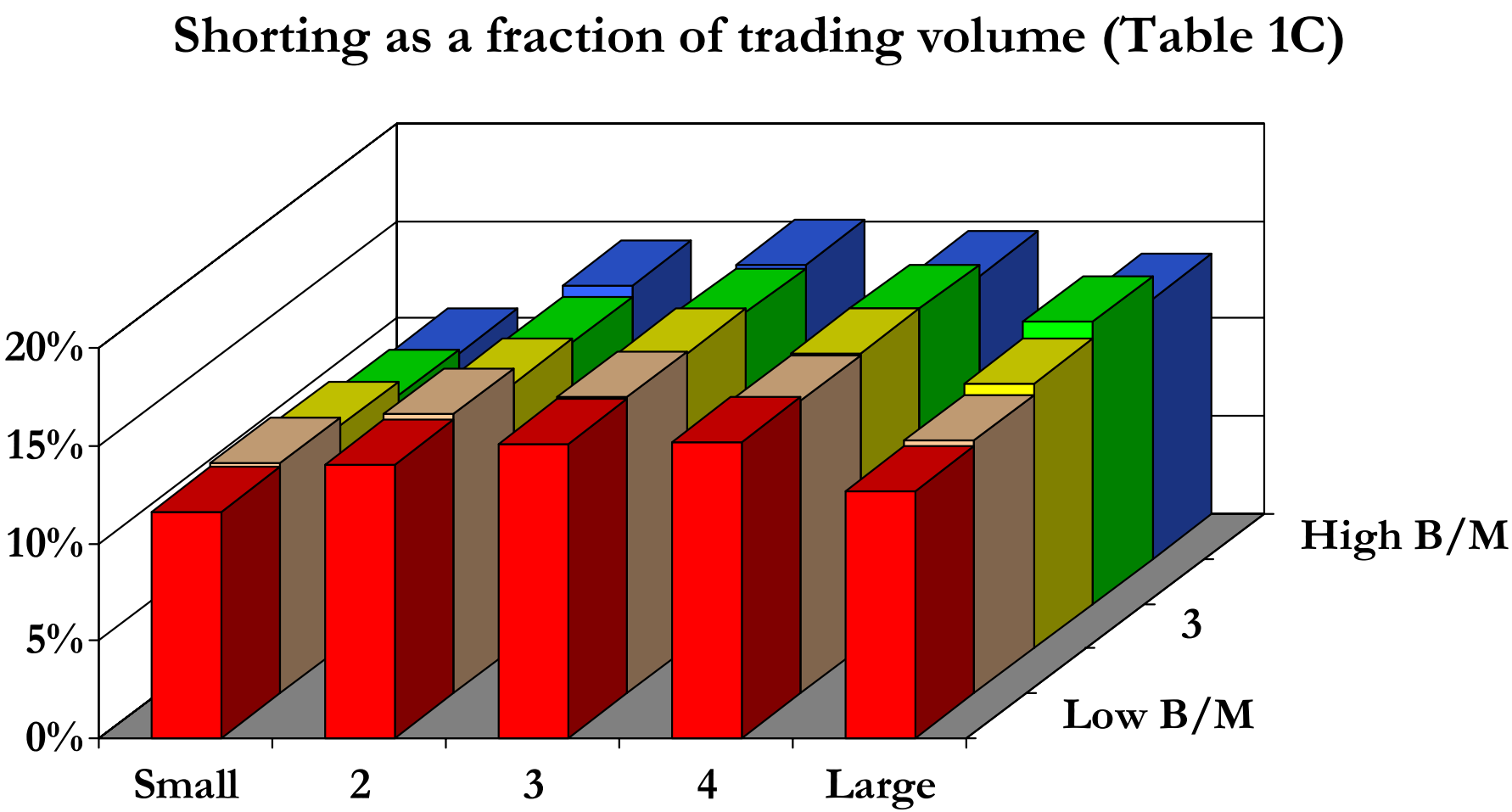
Shorting is fairly prevalent

Table 1 Panel A Daily statistics (per stock)	Executed Short Sale Orders	Shares Shorted	Shorting share of volume
Mean	146	99,747	12.86%
Cross-sectional σ	194	232,541	10.59%
25%	23	6,331	4.90%
50%	77	27,425	10.27%
75%	192	95,417	18.10%
Avg. # of stocks	1,239	1,239	1,239

…and increasing over time



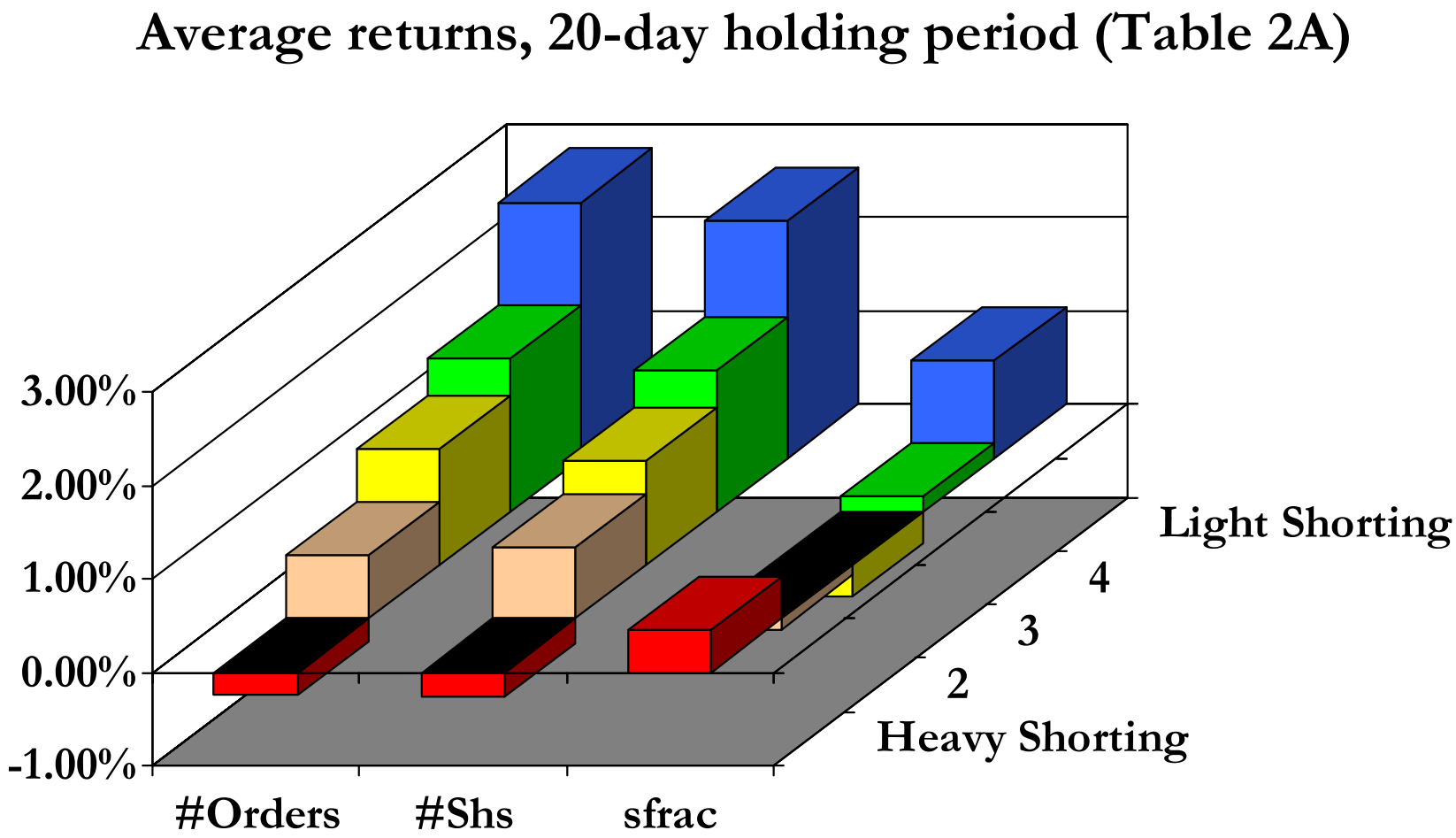
Shorting prevalence across stocks



Shorts are short-lived

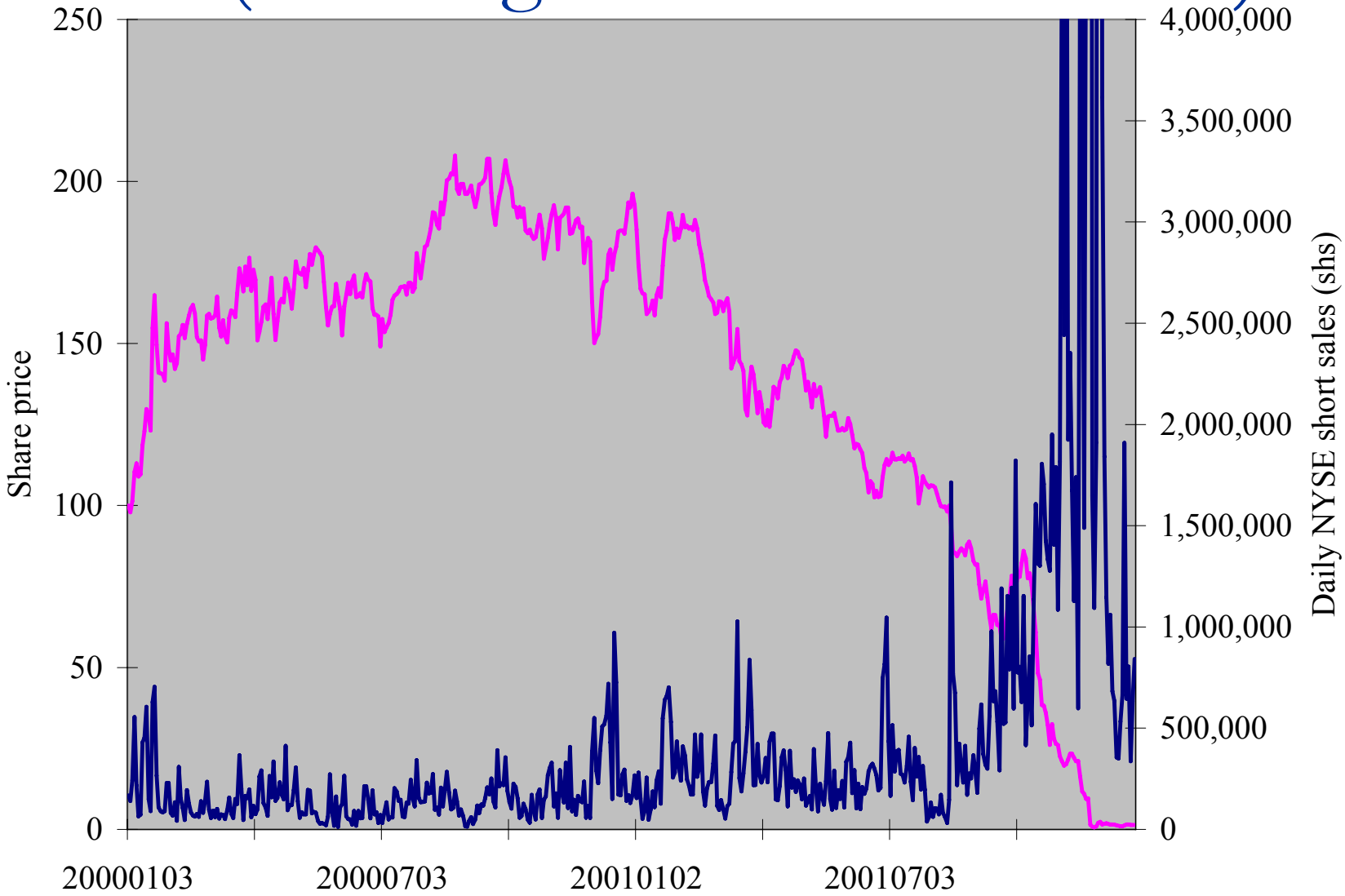
- Duration of short positions in 2004 (ignoring Jensen's inequality):
  - = Short interest / Shorting volume
  - = 7.6 billion shares / 51.2 billion shares
  - = 0.15 years (about 37 trading days)
- Duration of long positions
  - = Long interest / non-shorting volume
  - = (SHSOUT + SI) / non-shorting volume
  - = 1.20 years

Simple sorting on shorting

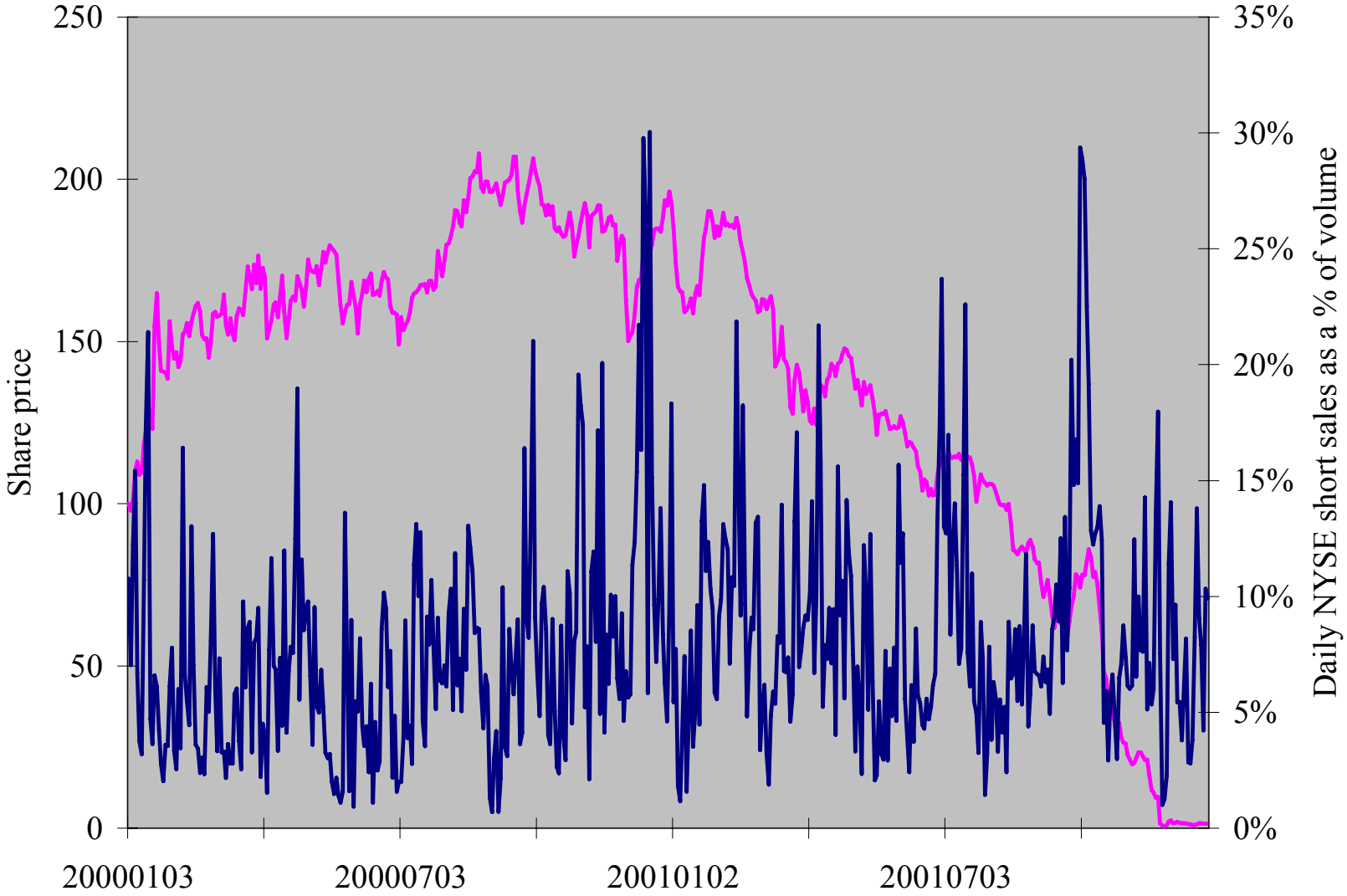


Shorting measures are calculated over a 5-day period

Enron (shorting measured in shares)



Enron (shorting as a % of volume)



Choices: sorting and returns (tbl 2A)

	daily short orders	daily shares shorted	shorting share of volume	daily turnover	daily ret. σ (ann'd.)	market cap. ($millions)	book/mkt	value-weighted return	pf5-pf1 (t-stat)	Fama French alpha	pf5-pf1 (t-stat)
Portfolios sorted by number of executed short sale orders											
1 (least)	4	10,069	9%	0.40%	34.7%	1149	0.82	2.74		2.02	
2	12	27,100	13%	0.50%	33.4%	1968	0.75	1.64		1.02	
3	22	56,583	15%	0.58%	32.7%	3629	0.71	1.25		0.73	
4	40	120,129	16%	0.62%	31.9%	7976	0.65	0.68	-2.99	0.32	-2.05
5 (most)	93	391,415	16%	0.64%	32.2%	33180	0.52	-0.25	-6.80	-0.03	-7.24
Portfolios sorted by number of shares shorted											
1 (least)	5	7,337	9%	0.37%	31.7%	1163	0.77	2.54		1.83	
2	13	22,697	13%	0.50%	32.6%	2006	0.73	1.51		0.91	
3	24	49,997	15%	0.58%	32.6%	3720	0.68	1.12		0.63	
4	41	109,811	16%	0.64%	32.8%	7764	0.66	0.77	-2.80	0.43	-1.87
5 (most)	89	415,449	16%	0.65%	35.3%	33245	0.60	-0.26	-6.26	-0.04	-6.51
Portfolios sorted by shorting's share of volume											
1 (least)	16	59,208	5%	0.50%	35.3%	10162	0.75	1.04		1.25	
2	29	110,100	9%	0.53%	33.3%	13091	0.67	0.16		0.30	
3	37	137,824	13%	0.55%	32.6%	11848	0.66	-0.34		-0.31	
4	43	147,462	17%	0.58%	32.2%	8417	0.67	-0.11	-0.58	-0.27	-1.25
5 (most)	46	152,020	25%	0.59%	32.2%	4539	0.69	0.46	-1.56	0.00	-3.67

Caveats

- Not implementable: these data are not public (though specialists and brokers may be able to see subsets of these data).
- Gross returns only
  - No commissions or other trading costs
  - No costs of borrowing shares or recall risk
  - Uptick rule ignored in taking short positions
- Should interpret these return differences as measures of private information.

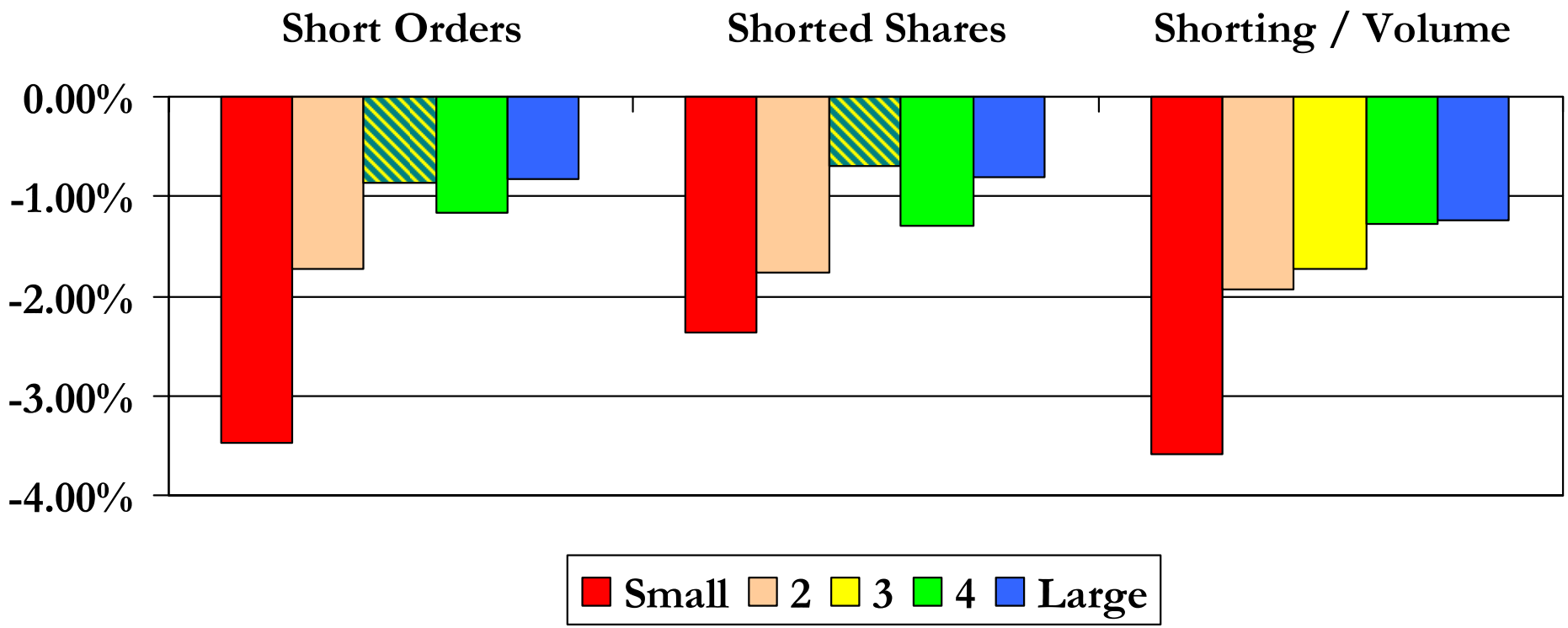
Double sorts

Two purposes:

- Confirming the shorting effect isn't co-linear with other regularities
  - Market cap
  - Book-to-market
  - Total volatility (Ang-Hodrick-Xing-Zhang, 2005)
  - Turnover
- Identify where shorts seem to have the most information

Double sort: market cap, shorting

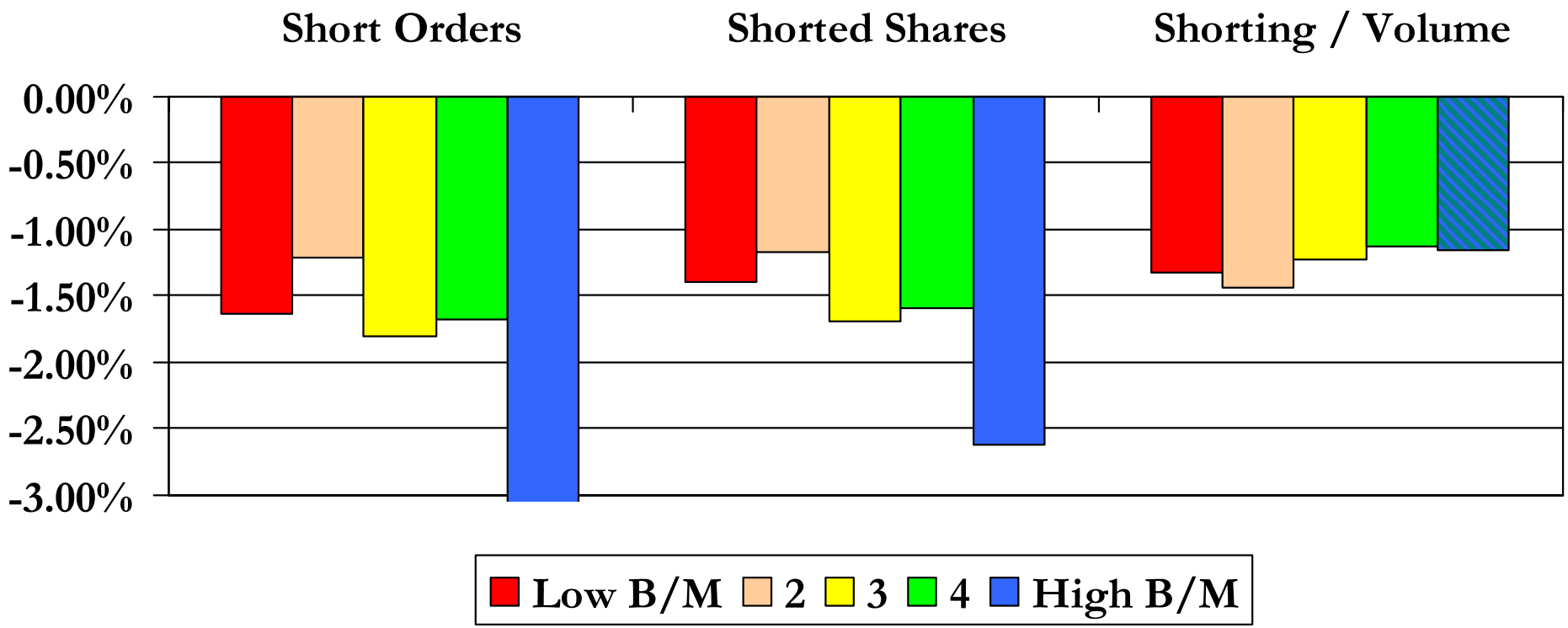
Shorting Pfl5 - Pfl1 FF alphas, 20-day holding period (Table 3A)



Shorting measures are calculated over a 5-day period

Double sort: book/mkt, shorting

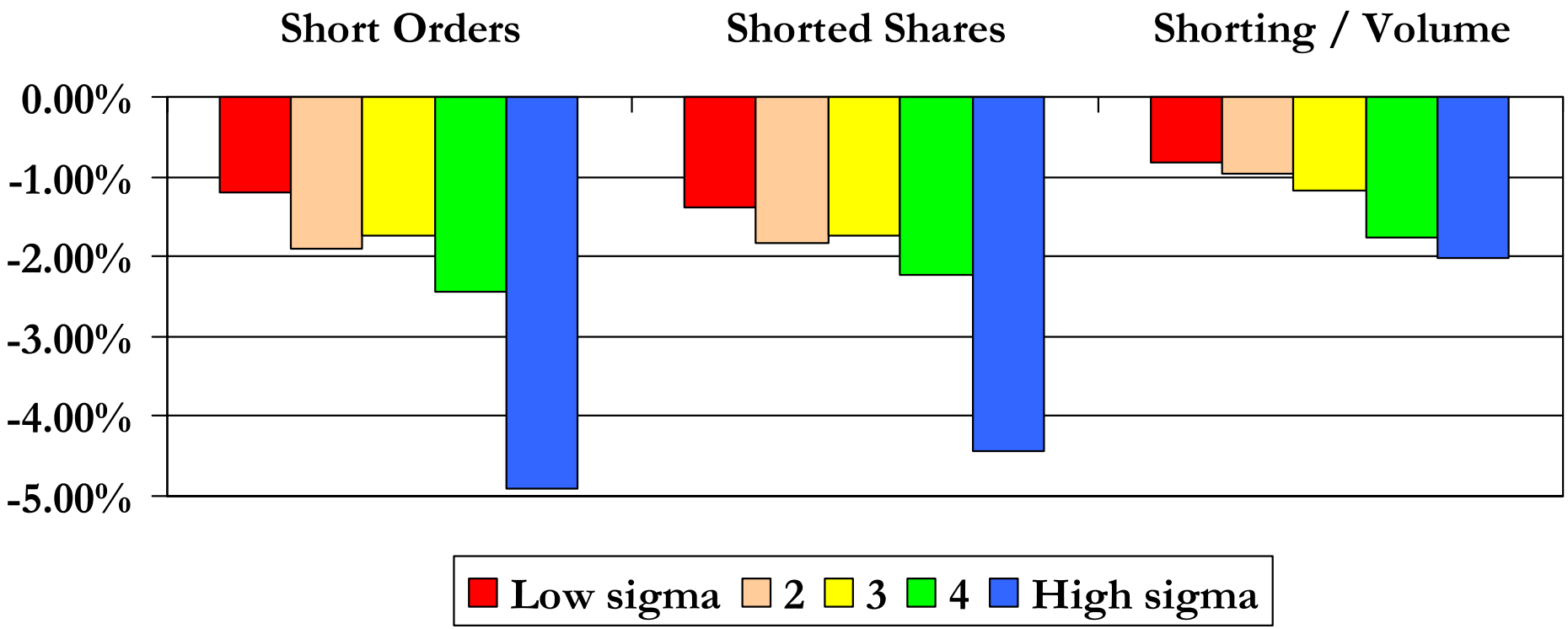
Shorting Pfl5 - Pfl1 FF alphas, 20-day holding period (Table 3B)



Shorting measures are calculated over a 5-day period

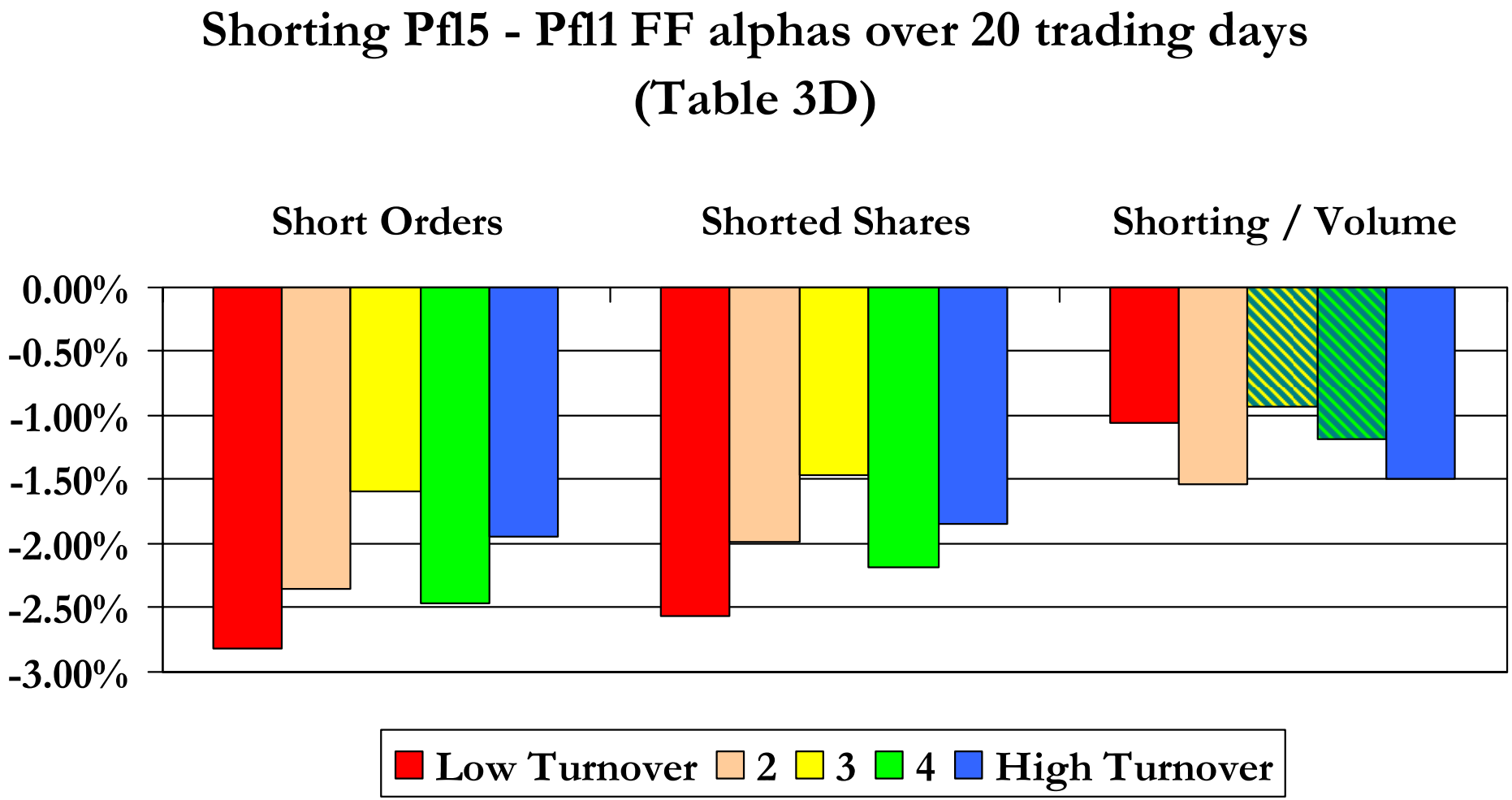
Double sort: volatility, shorting

Shorting Pfl5 - Pfl1 FF alphas over 20 trading days (Table 3C)



Shorting measures are calculated over a 5-day period

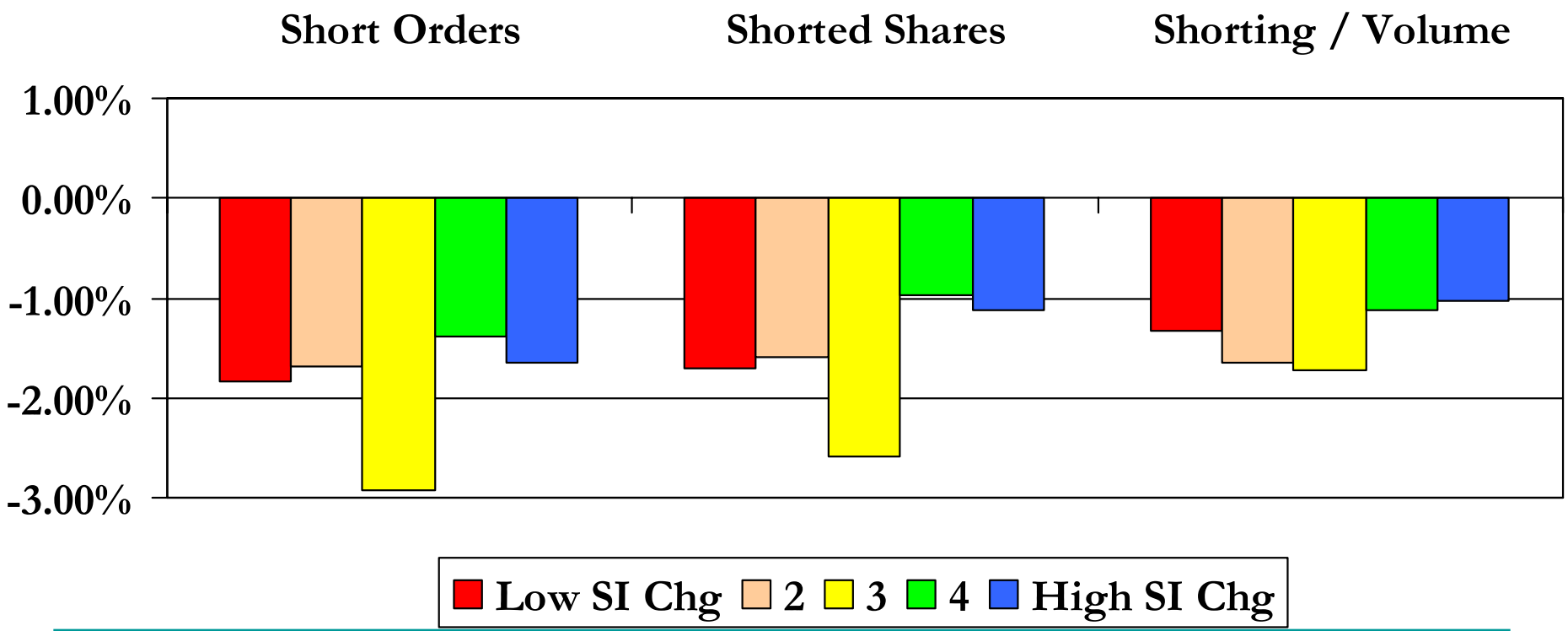
Double sort: turnover, shorting



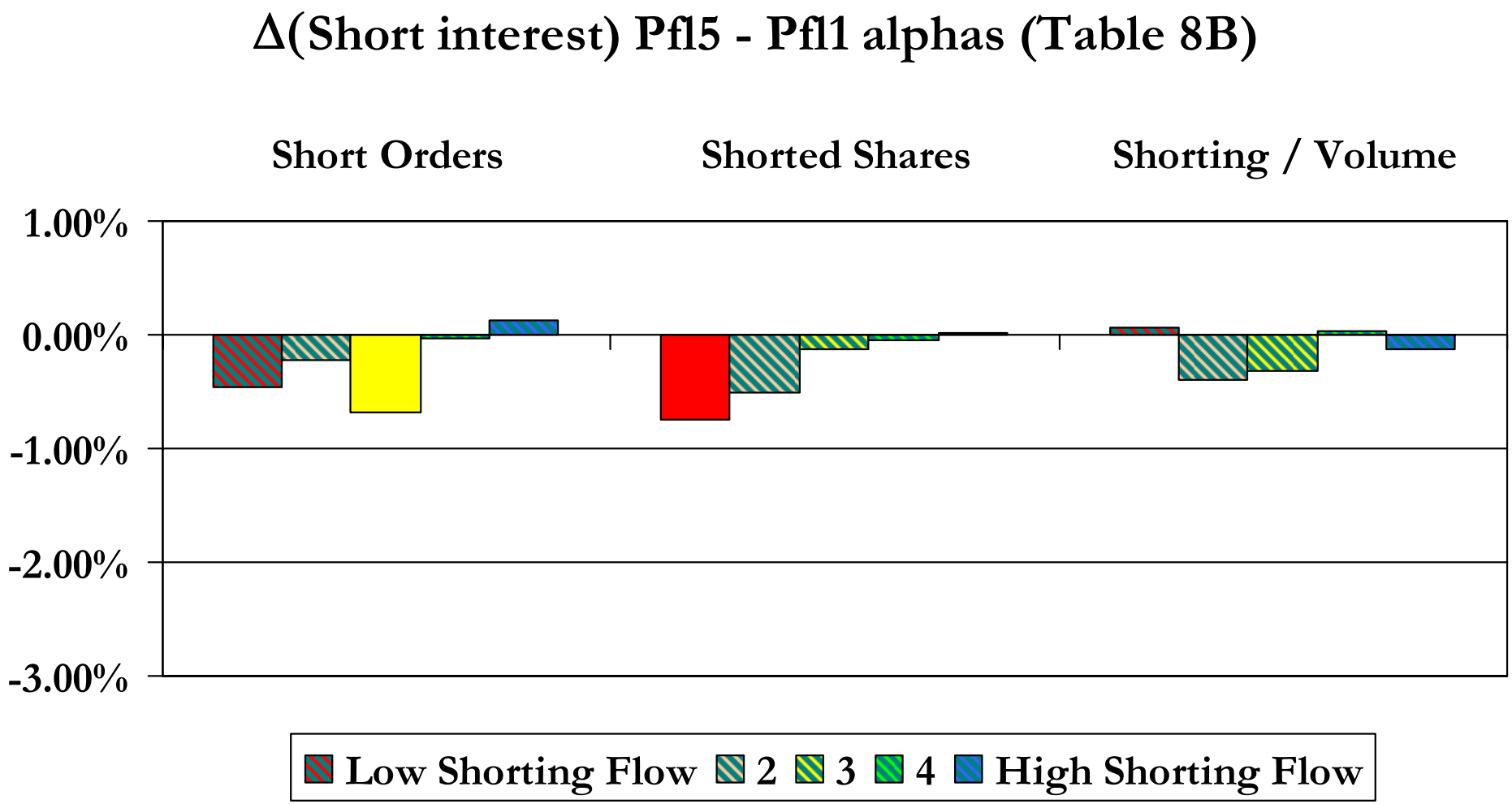
Shorting measures are calculated over a 5-day period

Changes in short interest do not drive out the flow information

Shorting flow Pfl5-Pfl1 alphas, 20-day holding period (Table 8A)



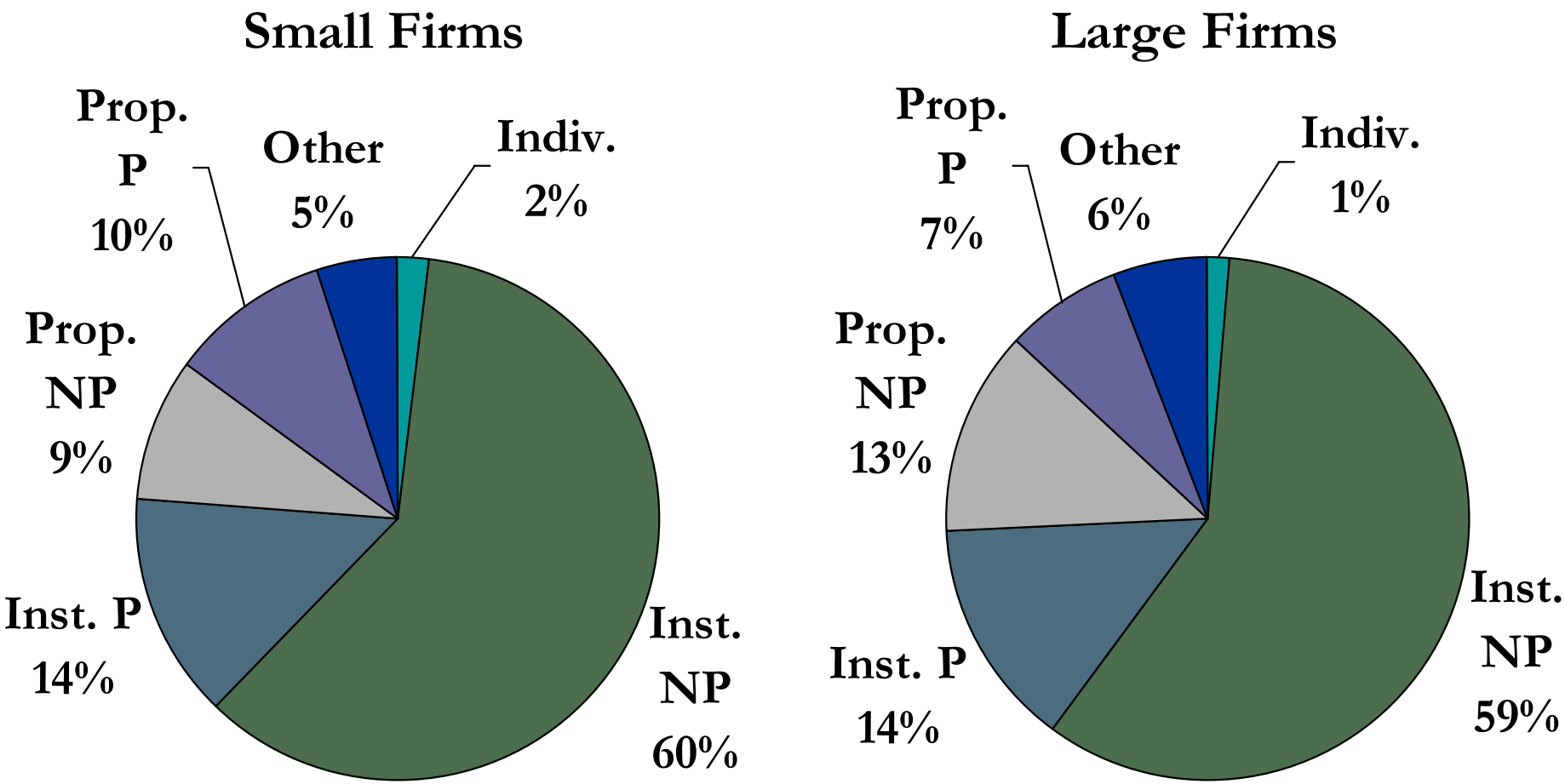
But shorting flow drives out S.I.



Fama-MacBeth regressions (Table 4)

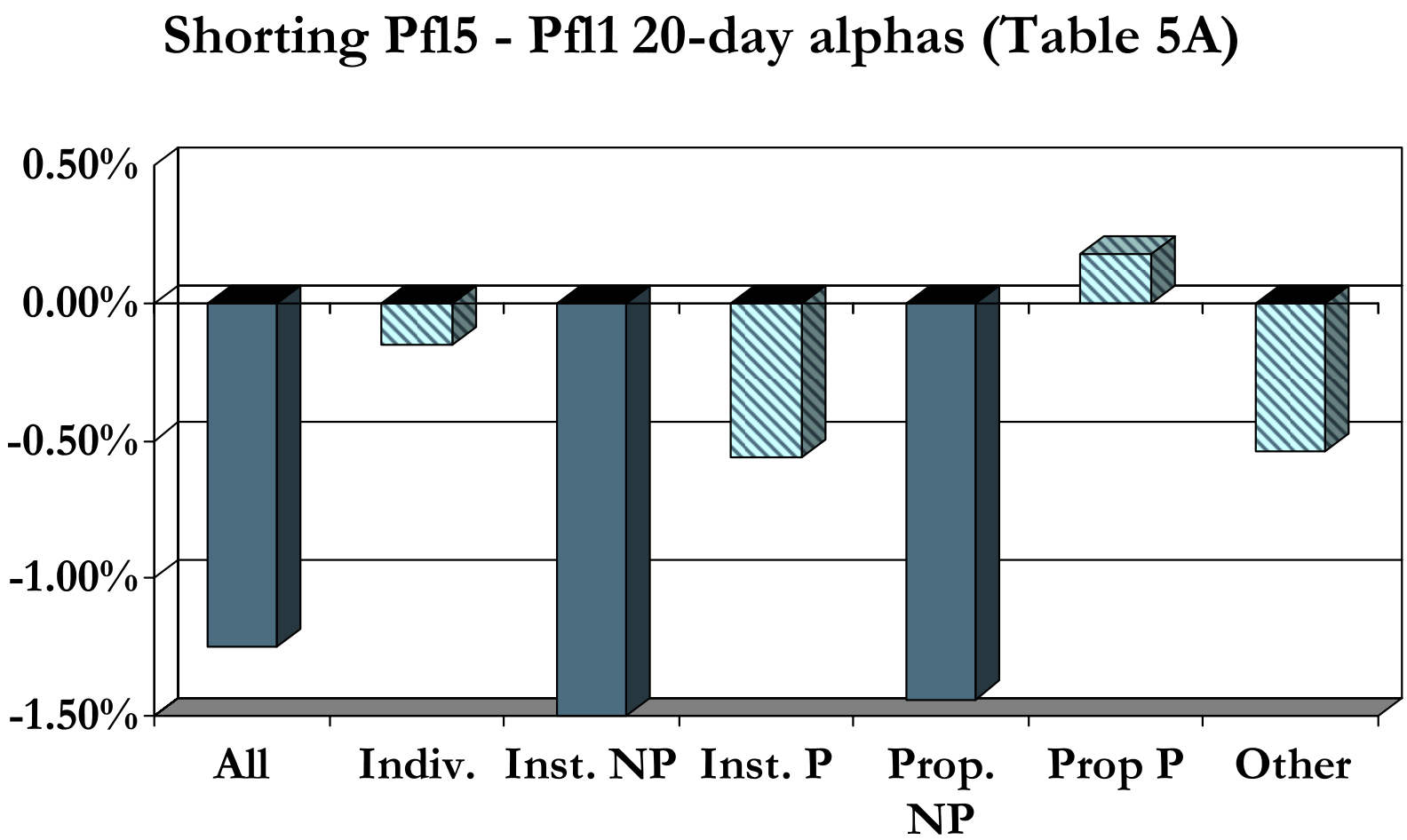
LHS Variable	Intercept	Shorting share	Log mktcap	Book to market	Return volatility	Previous month return	Turnover	Positive OIB	Negative OIB	adj R^2
Raw returns	1.38	-0.54								0.3%
	1.98	-8.67								
	10.83	-0.53	-0.66	0.41	1.85	-0.03	-1.11			7.5%
	6.68	-10.01	-6.93	3.27	1.73	-2.26	-3.21			
	10.40	-0.52	-0.64	0.41	1.81	-0.03	-1.07	0.68	-4.55	7.6%
	6.45	-8.70	-6.77	3.30	1.68	-2.26	-3.12	1.20	-4.12	
Fama-French alphas	0.56	-0.53								0.3%
	5.10	-10.21								
	5.79	-0.50	-0.37	0.15	1.64	-0.02	-0.89			3.7%
	5.88	-11.04	-6.71	1.86	1.96	-1.78	-3.14			
	5.41	-0.49	-0.35	0.16	1.59	-0.02	-0.86	0.76	-4.67	3.8%
	5.35	-9.67	-6.35	1.90	1.91	-1.78	-3.04	1.50	-3.79	

Shorting prevalence by account type



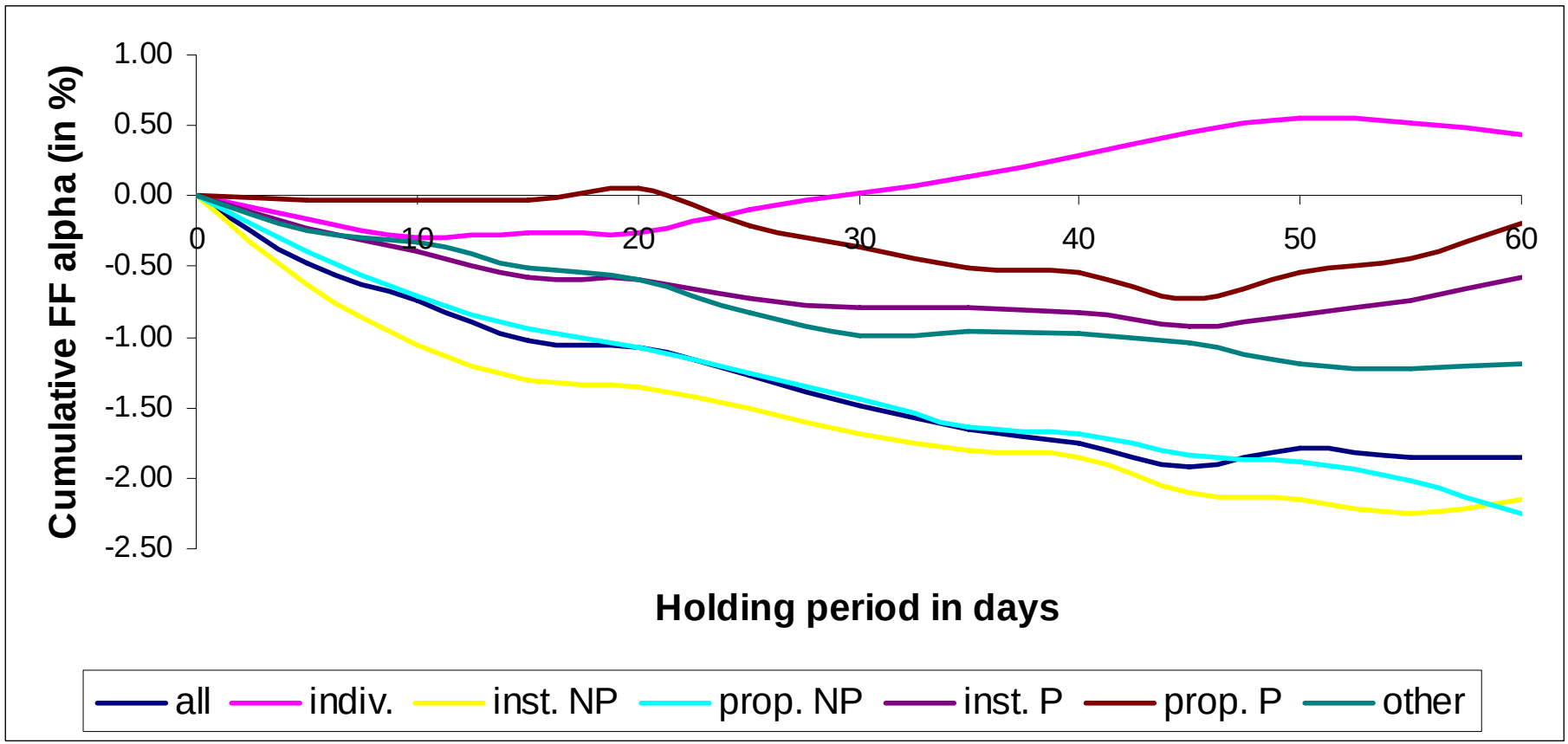
Fraction of total shorting volume (measured in shares) from Table 1D

Which shorts are informed?



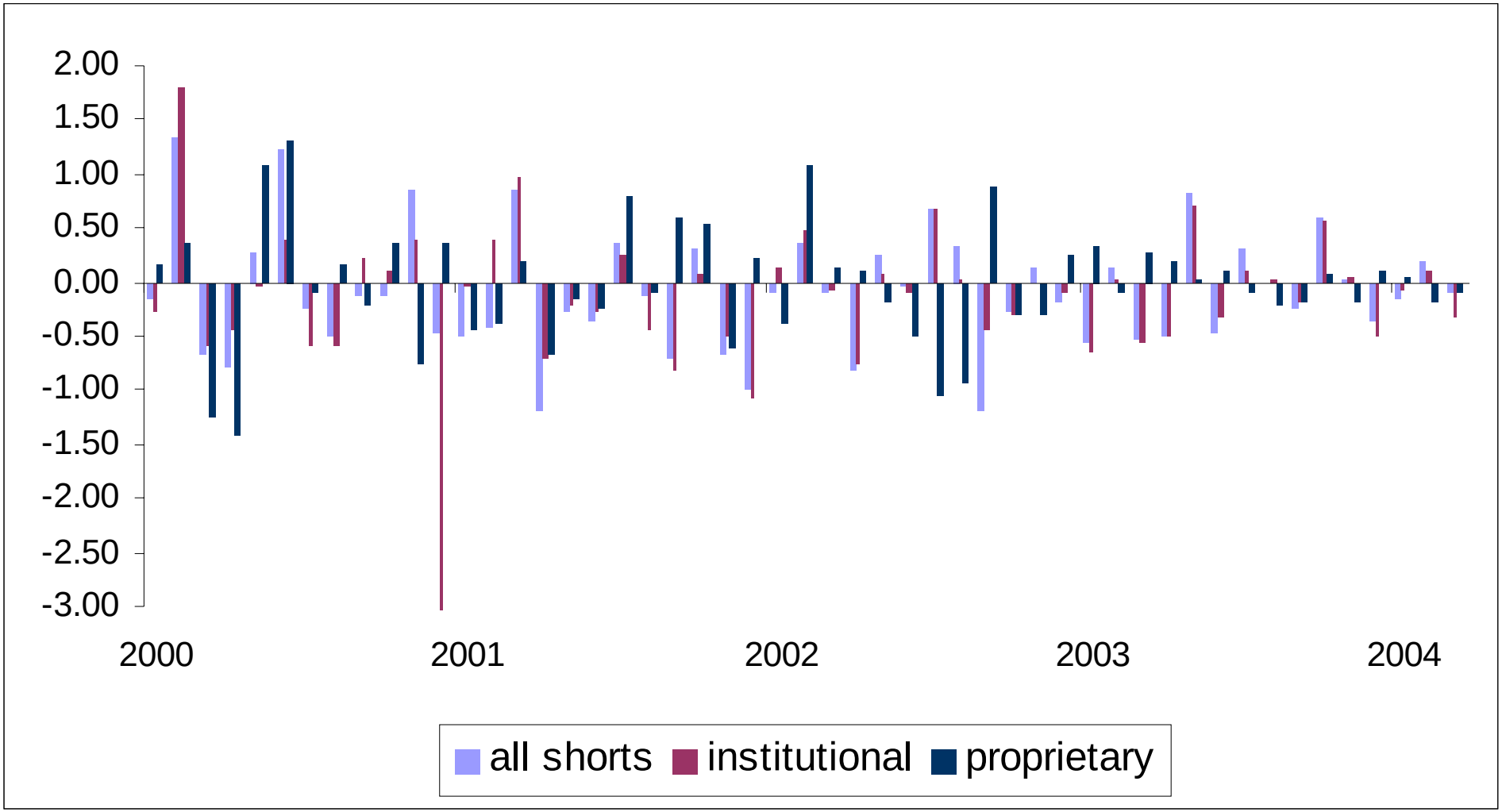
Sorting variable is shorting as a fraction of trading volume, past 5 days

Cumulative underperformance, heavily vs. lightly shorted stocks



Sorting variable is shorting as a fraction of overall trading volume, past 5 days

Monthly heavy short underperformance



20-day holding period, monthly Pfl5 – Pfl1 Fama-French alphas in percent

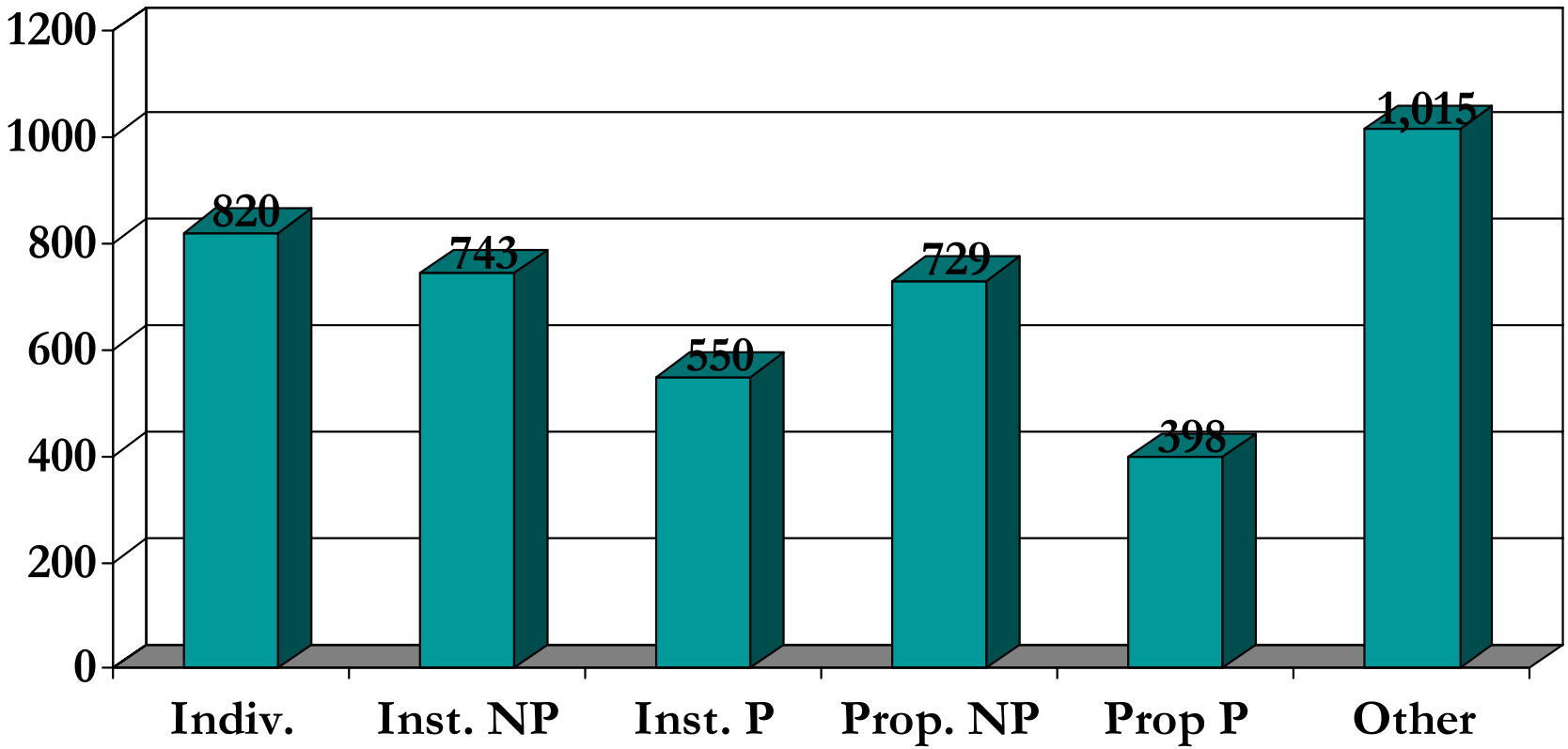
Regressions by account type (Table 6)

	Short selling during the previous week by								
Intercept	Individual	Institution Non-Prog	Proprietary Non-Prog	Institution Program	Prop Program	Other	Positive OIB	Negative OIB	adj R^2
5.16	-0.03						-1.79	-5.56	3.7%
5.11	-0.65						-3.96	-4.54	
4.99		-0.44					0.29	-5.07	3.8%
4.85		-9.18					0.61	-4.11	
5.06			-0.12				-1.49	-5.49	3.7%
5.00			-2.49				-3.23	-4.51	
5.52				-0.23			-1.32	-5.15	3.8%
5.56				-4.37			-2.67	-4.28	
5.54					-0.19		-1.36	-5.31	3.8%
5.30					-3.52		-2.96	-4.33	
5.11						-0.12	-1.63	-5.44	3.7%
5.10						-2.57	-3.52	-4.46	
5.42	0.00	-0.39	-0.06	-0.15	-0.10	-0.05	0.83	-4.62	4.2%
5.21	0.00	-7.90	-1.25	-2.76	-1.87	-1.06	1.69	-3.78	

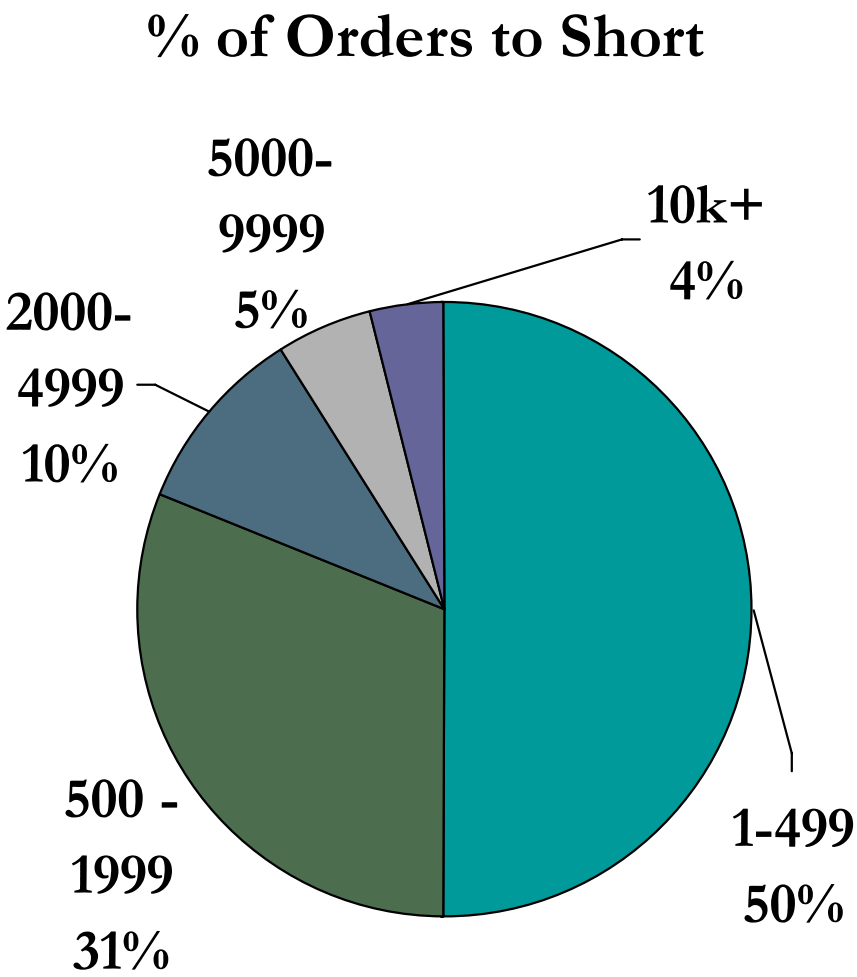
Coefficients and t-stats on Fama-MacBeth regressions. Dependent variable is the return over the next 20 trading days. See Table for other controls.

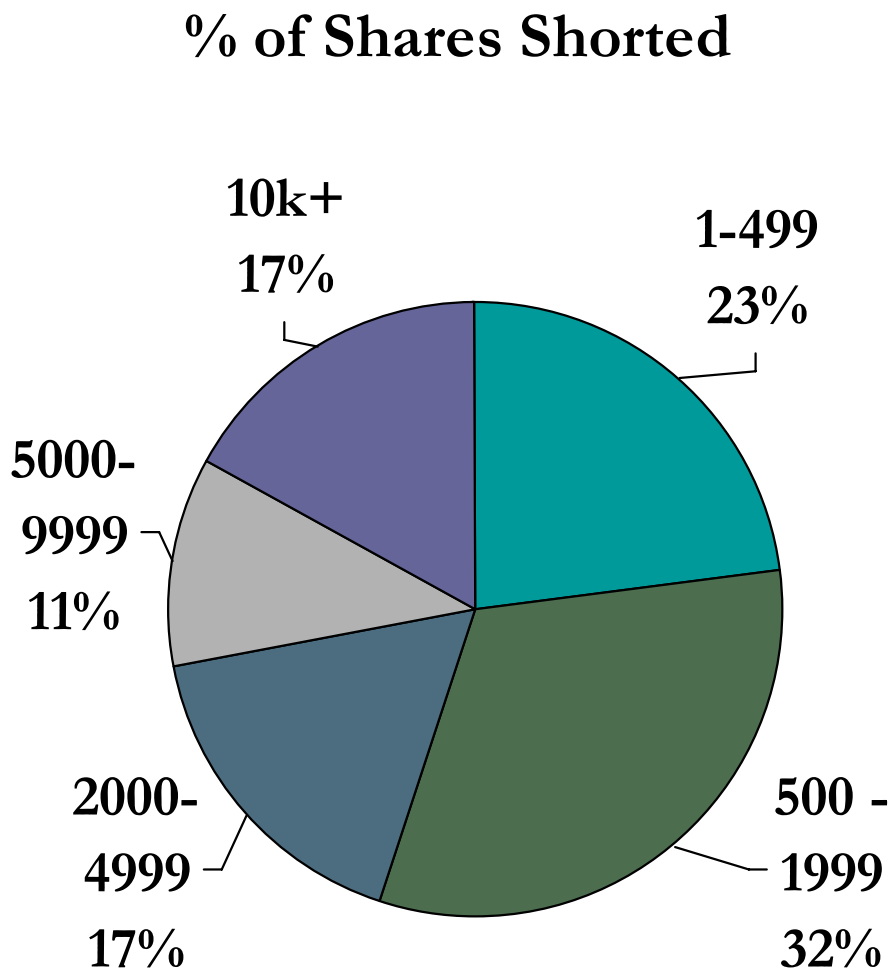
Mean short sale order size in shares

(Table 1E)



Order size prevalence

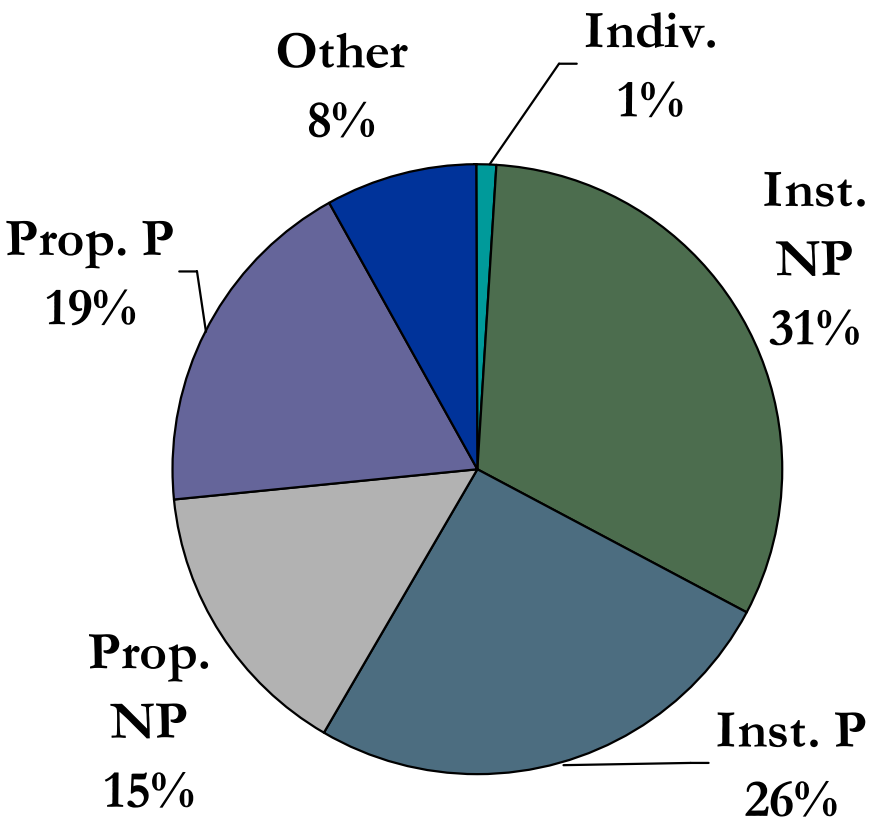




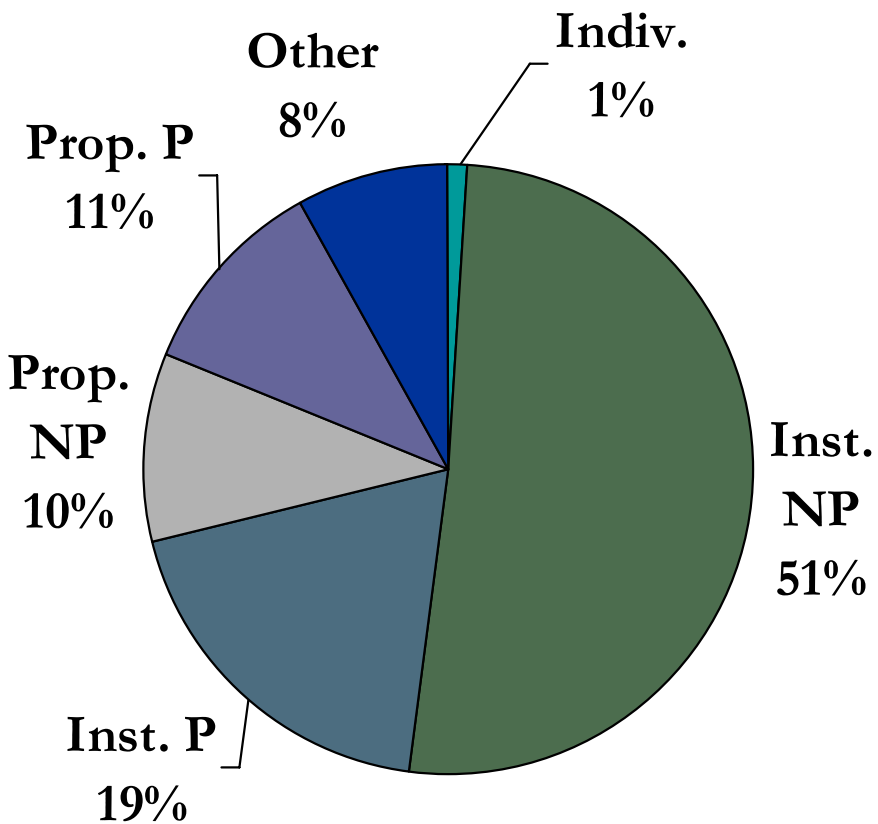
Order size ranges in shares

Small short account types

Order size < 500 shares

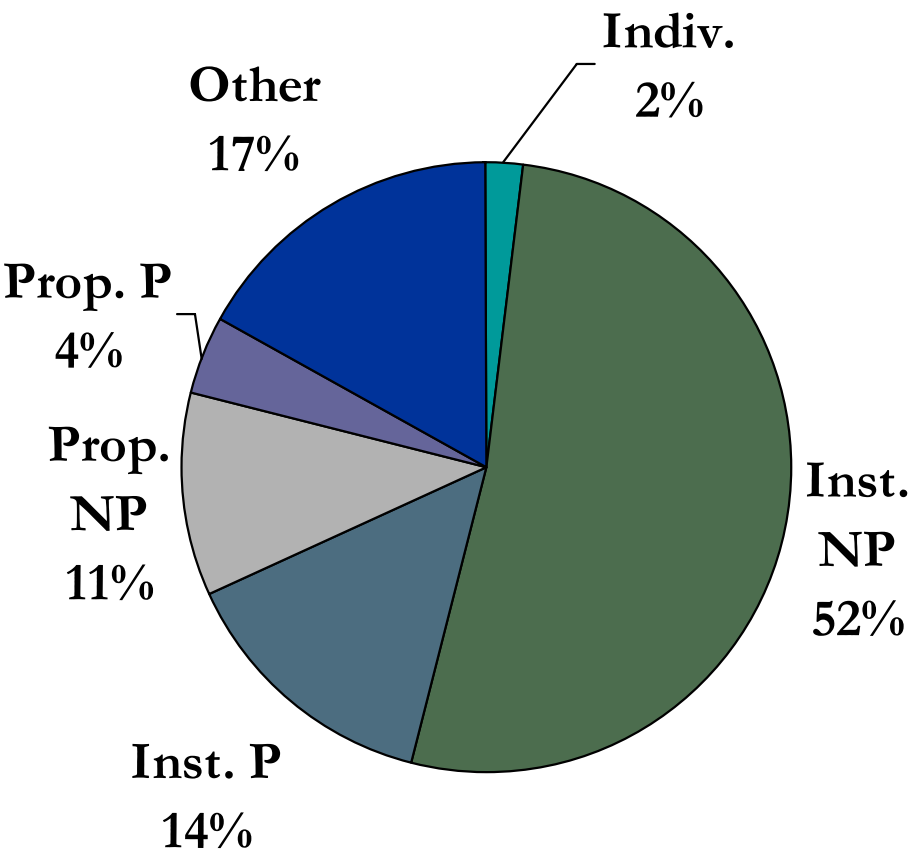


Order size 500 - 1,999 shs

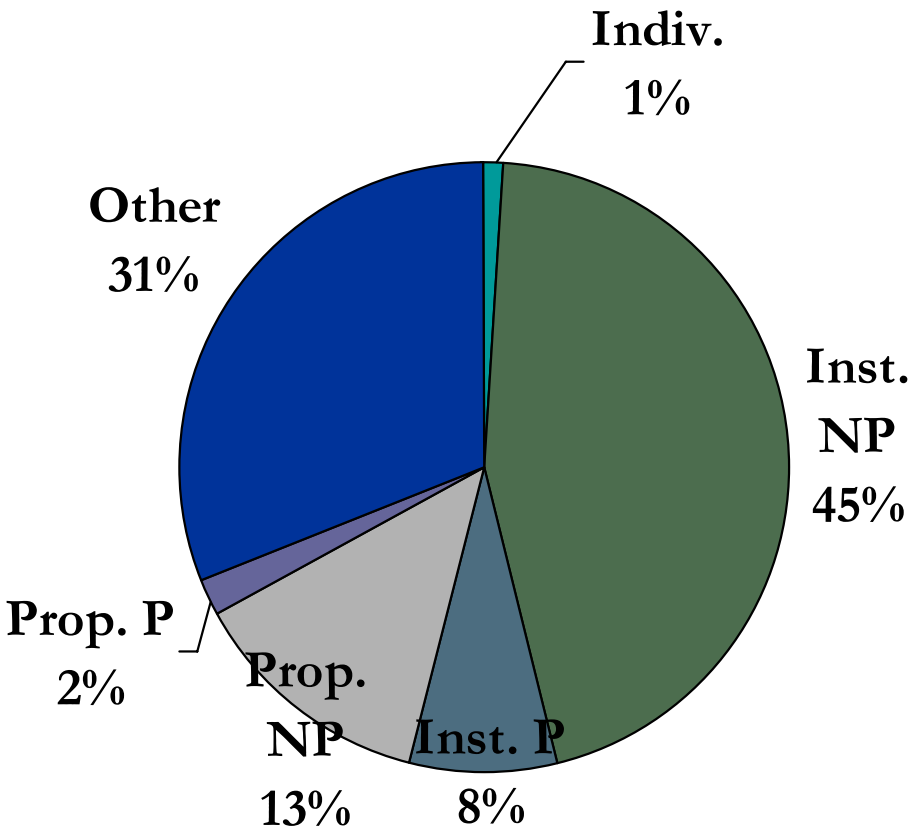


Large short account types

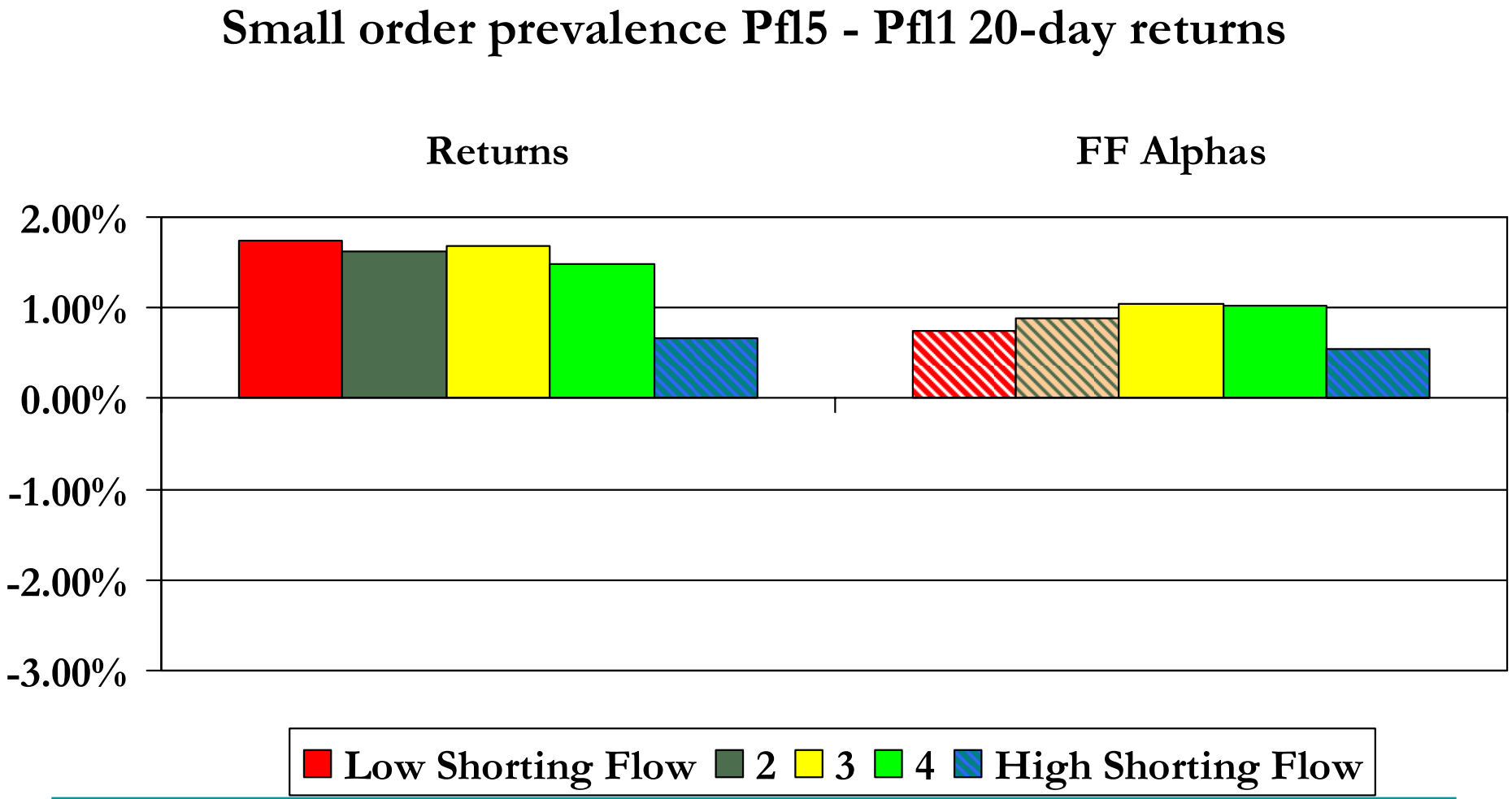
Order size 5,000-9,999 shs



Order size 10,000+ shares

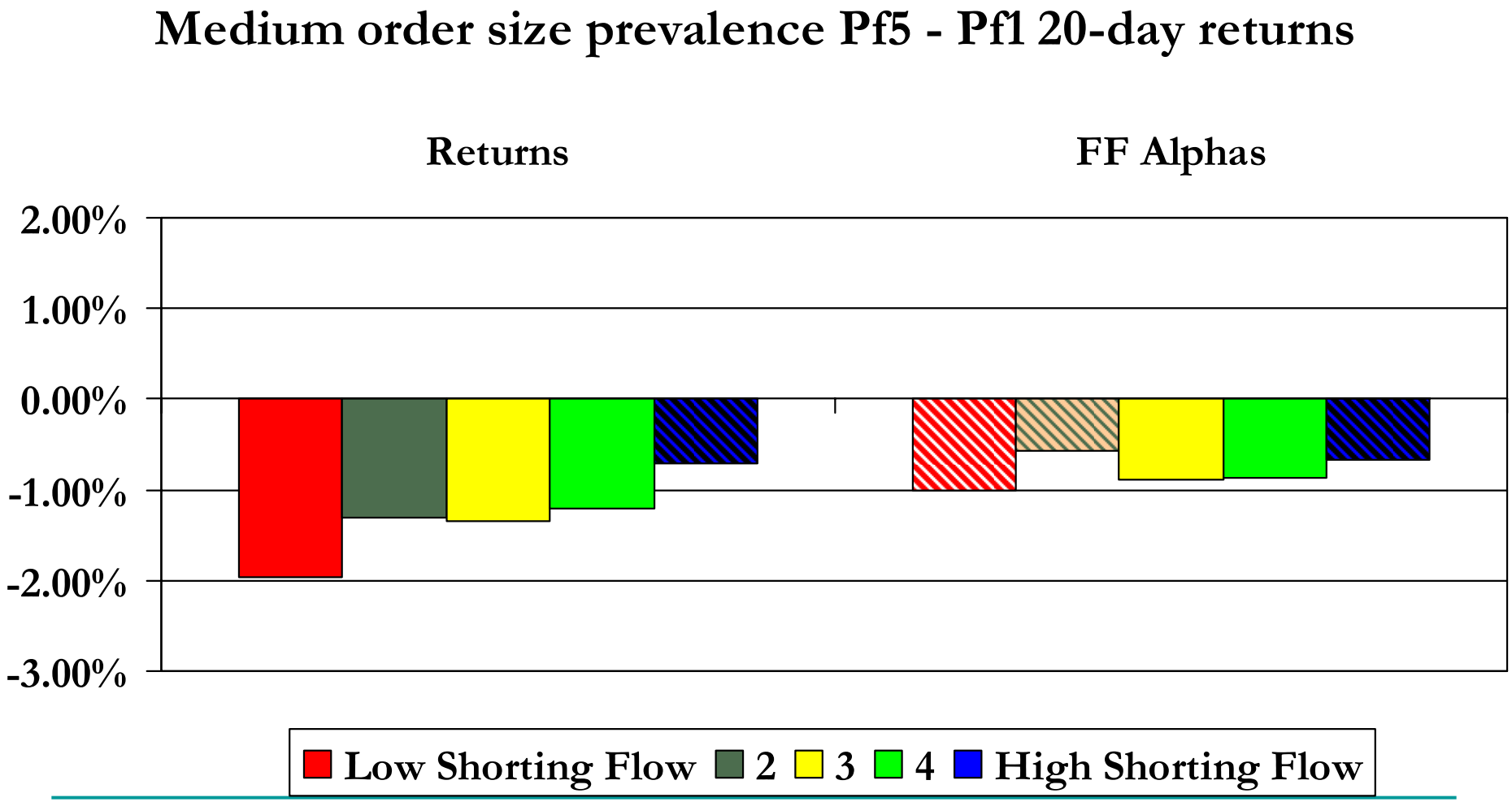


Double sort: shorting, then order size prevalence (Table 7)



Small order prevalence: short orders of less than 500 shares / total short orders

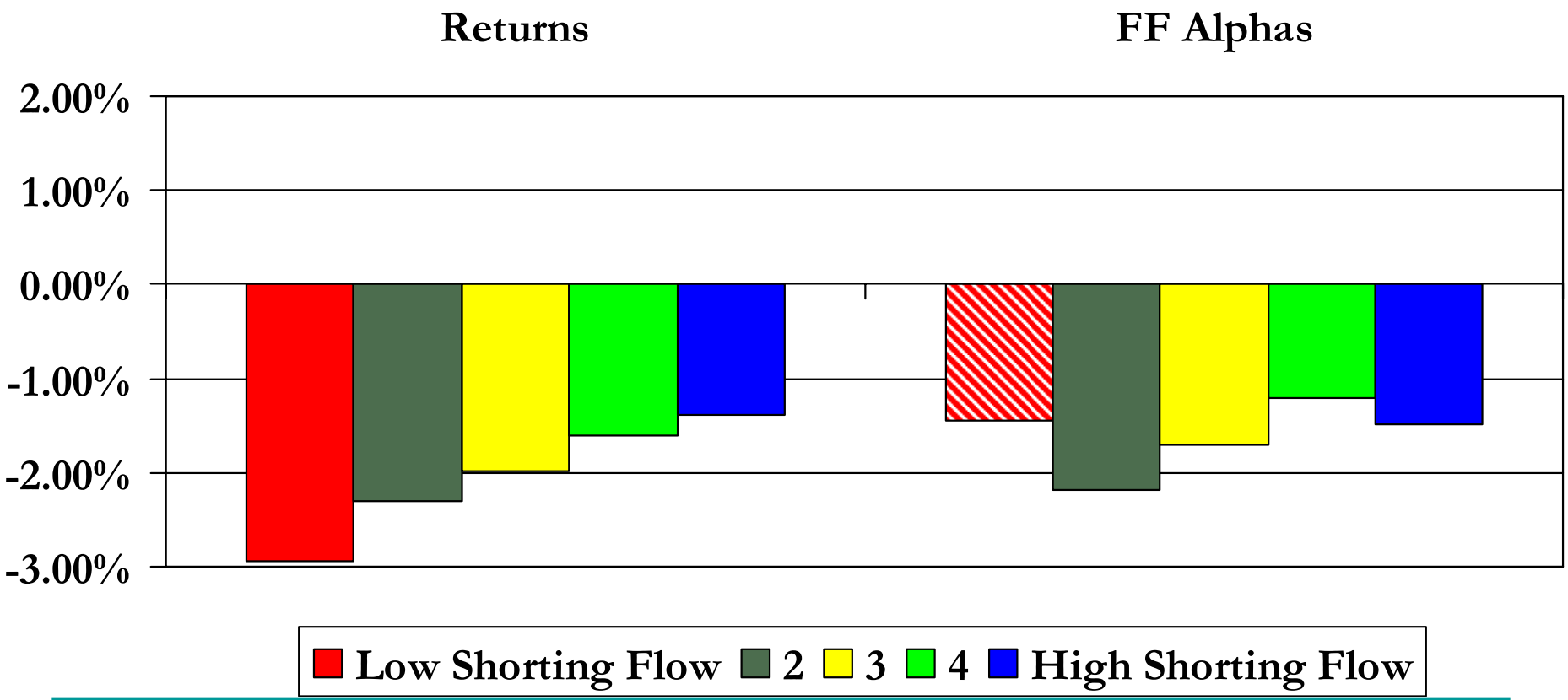
Double sort: shorting, then order size prevalence (Table 7)



Medium order size prevalence: short orders of 2,000-4,999 shares / total short orders

Double sort: shorting, then order size prevalence (Table 7)

Large order prevalence Pfl5 - Pfl1 20-day returns



Large order size prevalence: short orders of 5,000+ shares / total short orders

Summary of results

- First high-frequency look at a long panel of shorting flow.
- Shorting accounts for at least 13% of NYSE volume and is increasing over time.
- On average, shorting is similarly prevalent in even the smallest growth and value stocks.
- Heavy short sales predict underperformance of 1.25% over the next 20 trading days (16% per yr). This number gets bigger:
  - for small firms
  - for more volatile firms
  - by sorting instead on number of short orders

Summary of results II

- The most informed are the non-program institutional shorts (1.54% per month, over 20% per year).
- Individual short sellers are on average uninformed.
- Small short sales (< 500 shares) are on avg. uninformed; all else equal, heavy shorting of this variety predicts a price *rise* next month.
- The largest short sales (≥ 5,000 shares) are the most informed.
- Doesn't match the stealth trading evidence.

The big question for future work

What do shorts know?

- If it's fundamentals, we should expect a negative information release after heavy shorting.
  - Negative earnings surprise
  - Analyst downgrade
  - Earnings restatement
- If they're trading existing anomalies, we should see commensurate patterns:
  - PEAD: heavy shorting after negative earnings shock
  - Momentum: heavy shorting after price decline
- If they know about future order flow, shorting should predict that order flow.
  - Our work in progress: no such evidence
- If shorts are manipulating prices, prices should eventually reverse.
  - Not present in these data, at least out to three months.

Conclusions

- Short sellers are earning their exalted place in the pantheon of investors by identifying relative mispricings.
- Easing shorting constraints might be a good idea, but not particularly relevant for NYSE stocks.
- Short sale order flow information appears to be quite valuable.