Do short sale transactions precede bad news events?

Scott Richardson

Based on work with Holger Daske and İrem Tuna.

Overview

Brief discussion of facts related to short selling in US markets.

Quick summary of some prior work.

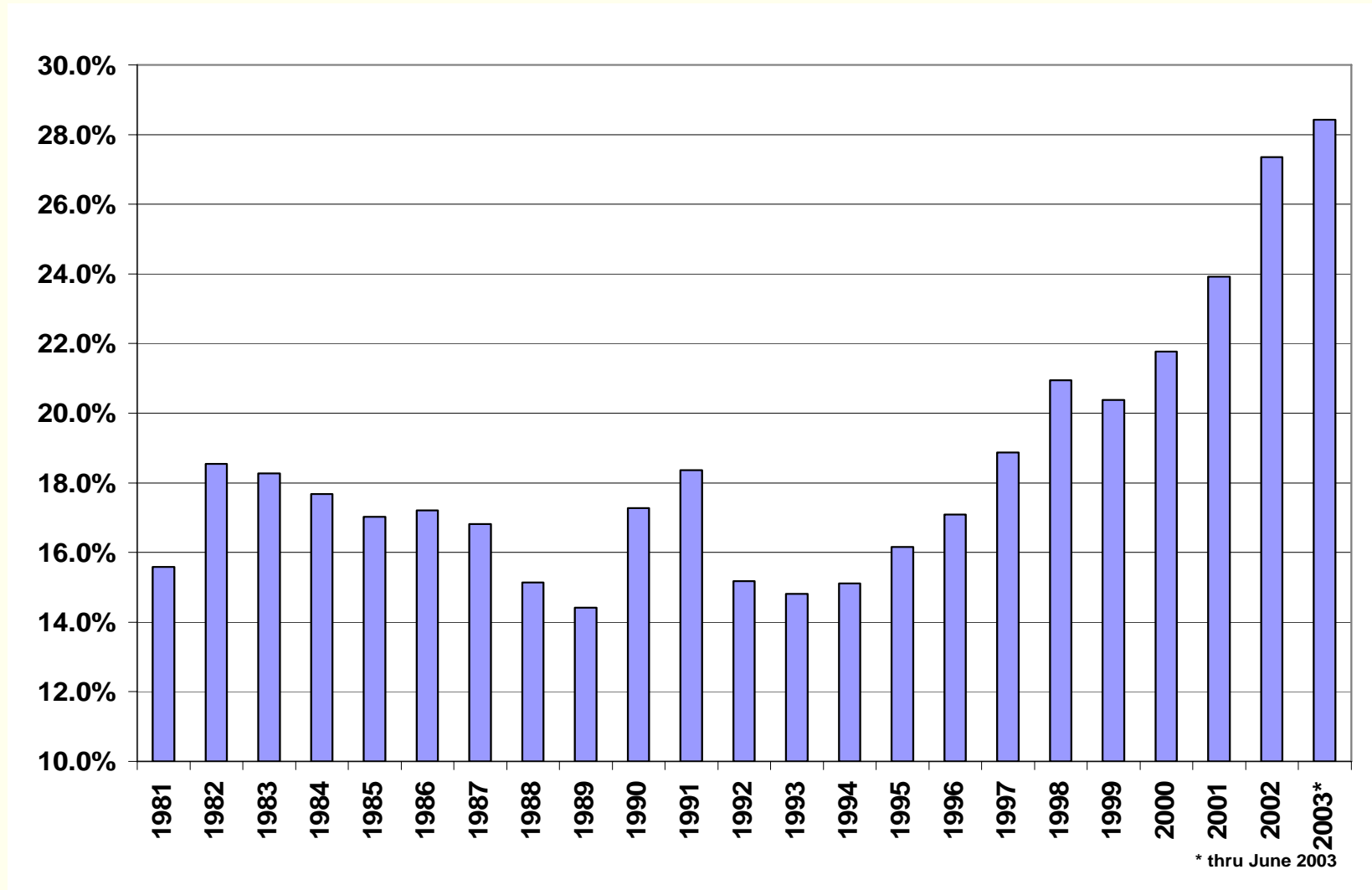Daske, Richardson and Tuna (2005). New daily data from NYSE.

- For a large sample of NYSE equity securities virtually no evidence that aggregate short selling is a leading indicator of earnings surprises, management forecast surprises or extreme price jumps.
- Some evidence that portfolios based on aggregate short selling leads equity returns over short intervals
  - But more from Boehmer, Jones and Zhang (2006) later today.

Some thoughts on the information content of short selling data.
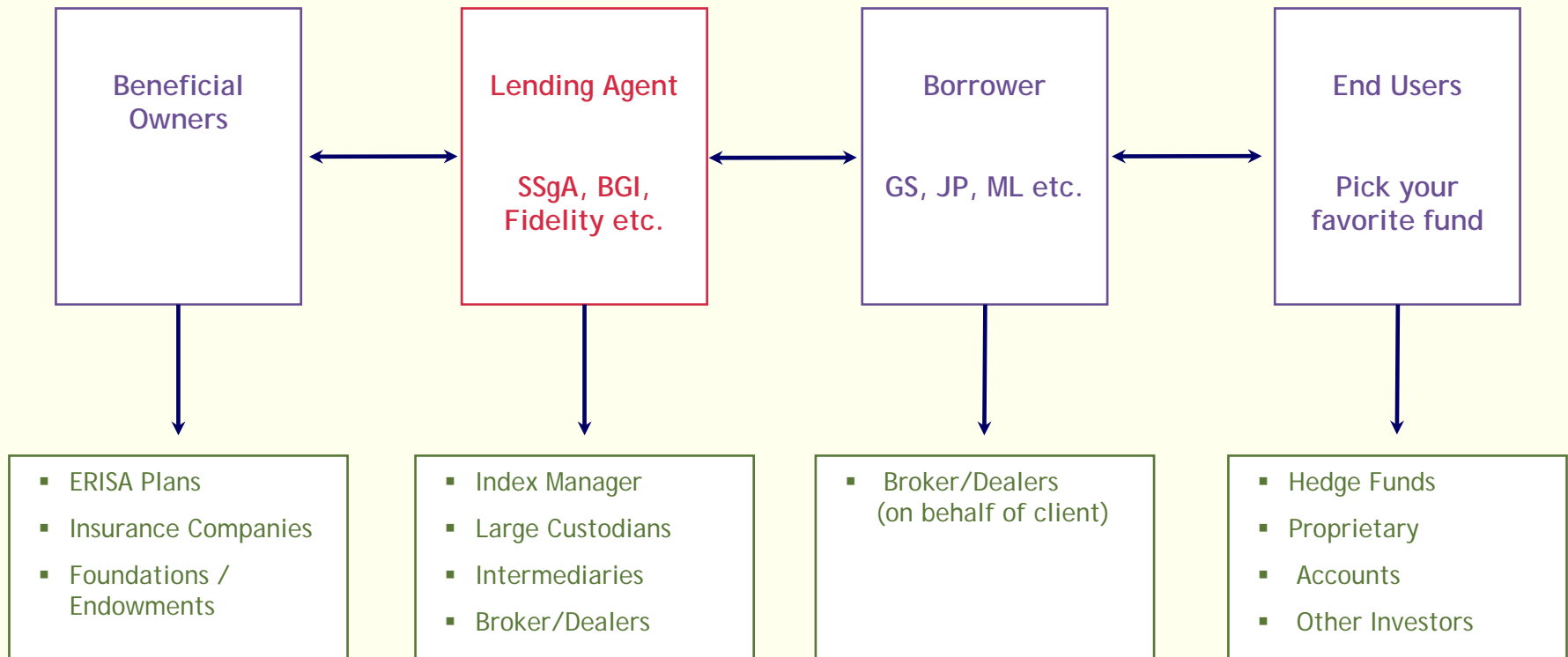
NYSE short sale volume (initiations and covers)

* thru June, annualized
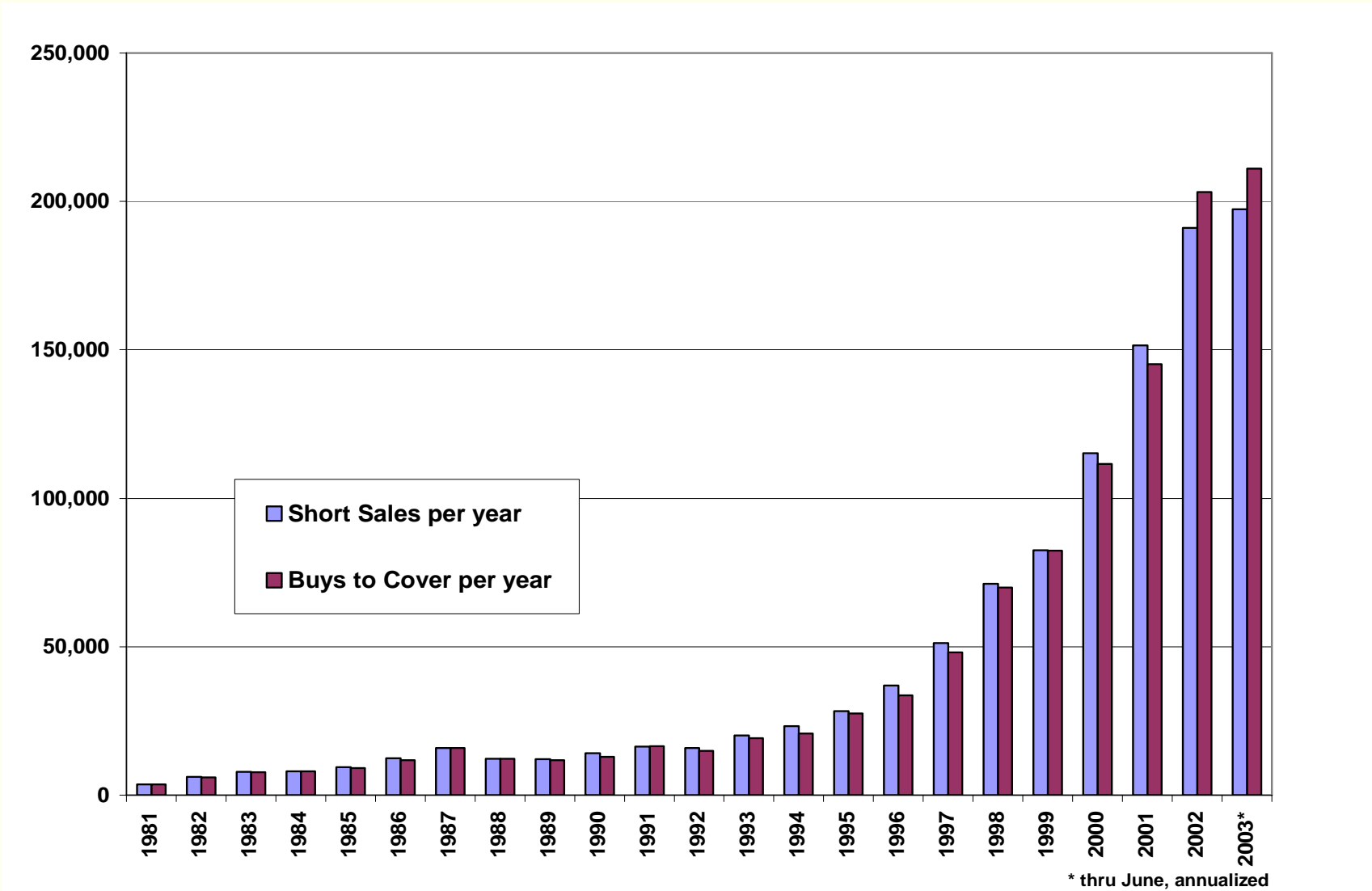
NYSE: short related volume as fraction of total volume

* thru June 2003

SECURITIES LENDING STRUCTURE
Who are the market participants?

Beneficial Owners	Lending Agent SSgA, BGI, Fidelity etc.	Borrower GS, JP, ML etc.	End Users Pick your favorite fund

▪ ERISA Plans ▪ Insurance Companies ▪ Foundations / Endowments	▪ Index Manager ▪ Large Custodians ▪ Intermediaries ▪ Broker/Dealers	▪ Broker/Dealers (on behalf of client)	▪ Hedge Funds ▪ Proprietary ▪ Accounts ▪ Other Investors

SECURITIES LENDING STRUCTURE
How it works

US Securities $100

US Securities $100

Beneficial Owners

A fund within one of the lending agents (e.g., PIMCO Total Return Fund)

Lending Agent

PIMCO

Borrower

GS

Collateral $102

Mark-to-Market Collateral

Dividends & other entitlements

Dividends & other entitlements

Cash collateral $102

Cash Investment Vehicle
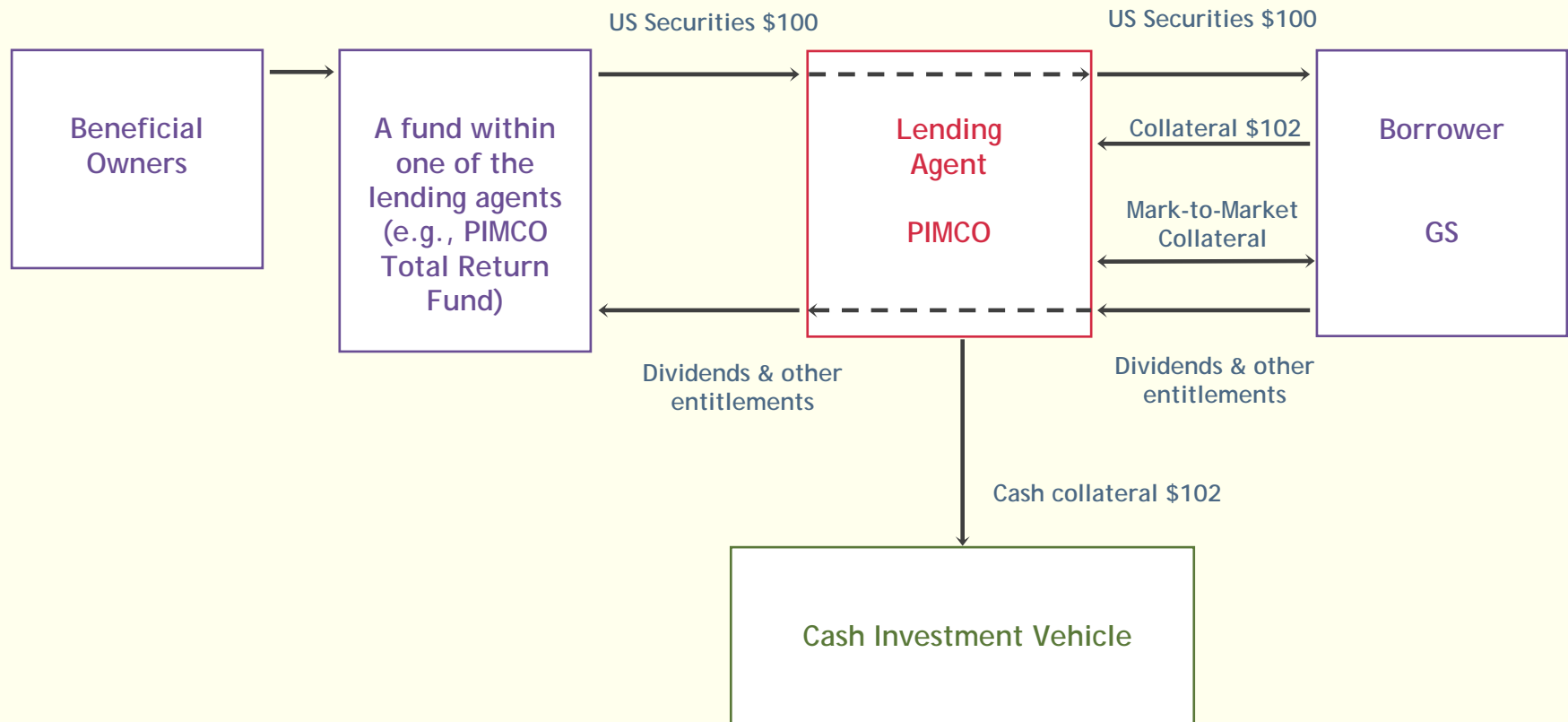
Securities lending and ability to short

There exists a very rich network between large custodians facilitating asset lending.

It is relatively easy to short every US equity instrument in the primary indices.

Rarely it can be difficult to find an entity willing to loan an asset (especially in equity). But in those circumstances the price adjusts. Rebate paid on collateral may be less than a standard amount (special).

In summary, short sellers are able to express their views, so aggregate short selling information should capture such negative opinion. (Some exceptions: hedging).

Some background...

Considerable research has examined the link between short selling activity and future firm performance

Some evidence that short sellers are able to predict poor future performance.

BUT....

In recent years there has been an explosion in short selling activity by institutional and retail investors

- Is it still information based trading?

Current regulatory climate has tightened many sources of private information

- Reg FD

Some prior literature

Monthly Short Interest Reports (1990s data)

- Predicts future returns (Desai et al 2002, Asquith and Meulbroek, 1996)
- Correlated with fundamental measures of mispricing (Dechow et al, 2001)
- Ambiguous relation future stock returns using a longer time series (Asquith, Pathak and Ritter, 2004)
  - Driven by very few firms with low institutional ownership

Data from equity lenders (try to measures short constraints)

- Reed (2003)
- Geczy, Musto and Reed (2002)

High frequency data

- Daily. Christophe, Ferri and Angel (2004) 913 NASDAQ firms for 3 months at the end of 2000
- Intra-day. Aitken et al (1998) Australia

Some recent literature

Boehmer, Jones and Zhang (2005)

- Sample of 1,247 NYSE securities (Jan 2000 to April 2004)
- Proprietary exchange dataset (not available generally)
- Hedge returns from shorting (buying) the most (least) heavily shorted firms on a given day of about 15% annualized.
- Driven by institutional and "other" trades.

Diether, Lee and Werner (2005)

- Can short sellers predict returns (daily NASDAQ data in 2005)
- Costs of such a strategy outweigh the negative returns.

Cohen, Diether and Malloy (2005)

- Attempts to measure "shocks" to demand and supply in the equity lending market.
- Uses daily data from one equity lender (NASDAQ data from Sept 1999 – August 2003)
- Find 2% abnormal returns (monthly) after jumps in shorting demand (as measured by loan fees)
- BUT, results driven by VERY small NASDAQ firms and monthly portfolios have VERY high turnover
  - Not implementable.

Daske, Richardson and Tuna (2005)

We explore a very simple research question:

Are short sellers able to time their trades?

More specifically, we seek to find a footprint left by short sellers around significant bad news events.

Some obvious issues

- How to define a "news" event.
- Identify a powerful setting to capture short selling.
- Is the null hypothesis reasonable?

Defining a News Event

Earnings Announcements

- 3,301 firm-quarter announcements
  - Scheduled event, linked to fundamental analysis

Management Forecasts

- 2,056 quarterly and annual forecasts
  - Can be unscheduled so a natural test of trading on truly private information

Many other possible events

- M&A announcements, restatements, class action law suits, drug trials...

Use stock returns directly to infer news

Defining the content of a News Event

Earnings based definition

- $(E_t - E_{t-4})/P_{t-4}$ for earnings announcements
- $(M_t - A_t)/|A_t|$ for management forecasts

Stock price definition

- Infer news content from the market reaction to the announcement
  - 2 days from the day of to the day after the announcement

We focus on the latter but results are similar with both

Some Issues ...

Time horizon

- Daily, weekly, monthly?

- Over what horizon does the typical informed short seller trade?

  - No one knows. Reed (2003): 10 days. Turnover of funds: several months

  - We compute about 35 days using monthly short interest reports and newly initiated short positions

- Mispricing based on accounting fundamentals tends to correct around subsequent earnings announcements. To profit from this, short sellers would time their trades around the announcement

Some Issues ...

NYSE securities

- Is this a powerful setting?
- NASDAQ may be preferred (e.g., Christophe, Ferri and Angel 2004) Short interest v short volume.
- But note Diether, Malloy find similar results in NASDAQ setting.

Announcement dates are problematic for the earnings announcements and management forecasts

- Could be a day off due to after hours releases
- But we look at extended windows around the announcement date

SuperDOT is not all NYSE volume

- Are sophisticated short sellers trading elsewhere?

Sample ...

NYSE Volume Summary

- Has daily short sale transaction data (at least executed short sell orders on SuperDOT system)

Period April 1, 2004 through to March 31, 2005

Full sample is 3,651 securities

Reduced sample of 1,749 securities (mitigates non-synchronous data issues and costly short selling firms)

- Price greater than $10

- Average number of daily trades > 100

- Security traded every day during our sample period

Results (or lack thereof) are the same for the full sample

Some descriptive statistics

Panel A: All Data from NYSE Volume Summary

	Mean	Std Dev	Min	Q1	Median	Q3	Max
NYSE Volume	387,736	1,058,574	0	7,137	57,285	309,764	19,818,000
SuperDOT Volume	301,698	722,591	112	15,925	70,978	269,065	14,192,152
# Trades	476	772	0	11	97	646	6,093
SHORT	62,599	152,397	0	234	5,168	57,686	3,059,871
SHORT/SHARES	0.09%	0.14%	0.00%	0.01%	0.06%	0.11%	5.03%
SHORT/VOLUME	14.34%	11.09%	0.00%	3.96%	13.65%	22.94%	91.53%

Panel B: Data after Sample Selection

	Mean	Std Dev	Min	Q1	Median	Q3	Max
NYSE Volume	741,405	1,321,280	11,192	133,921	315,253	801,274	19,188,762
SuperDOT Volume	549,276	895,904	14,384	107,412	255,920	626,625	12,379,957
# Trades	991	914	101	338	705	1,317	6,093
SHORT	122,184	185,106	0	21,867	60,386	144,166	1,676,185
SHORT/SHARES	0.11%	0.10%	0.00%	0.05%	0.08%	0.14%	1.20%
SHORT/VOLUME	22.50%	7.46%	0.00%	18.21%	22.49%	26.81%	72.80%
%? SHORT	24.87%	10.64%	-83.06%	19.89%	23.75%	28.82%	249.25%
%? SHORT/SHARES	15.62%	7.72%	-71.25%	11.66%	14.83%	18.93%	152.60%
%? SHORT/VOLUME	25.26%	11.03%	-83.06%	20.08%	24.05%	29.24%	249.25%
RET	0.07%	0.18%	-1.55%	0.00%	0.06%	0.12%	1.90%

An example from Merck (Vioxx drug issue, September 27, 2004)

Daily SHORT and daily return (Merck)
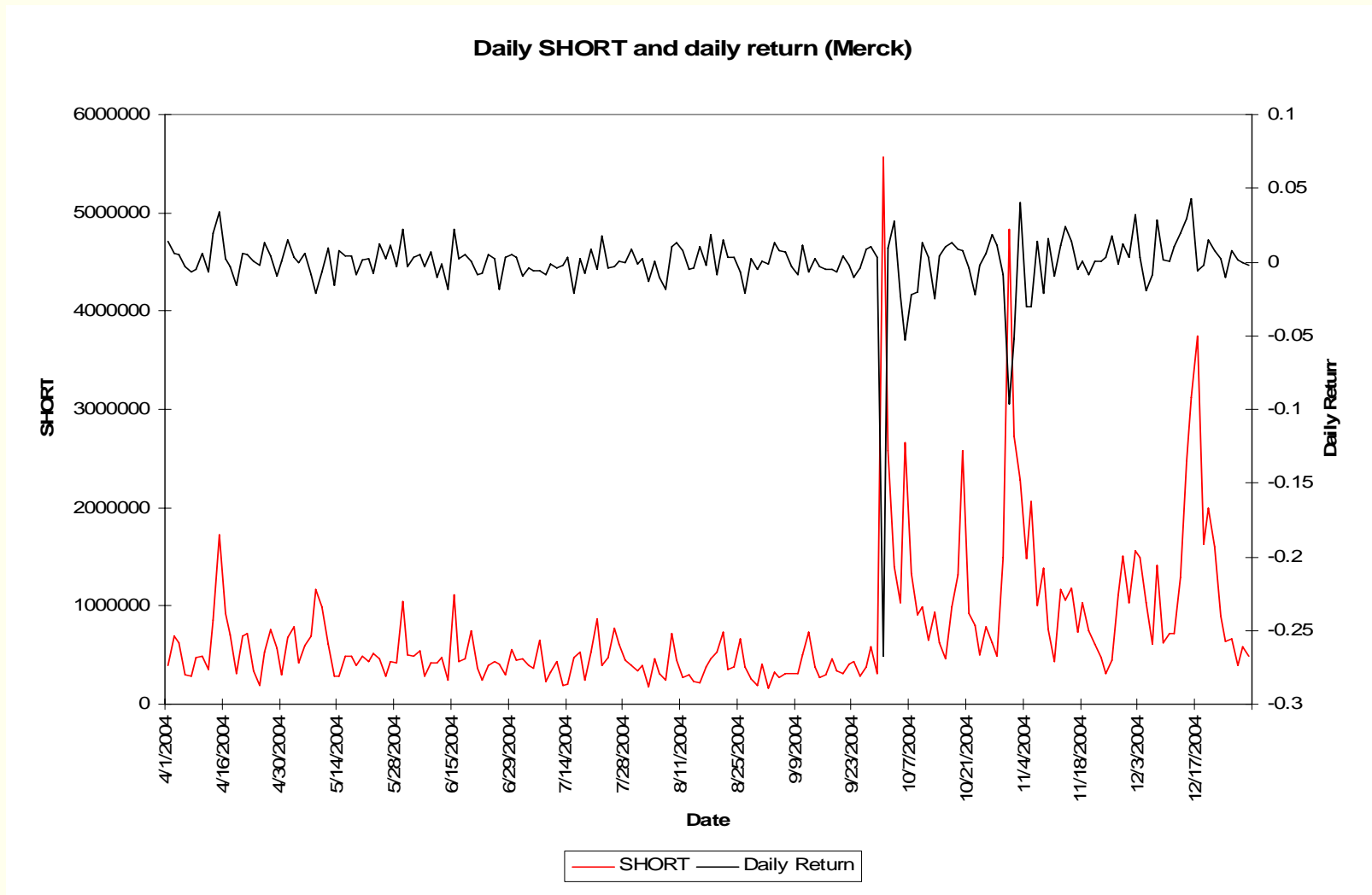
An example from Coke (earnings expectation shortfalls July 23, 2004 and September 16, 2004)

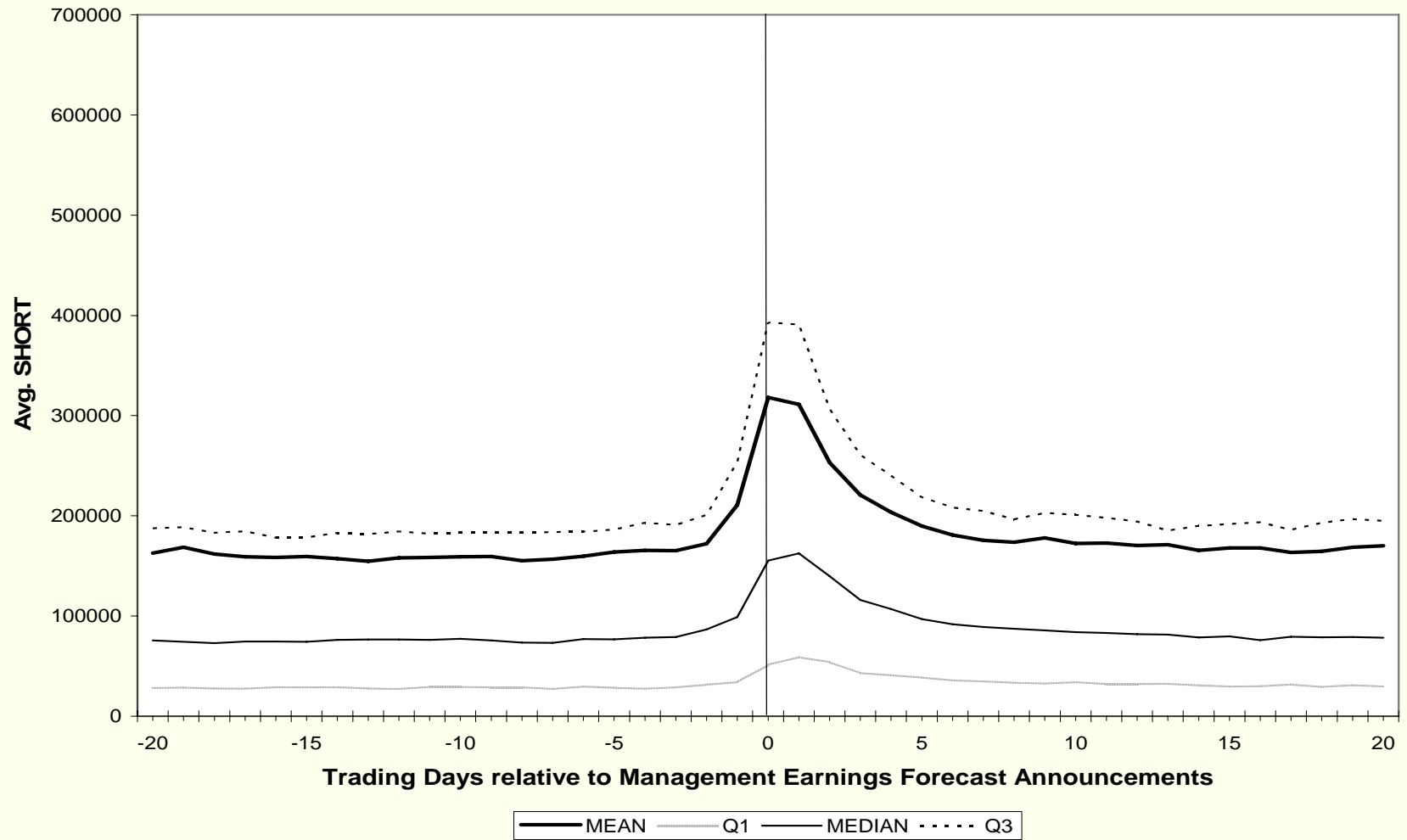**Daily SHORT and daily return (Coca Cola)**
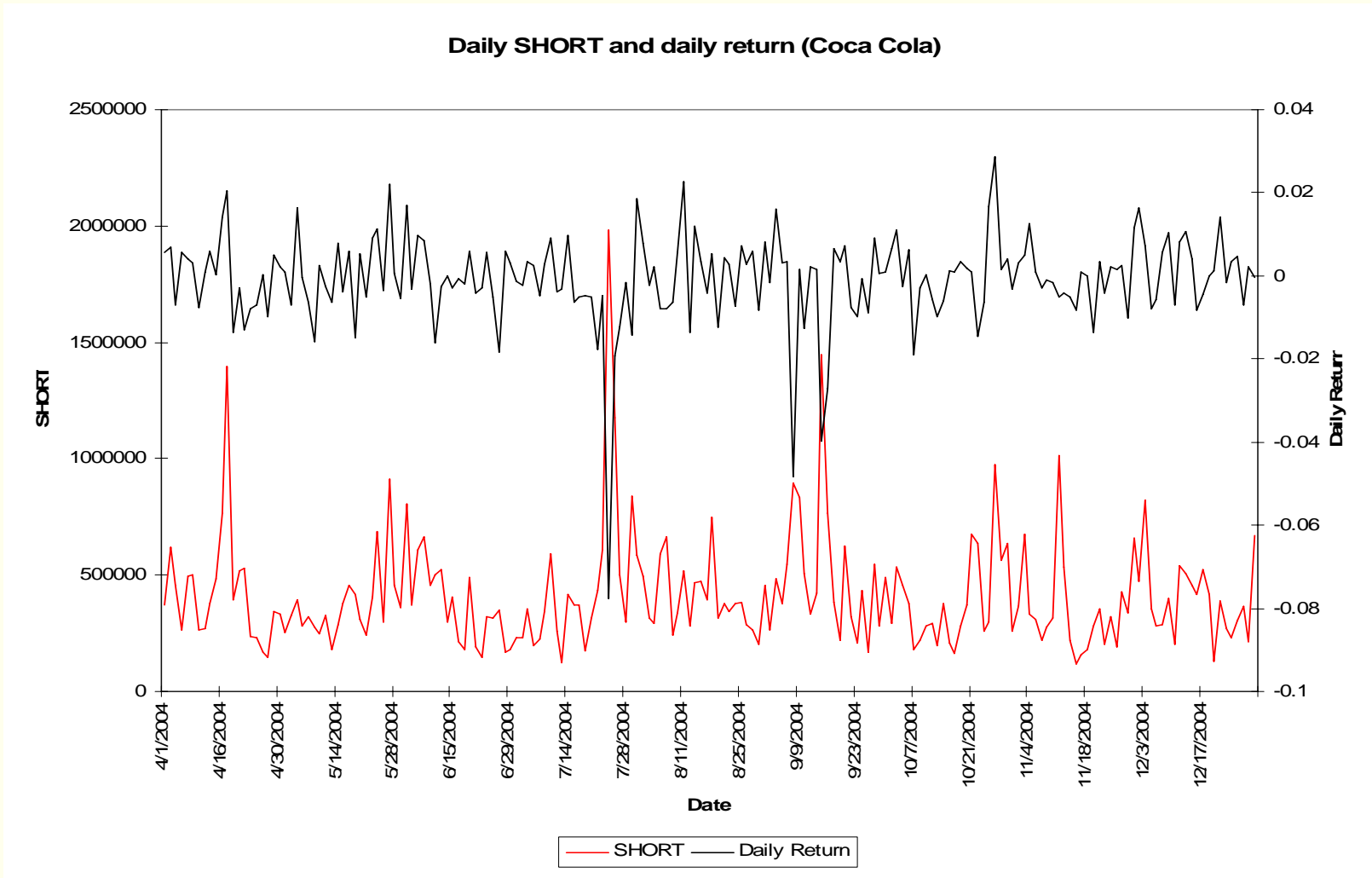
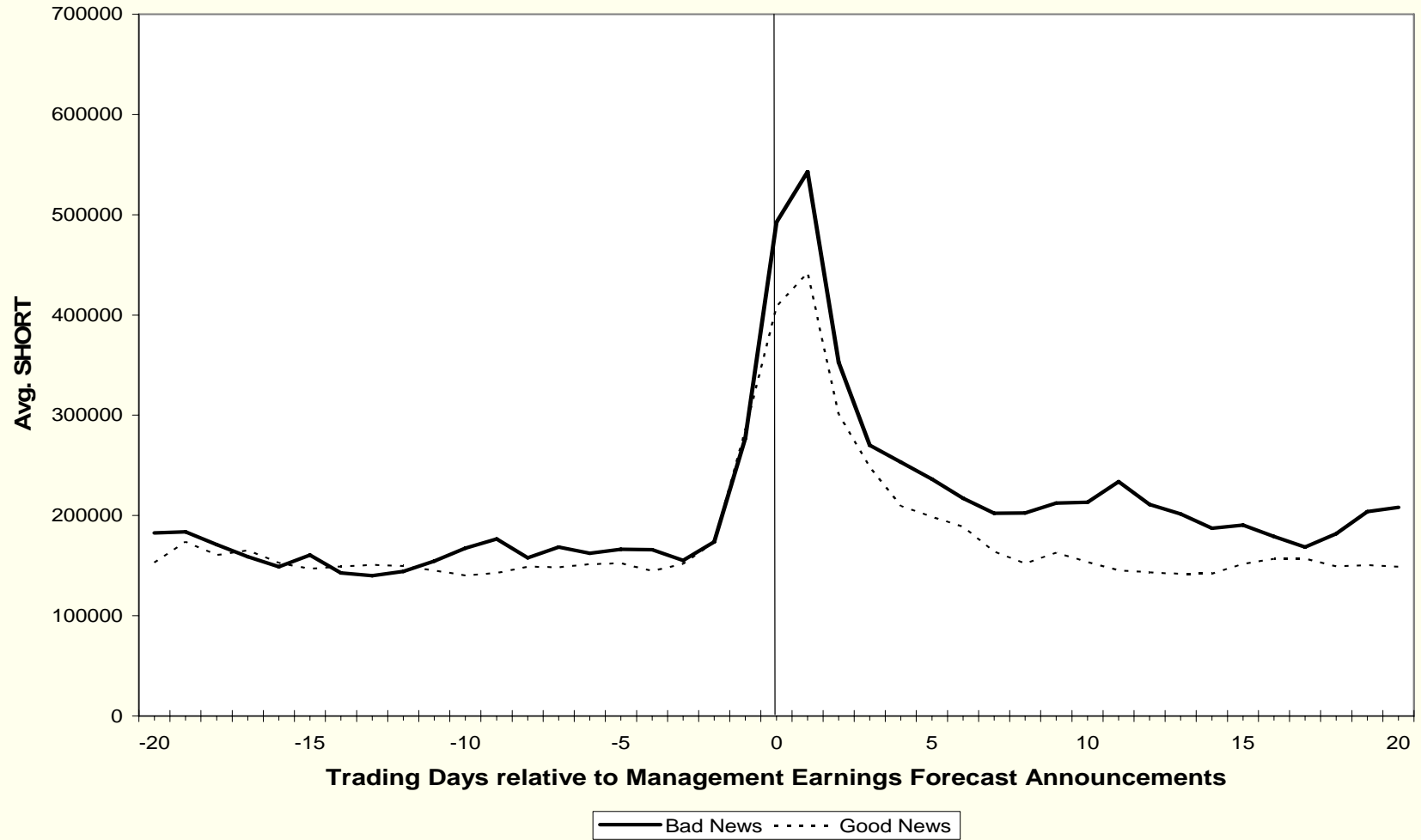# Short sales transactions around earnings announcements (all)
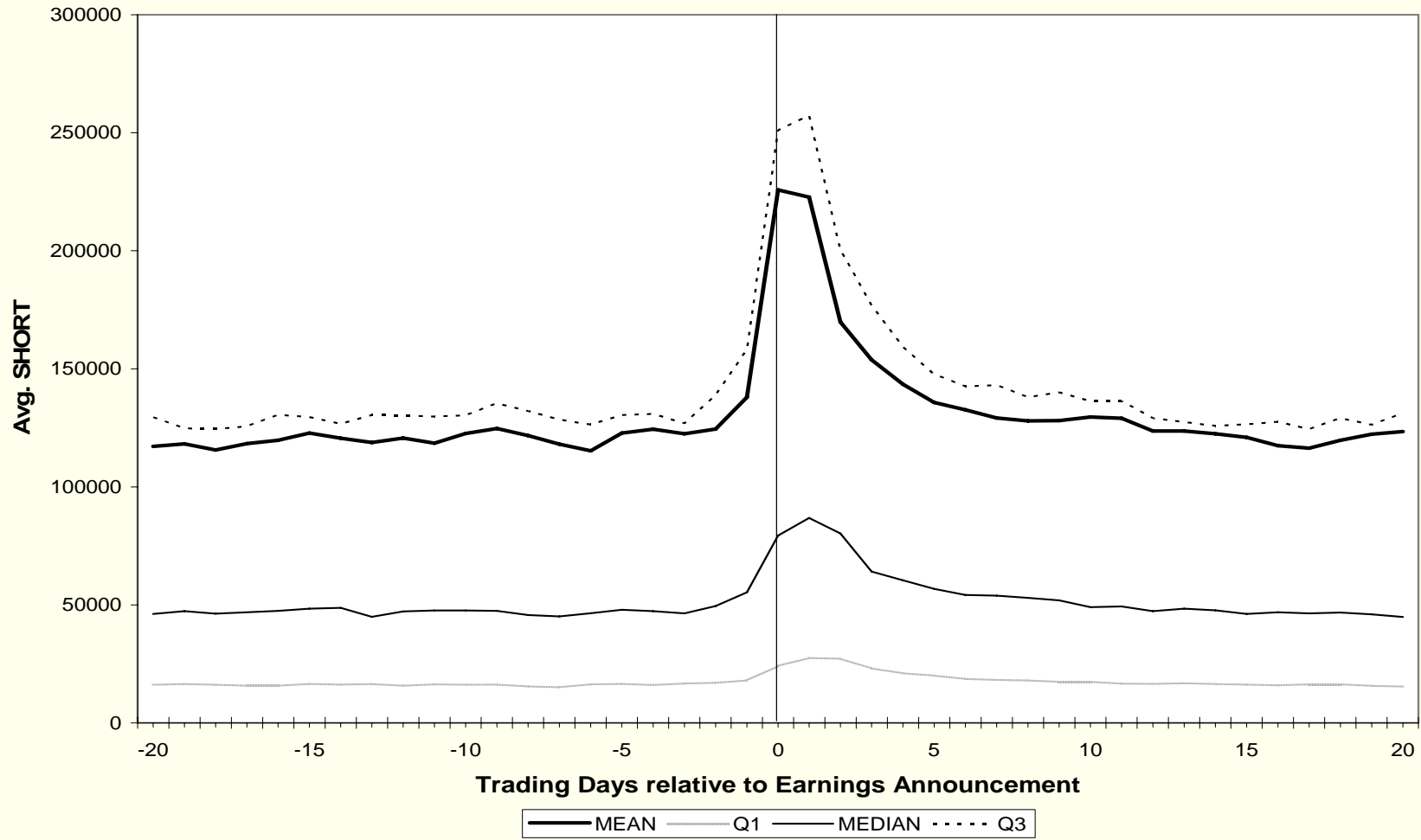
Short sales transactions around earnings announcements (good vs bad)
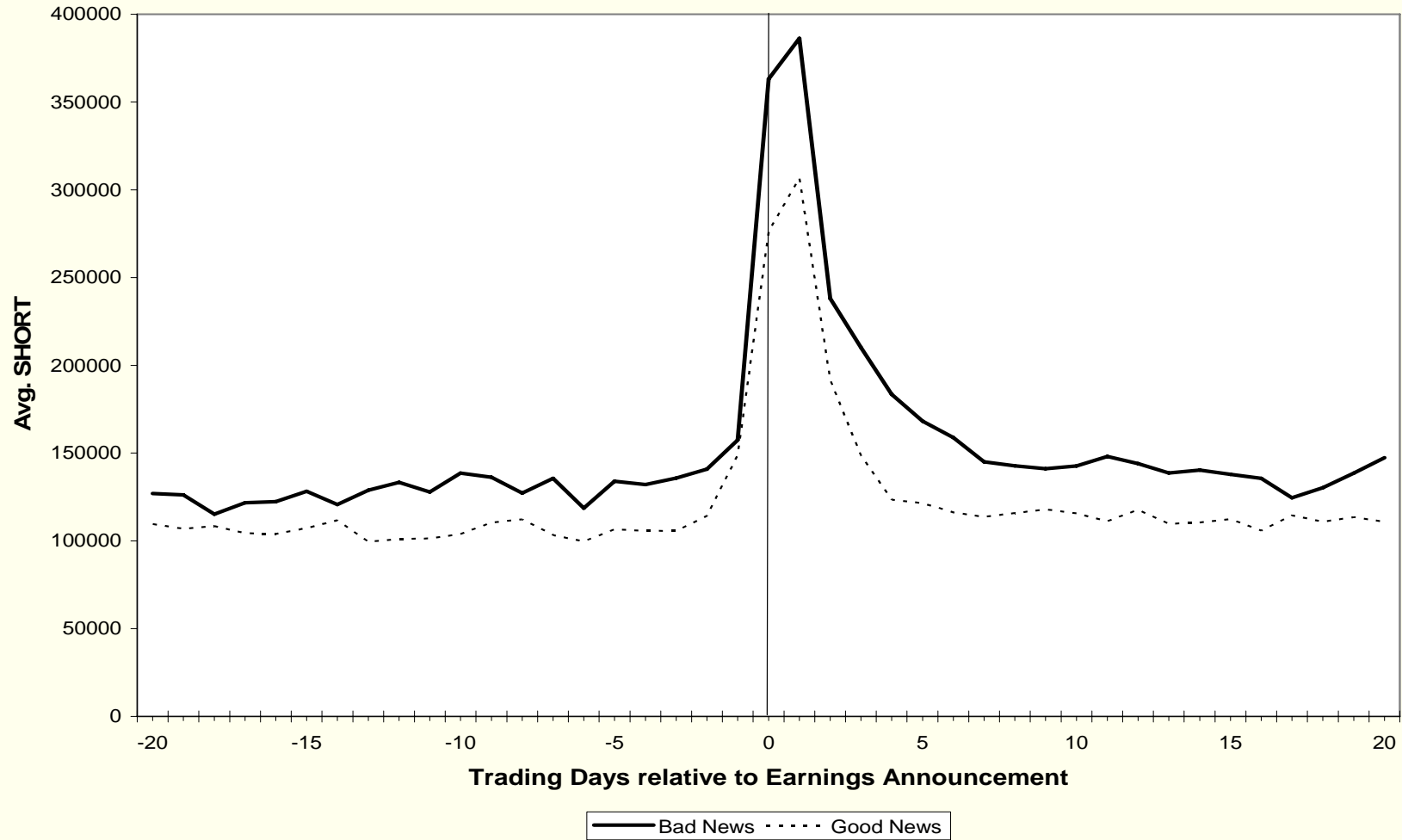
Short sales transactions around management forecasts (all)

Short sales transactions around management forecasts (good vs bad)

Regression analysis (earnings announcements)

$$AB\_SHORT/SHARES(-5, -1) = \beta_0 + \beta_1 RET(0, +1) + \beta_2 RET(-5, -1) + \beta_3 ABVOL(-5, -1) + \varepsilon$$
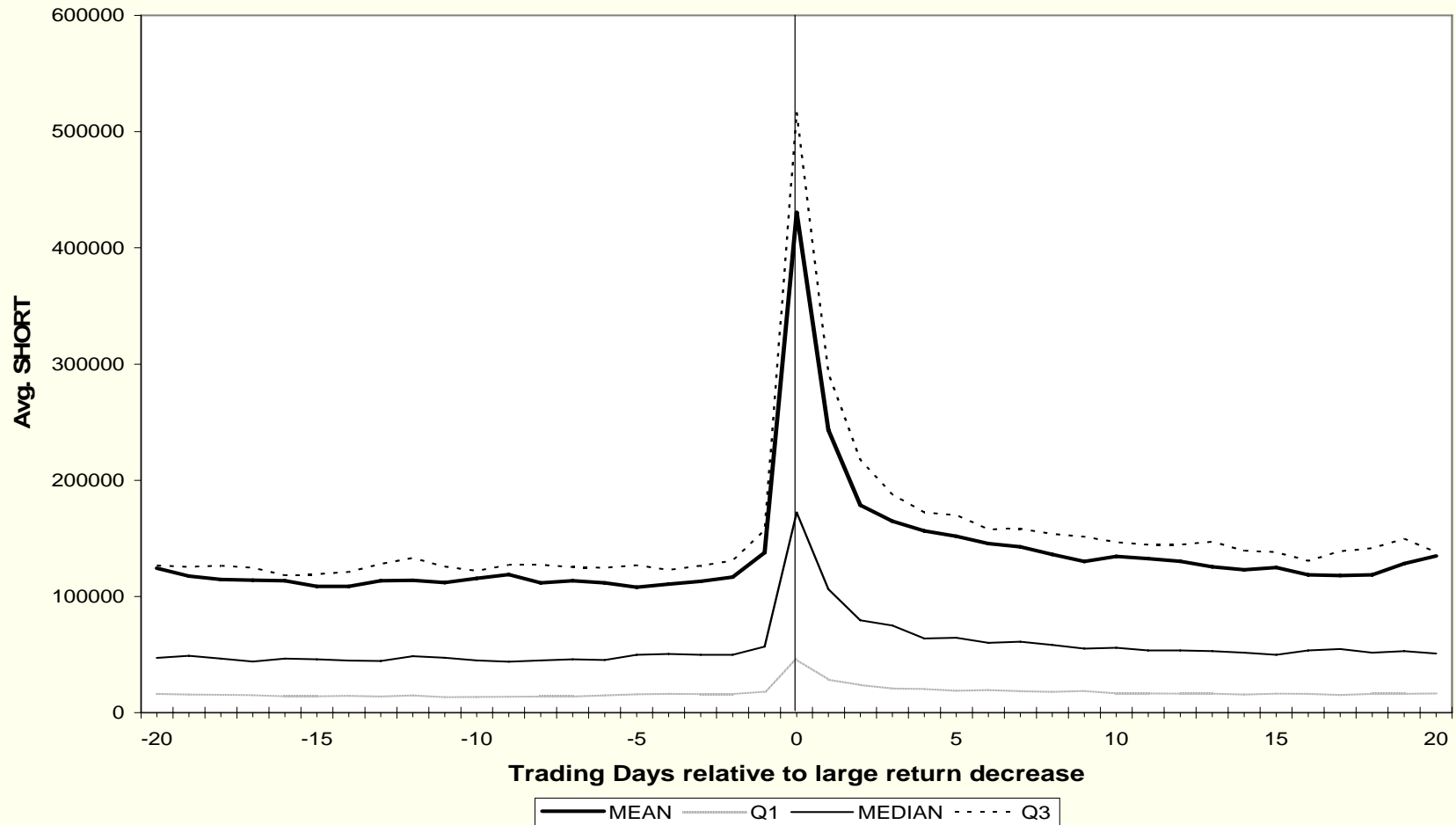
	β_0		β_1	β_2		β_3		Adj. R^2
Coefficient	0.019	***	0.011	2.604	***	0.876	***	41.11%
Robust t	3.12		0.07	10.44		20.37		

Regression analysis (management forecasts)

$$AB\_SHORT/SHARES(-5, -1) = \beta_0 + \beta_1 RET(0, +1) + \beta_2 RET(-5, -1) + \beta_3 ABVOL(-5, -1) + \varepsilon$$

	β_0		β_1	β_2		β_3		Adj. R^2
Coefficient	0.014	*	0.027	2.159	***	0.912	***	42.62%
Robust t	1.65		0.18	6.03		12.62		

Short sales transactions around extreme daily price drops (summary measure of bad news events)

## Regression analysis (short selling around extreme price drop days)

$$AB\_SHORT/SHARES(-5, -1) = \beta_0 + \beta_1 RET(0) + \beta_2 RET(-5, -1) + \beta_3 ABVOL(-5, -1) + \varepsilon$$

	β_0		β_1	β_2	β_3		Adj. R^2
Coefficient	0.052	***	-0.262	0.658	0.426	***	25.51%
Robust t	3.55		-1.57	1.31	3.72		

The analysis with stock returns as summary news measure gets closer to a result (6% p-value one-sided test).

What if we look at the information from short selling at the portfolio level?

What about general short selling and daily return movements?

Aggregate SHORT with Aggregate Returns (MEANS)

Legend: Mean SHORT — Mean Return
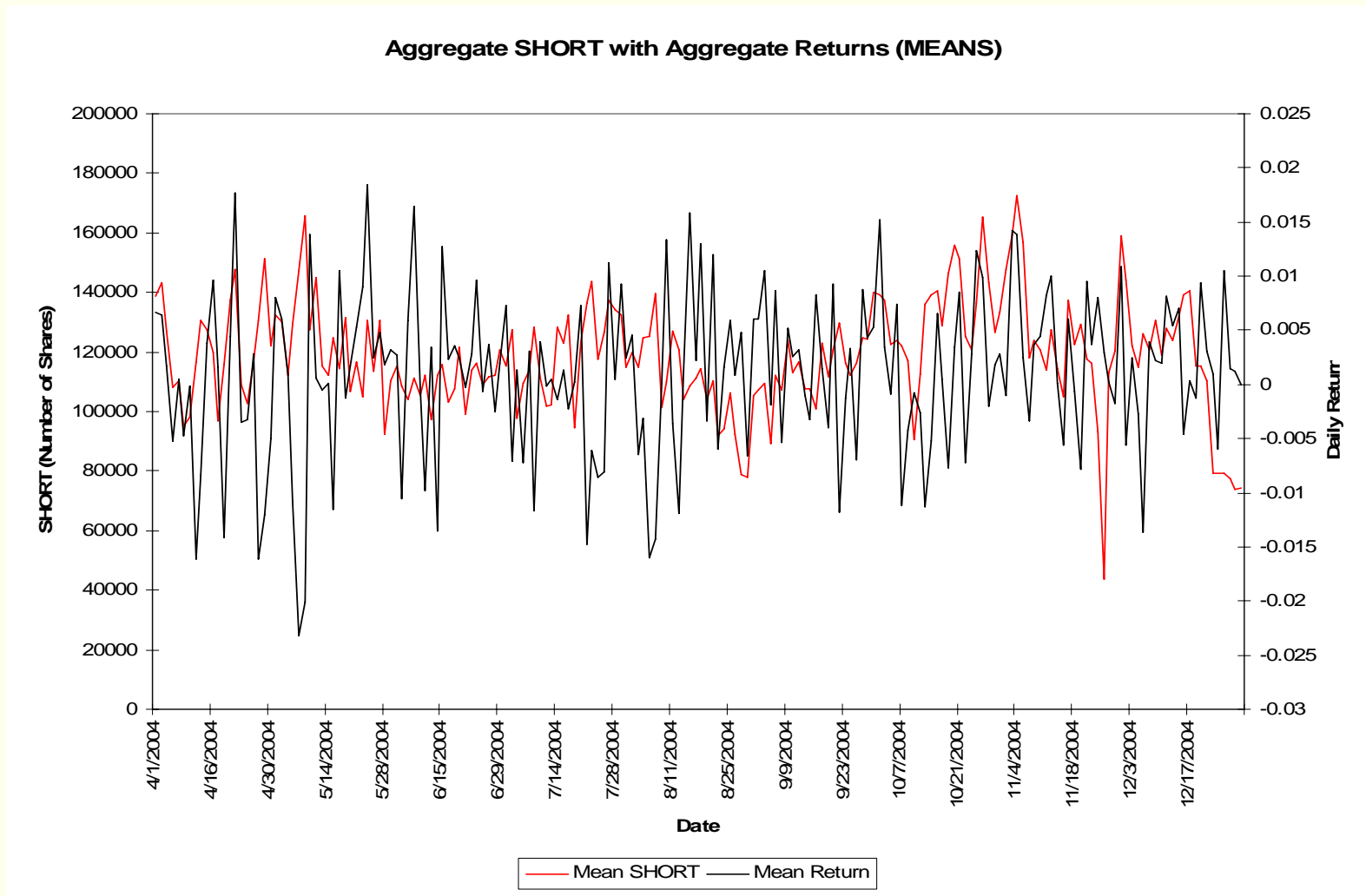
Statistical tests continue to reject the null hypothesis of a relation between short selling and daily return movements.

Portfolio analysis (ala Boehmer, Jones and Zhang, 2006)

1. Sort firms into quintiles every day based on the average of SHORT/SHARES for the previous five trading days.

2. Track the returns of these portfolios over the next twenty trading days.

3. For these 247 twenty-day portfolio returns in our sample, we find that the portfolio with the highest (lowest) level of daily shorting activity over the previous five days experiences average returns of 114 (110) basis points over the next twenty trading days (this difference is not statistically significant at conventional levels).

4. From the standard three factor Fama-French portfolio analysis for this sample, we find that the alpha for the portfolio with the highest (lowest) level of daily shorting activity over the previous five days is 40 (75) basis points over the next twenty trading days. The hedge return of 35 basis per month is significant at the nine percent level (t-statistic of 1.73, Newey-West corrected).

Additional analyses

We re-ran all analyses for the following sub-samples where it is MOST likely that short sellers have an informational advantage:

- Bottom quartile of NYSE securities based on:
  - Market capitalization
  - Institutional ownership
  - Analyst Following
- Remove firms with convertible debt
- Remove firms with put options traded on CBOE
- Remove firms with stock splits during our sample period
- Remove firms which were listed on a prime broker's hard to borrow list during our sample period

Results (or lack thereof) are robust to these sub-samples.

Conclusions ...

For our sample of 3,651 NYSE securities for the period April 1, 2004 through March 31, 2005 we found very little evidence that daily short sale transactions precede bad news events.

- Earnings Announcements and Management Forecasts.
- Change in short sales and daily returns analysis.
  - Revise priors from Christophe, Ferri and Angel (2004).
- But, some marginal results with the portfolio analysis.

Short sellers do not appear to trade prior to bad news events in the last year. Why?

- Flood of short activity (watered down).
- Aggregate short selling data.
- Reg FD and tightening of selective information channels?

Conclusions ...

Disclaimers:

- On average result only
  - Future work could partition by type of short seller
    - Exchanges track customer order driven or dealer trades (e.g., Boehmer, Jones and Zhang 2006)
- NYSE securities only
  - Is this market too liquid, well informed for short sellers to play?
- Null hypothesis may be too restrictive
  - Who can time their trades to the day?