Go down fighting: Short sellers vs. firms

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This draft: July 14, 2004
First draft: October 22, 2002

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The most recent version of this paper is at: http://mba.yale.edu/faculty/professors/lamont.htm

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ABSTRACT

I study battles between short sellers and firms. Firms use a variety of methods to impede short selling, including legal threats, investigations, lawsuits, and various technical actions intended to create a short squeeze. These actions create short sale constraints. Consistent with the hypothesis that short sale constraints allow stocks to be overpriced, firms taking anti-shorting actions have in the subsequent year very low abnormal returns of about -2 percent per month.

Short sale constraints can allow stocks to be overpriced. Constraints include various costs and risks, such as the expense and difficulty of borrowing stock, legal and institutional restrictions, and the risk that the short position will have to be involuntarily closed due to recall of the stock loan. If these impediments prevent investors from sufficiently shorting certain stocks, these stocks can be overpriced and thus have low future returns until the overpricing is corrected. By identifying stocks with particularly high short sale constraints, one can identify stocks with particularly low future returns. These constraints are difficult to measure, however, and researchers have struggled to find appropriate data to test the overpricing hypothesis.

In this paper, I test whether overpricing increases when firms deliberately raise the level of short sale constraints. Firms can take a variety of actions to impede short selling of their stock. Firms take legal and regulatory actions to hurt short sellers, such as accusing them of crimes, suing them, hiring private investigators to probe them, and requesting that the authorities investigate their activities. Firms take technical actions to make shorting difficult, such as splits or distributions specifically designed to disrupt short selling. Firms can coordinate with shareholders to withdraw shares from the stock lending market, thus preventing short selling by causing loan recall. These battles between short sellers and firms can be extraordinarily acrimonious. The following statement from the sample used in this paper gives a flavor of attitudes toward short sellers: "Your activities are mean, shameful and loathsome. They are motivated by appalling avarice and greed, and they will not be permitted to go unanswered." (Fulman, 1998)

An example of the various anti-shorting strategies used by firms is provided by Solv-Ex, a firm that claimed to have technology for economically extracting crude oil from tar-laden sand. Short sellers claimed that Solv-Ex was a fraud. On 2/5/96, the management of Solv-Ex faxed a

letter to brokers and shareholders: "To help you control the value of your investment…we suggest that you request delivery of the Solv-Ex certificates from your broker as soon as possible." (Weiss, 1996). This suggestion, entirely legal on the part of Solv-Ex, was essentially an attempt at market manipulation. The letter was an attempt to orchestrate a short squeeze using the stock lending system (the mechanics of stock lending are described further in section I).

Any shareholder heeding Solv-Ex's suggestion would have withdrawn his shares from the stock lending market, potentially forcing short sellers to cover their positions. On 2/2/96, before the letter, Solv-Ex's price was at $24.875. By 2/21/96, the price had risen to $35.375, perhaps due to Solv-Ex's attempted squeeze. Solv-Ex took other action against short sellers as well. Later in 1996, Solv-Ex said that it had hired private investigators to find out who was spreading misinformation about the firm, and subsequently it filed suit against a well-known short seller, claiming he had spread false information. However, in this case it was Solv-Ex which was engaged in illegal activities, not the short sellers. Solv-Ex delisted at 7/1/97 at $4.25, it entered Chapter 11 bankruptcy in 1997, and in 2000 the court ruled that the firm had indeed defrauded investors.

In this case, the evidence is consistent with the idea that Solv-Ex was overpriced in February 1996, since it subsequently fell sharply. This paper looks at long-term returns for a sample of 266 similar firms who threaten, take action against, or accuse short sellers of illegal activities or false statements. The sample is constructed using publicly observable actions from news reports and firm press releases.

It turns out that (as in the Solv-Ex case) sample firms have very low returns in the year subsequent to taking anti-shorting action. Abnormal returns are approximately -2 percent per

month. While this degree of underperformance may seem implausibly large, it is in line with other estimates from Jones and Lamont (2002), Lamont and Thaler (2003), and Ofek, Richardson, and Whitelaw (2003).   Thus the evidence is consistent with the idea that short sale constraints allow very substantial overpricing, and that this overpricing gets corrected only slowly over many months. As a secondary issue, this paper also examines the behavior of short interest and prices around anti-shorting actions. There is weak evidence at best that deliberate short squeezes can temporarily raise stock prices.

The idea that short sale constraints can prevent negative information or opinions from being expressed in stock prices comes from Miller (1977). Although constraints are necessary in order for mispricing to occur, they are not sufficient. Constraints can explain why a rational arbitrageur fails to short the overpriced security, but not why anyone buys the overpriced security. To explain that, one needs investors who are willing to buy overpriced stocks. Thus two things, trading costs and some investors with downward sloping demand curves, are necessary for substantial mispricing. This willingness to hold overpriced stocks can be interpreted either as reflecting irrational optimism by some investors, or rational speculative behavior reflecting differences of opinion. I discuss the underlying theory more in section I.

This paper is organized as follows. Section I discusses the general issues of short sale constraints and reviews related research. Section II describes how the sample was constructed. Section III describes the sample characteristics. Section IV examines long run returns for sample stocks. Section VI examines shorting costs and short interest around anti-shorting events. Section VI looks at short term price movements around attempted short squeezes. Section VII summarizes and presents conclusions.

I. Background and literature review

A. Mechanics of shorting stock

To be able to sell a stock short, one must borrow it, and because borrowing shares is not done in a centralized market, finding shares can sometimes be difficult or impossible. In order to borrow, an investor needs to find an institution or individual willing to lend. These lenders receive a daily lending fee from the borrowers, determined by supply and demand in the lending market.

Brokers have the ability to lend shares of their customers, provided customers have given written permission. Once a short seller has initiated a position by borrowing stock, the borrowed stock may be recalled at any time by the lender. If the short seller is unable to find another lender, he is forced to close his position. This possibility leads to recall risk, one of many risks that short sellers face.

There are several reasons that a shareholder might initially refuse to lend stock, or might later withdraw his shares from the stock lending market. First, if the lender sells his stock, he must recall his stock loan so that he can deliver his shares to the buyer. Second, in some unusual cases (which are studied here), firms devise technical actions which force shareholders not to lend. For example, one firm required shareholders to send their stock certificates to the firm's transfer agent in order to receive a distribution. An owner cannot send in the certificate unless he is in physical possession of it. Third, shareholders may refuse to lend their stock because they fear that by helping short sellers, they will be helping drive stock prices down. This idea (the basis of the Solv-Ex example) obviously makes no sense in a competitive market where no individual investor is big enough to affect prices. Fourth, for individual investors, brokers typically only have the ability to lend out of margin accounts, not cash accounts. Fifth, some

institutions do not have stock lending programs at all, perhaps because the income generated by lending would not be enough to compensate for the fixed cost of setting up a lending program.

Generally, it is easy and cheap to borrow most large cap stocks, but it can be difficult to borrow stocks which are small, have low institutional ownership, or which are in high demand for borrowing. A somewhat paradoxical description of the stock lending market is that it usually works very well, except when you want to use it, in which case it works terribly. By this I mean that it can be difficult or expensive to short stocks that many people believe are overpriced and many people want to short. Of course, this point is the essence of the overpricing hypothesis: stocks are only overpriced when informed investors are unable or unwilling to short them. No one would want to short them if they weren't overpriced, and they wouldn't be overpriced if they weren't hard to short.

Since the data collection strategy is based on public anti-shorting actions taken by firms (and in the case of lawsuits depends on firms being able to identify short sellers), it is useful to consider the conflicting incentives for secrecy faced by short sellers. Short sellers sometimes attempt to remain anonymous, while other times publicize their activities. On the one hand, when shorting a stock, one has the incentive to publicize the opinion that the stock is overpriced. The sooner one can convince other investors that the stock price is too high, the sooner the price will fall, minimizing holding costs and price risk.

On the other hand, recall risk, and more generally the cost of maintaining a short position, gives short sellers an incentive for secrecy, since holding costs generally rise when other investors are also trying to short. For stocks that are hard to short, a short seller would like the stock price to go down, but he may not want other people to short the stock. The cost and difficulty of shorting is determined by supply and demand in the securities lending market. If

more people try to short a stock, the cost of shorting might rise and existing stock loans may be called in by the stock lender. In addition, secrecy might be preferred if the short seller wants to avoid being sued or harassed by the firm he is shorting.

B. Other short sale constraints

In addition to the problems in the stock lending market, there are a variety of other short sale constraints. US equity markets are not set up to make shorting easy. Regulations and procedures administered by the SEC, the Federal Reserve, the various stock exchanges, underwriters, and individual brokerage firms can mechanically impede short selling. Legal and institutional constraints inhibit investors from selling short.   For example, Almazan et al. (2000) find that only about thirty percent of mutual funds are allowed to sell short, and only two percent actually do sell short.

In addition to regulations, short sellers also face hostility from society at large. Policy makers and the general public seem to have an instinctive reaction that short selling is morally wrong. Short selling is characterized as inhuman, unAmerican, and against God (Proverbs 24:17: "Do not rejoice when your enemy falls, and do not let your heart be glad when he stumbles."). Hostility is not limited to America. In Malaysia in 1995, the Finance Ministry proposed mandatory caning as the punishment for short sellers (the beating "will be light, similar to the punishment carried out on juveniles") (Jayasankaran, 1995).

Short sellers face periodic waves of harassment from governments and society, usually in times of crisis or following major price declines as short sellers are blamed. Short sellers are often thought to be in league with America's enemies. The general idea seems to be that short selling is bad, and when bad things happen (such as war) it probably involves short sellers in some way. For example, the New York Stock Exchange imposed special short selling

regulations during World War I (in November 1917), in response to both a substantial market decline and a fear that the Kaiser would send enemy agents to drive down stock prices. Jones and Lamont (2001) and Jones (2002) discuss another historical episode following the crash of 1929. This historical pattern has continued in recent years, following both the terrorist attack of September 11, 2001 and the more general market fall starting in 2000. Media reports indicate that authorities in Britain and Japan have sought to discourage shorting.

C. Overpricing: Theory

Harrison and Kreps (1978) construct a model with rational investors where differences of opinion, together with short sale constraints, create a "speculative premium" in which stock prices are higher than even the most optimistic investor's assessment of their value (see also Duffie et al, 2002). These differences of opinion can be interpreted as arising from different prior beliefs which rationally converge as information arrives (Morris 1996), or as irrational overconfidence (Scheinkman and Xiong, 2003). In any case, short sale constraints generate a pattern of overpricing leading to subsequent low returns.

Here I give an example that illustrates Harrison and Kreps (1978). In the model of Miller (1977) short sale constraints cause stock prices to reflect only the views of the optimists. The Harrison and Kreps (1978) story goes beyond Miller (1977) to say that the stock can be priced even higher than the most optimistic assessment of its true value. In their model, everybody agrees that stocks are overpriced but are still willing to hold stocks.

Suppose investor A and investor B have different beliefs about the prospects for a risky asset. Each one knows what the other one believes, but they agree to disagree, so there is no asymmetric information. Assume a simple set up with three dates, date 0, 1, and 2, and for simplicity assume risk neutral agents behaving competitively, a discount rate of zero, and there

are sufficient numbers of type A and type B investors for each type to hold all the asset by themselves. Suppose it is currently date 0, and both A and B believe that the asset is worth 200 today. Specifically, they both believe that at date 2 it will be worth 300 with 50% probability and 100 with 50% probability. However, A thinks that at date 1 some news will arrive that will resolve all uncertainty, while B thinks there will be no relevant news released until date 2. This belief about when news gets released is the only disagreement between A and B (it is not necessary to state who, if either, is right in their beliefs). The Harrison and Kreps (1978) model has the remarkable property that in the presence of short sale constraints, both A and B would be willing to hold the asset at 250 at date 0, despite the fact they both think it is only worth 200.

To get to this result, work backward from date 1, using the principle that with short sale constraints the optimist always sets the price. At date 1, if good news has arrived then A will value the asset 300 while B still thinks it is worth 200, thus the price will be 300 (A will hold all the asset, B will hold none of it). If bad news arrives at date 1, the price will be 200 (B will hold all of it). Since these two states happen with 50-50 probability, the date 0 expected price for date 1 is 250. Thus at date 0, both A and B are willing to hold the asset at a price of 250. Although everyone thinks it is overvalued at date 0, they are willing to buy at date 0 because they believe they are following a dynamic trading strategy that will take advantage of the other investor. This example formalizes the notion of the "greater fool" theory of asset pricing. Note that everyone agrees that long-term expected returns between date 0 and date 2 are low (as the value is expected to fall from 250 to 200), and thus a buy and hold strategy is a bad idea. Volume is a key part of the story. Since everyone is following a dynamic trading strategy, you see lots of trading at date 1 as traders try to take advantage of one another. Without volume, there would be no overpricing.

D. Overpricing: Evidence

A variety of empirical evidence confirms the prediction that binding short sale constraints lead to low returns, although much of the evidence is circumstantial because it is hard to observe the level of short sale constraints for different stocks. Looking across stocks, the prediction is that when constraints bind more tightly, subsequent returns will be lower. One can test this hypothesis either by finding stocks with higher constraints (if constraints vary across stocks), or finding stocks with higher unexpressed shorting demand (if the demand for shorting varies across stocks). The basic idea of looking at shorting demand is that some investors want to short a stock but are impeded by constraints, thus the stock is overpriced. If one can estimate the size of this group of investors, one can measure the extent of overpricing. In practice measures of shorting constraints and shorting demand tend to be highly correlated, since both are reflecting the same mechanism that constraints prevent informed investors from immediately correcting overpricing.

One measure of short sale constraints is the cost of shorting reflected in the stock loan market. A variety of recent papers study the market for borrowing stock (D'Avolio (2002), Geczy et al. (2002), Mitchell et al. (2002), Ofek and Richardson (2003), and Reed (2001)), unfortunately using sample periods of short duration. Jones and Lamont (2002), using a longer sample of shorting costs, show that stocks that are expensive to short or that enter the lending market have high valuations and low subsequent returns. Indirect costs of shorting can come from options as in Figlewski and Webb (1993), Sorescu (2000), Lamont and Thaler (2003), Ofek, Richardson, and Whitelaw (2003).

Proxies for shorting demand include breadth of ownership (Chen, Hong, and Stein (2002)), dispersion of beliefs (Diether, Malloy, and Scherbina, 2002), or the level of short

interest (Figlewski (1981), Figlewski and Webb (1993), and Dechow et al. (2001)).

Unfortunately, using short interest as a proxy for shorting demand is problematic, because the quantity of shorting represents the intersection of supply and demand. The quantity of shorting should respond to both the cost and benefit of shorting the stock, so that stocks that are very costly to short will have low short interest. Stocks that are impossible to short have an infinite shorting cost, yet the level of short interest is zero. Lamont and Thaler (2003), for example, examine a sample of technology carve-outs that appear to be overpriced. In one case they study, the apparent overpricing and the implied cost of shorting fall over time, while the level of short interest rises. Thus short interest can be negatively correlated with shorting demand, overpricing, and shorting costs. The problematic nature of short interest leads to weak empirical results.

E. Reaction to news

Another strand of literature looks at the reaction of prices to news about short sales. In rational models such as Diamond and Verrecchia (1987), informed investors sell short, but once short interest is announced stock prices should immediately adjust to take into account the negative information. Consistent with this idea, Aitken et al. (1998) find that stock prices fall immediately in response to announced increases in short interest.

The anti-shorting actions studied here might reveal something both about the presence of informed pessimists, and the information possessed by the firm. For example, perhaps only firms that believe themselves to be overpriced engage in anti-shorting actions, since underpriced firms know that the market will eventually recognize their true worth. As in the Solv-Ex case, empirically many firms accuse short sellers of fraud, but are in fact themselves guilty of fraud ("The lady doth protest too much, methinks." Hamlet. Act iii. Sc. 2.). One short seller in the

sample noted "we can look at a company that is attacking us. When we have the goods on that company, it tells us we are onto something. The louder they scream, the better the short." (Pender, 1989)

While the information revealed by anti-shorting actions is an interesting topic, it isn't explored here. Rather, the hypothesis tested is whether anti-shorting actions lead to predictable low returns. Under the hypothesis of efficient markets with no frictions, prices should immediately adjust to new information, and post-event returns should be unpredictable. The empirical question studied here is not reaction to news, but rather long-term returns based on lagged public information.

II. Constructing the sample

I searched Lexis, Dow Jones Interactive, and other text sources for episodes featuring reported disputes between short sellers and firms, ending in June 2002. These sources contained newspaper and magazine articles, newswire items, transcripts of broadcast media, and press releases. "Firms" were in most cases firm management, but in a few cases were large shareholders of the firm. I searched on key words such as "short seller", "lawsuit," "conspiracy," and so on. Finding the relevant events was a time-consuming and labor-intensive process that involved reading several thousand pages of text. Coding the events sometimes required judgment calls, and information was often incomplete or ambiguous.

I find 327 events from 266 different firms, the earliest event in March 1977, and the latest in May 2002. Media coverage is thinner in earlier years, and 77% of the events occur after 1990. In addition to events, I also have (up to June 2002) returns, market equity, and volume from CRSP, book values from Compustat, and short interest from the NYSE (from 1992 to 2001) and NASDAQ (from 1995 to 2001). To get in the sample, a firm must be common stock in CRSP

with data available within the first 12 months after the event (this excludes OTCBB stocks, which are the source of many extraordinary anti-shorting episodes). I exclude cases involving merger arbitrage or convertible securities arbitrage.

The sample includes events where the firm mounts some sort of defense against short sellers, or accuses short sellers of wrongdoing (and thus implicitly raise the threat of legal action). The sample includes nine types of events, sorted into three categories. The first category is belligerent statements about short sellers, ranging from threats of legal action to detailed refutations of short seller's claims. The second category is taking legal or regulatory action against short sellers. The third category is taking technical action to prevent short selling. Table I lists the different events types of events.

A. *Belligerent statements*

The first category, belligerent statements, is when the firm claims that short sellers are acting improperly to cause the stock price to go down. I include in this category cases when the firm expends some effort refuting or denouncing short sellers, but falls short of taking specific actions. Belligerent statements often contain explicit or implicit threats of legal action against short sellers. Although belligerent statements themselves do not impede short sellers, they do indicate a greater likelihood that the firm will take some anti-shorting action in the future. Belligerent statements include any case in which firms explicitly accuse the short sellers of making illegal or improper actions, or disseminating false information. I exclude from the database cases where the firm mentioned short sellers but did not accuse them of improper action.

Belligerent statements come in three types. The first is when the firm claims some sort of conspiracy by short sellers, and includes claims of illegal shorting or stock price manipulation.

A typical statement is "We continue to firmly believe that ...stakeholders have been victimized by stock manipulators." (Knight, 1998) This category also includes claims that short sellers were harassing or manipulating customers, investors, or suppliers.

The second type (which was often difficult to distinguish from the first) was the claim the short sellers were spreading misinformation about the firm. Typical cases claimed lies, rumors, or planting negative stories in the media. To get into the database, firms had to either explicitly discuss the role of short sellers in spreading these lies, or to be rebutting someone who was publicly acknowledged to be shorting the stock. A typical statement is "These false rumors regarding both the company and its products have been spread by short sellers of the company's stock." (System Software Associates Inc., 1995)

Third, firms state they are considering their legal options and thus threaten potential legal action against short sellers or critics. A typical statement is "The Board of Directors has directed legal counsel to protect the Company's integrity and reputation and they will be assessing the legal remedies which the Company may pursue." (Quigley Corporation, 1997) This category also includes cases where the firm states they are undertaking their own investigation of short sellers, including hiring outside counsel or hiring private investigators.

B. Legal actions

I break legal or regulatory actions into two types of events. The first is when firms publicly announce that they are requesting an investigation by regulatory authorities, usually the relevant exchange or the SEC. This category also includes cases where the firm claims the SEC is already investigating short sellers. It is sometimes the case that when short sellers claim the SEC is investigating the firm for accounting shenanigans, the firm will respond by claiming that the SEC is investigating the short sellers for price manipulation.

This category also contained five cases when the media (as opposed to the firm) reports that the SEC or exchange actually are investigating short sellers. Although not every case reveals that the firm alleged wrongdoing, in each of the cases the reports occur after other anti-shorting activities by the firm. It seems reasonable to infer that the firm complained to regulators. This category also includes eight cases involving 1989 Congressional hearings about short selling. Media reports indicated that the hearings were initiated by disgruntled firms (these hearings are discussed further in Section VII).

The second type of legal action is lawsuits initiated by the firm or by shareholders against short sellers or critics. Sometimes these lawsuits were against short sellers or brokers, and sometimes against media outlets or analysts. Of the 35 lawsuits, 7 were "cybersmear" lawsuits involving electronic postings by unknown persons. These lawsuits usually speculated that the posters were short sellers: "In its libel suit, Hollis-Eden alleges the defendants, named only by their screen aliases, could be disgruntled former employees and shareholders or people working with short sellers to manipulate the stock." (Crabtree, 2001)

C. Technical actions

Firms can make it difficult to short their stock by disrupting the ability to borrow shares. One technical action taken by firms in the sample was to switch stock exchanges from the NASDAQ to AMEX or NYSE. For much of the sample period, NASDAQ was perceived as being more lax in its short selling rules (it did not adopt the uptick rule until 1994). The sample includes six firms announcing that they were changing or applying to change exchanges explicitly to impede short selling (event dates range from 1988 to 1996).

Second, as in the example of Solv-Ex (discussed in the introduction), 29 firms urge or suggest that shareholders collectively withdraw their shares from the stock lending market. A

prominent example is Irwin Jacobs, an investor who owned 5% of Conseco. In July 2000 he waged a personal campaign against short sellers, spending $400,000 for full-page ads in the New York Times and Wall Street Journal, calling on fellow shareholders to take their shares "in-house." (02/19/2001 Forbes).[1]

Third, firms attempt in a variety of ways to get shares into the hands of friendly owners, who presumably will not lend their shares. I classify 7 events of this type, and they include a number of loosely related actions. Again, all require that the stated action be explicitly in response to short sellers or taking place within the context of a battle with short sellers. Two are when the CEO of the firm announces that he is setting up an entity to buy and sell firm shares, using his own personal money. Three are when the firm announces it is repurchasing its own shares (I require that the announcement specifically mention short sellers). One is when it is announced that a large shareholder is withdrawing his shares from the lending market. One is when a firm announces that the employee stock ownership plan is acquiring shares. A last is when a firm offers to lend money to its shareholders to replace margin loans, so that the shareholders can place their stock in cash accounts (brokers typically can lend shares of their customers in margin accounts but not cash accounts).

The last category contains miscellaneous trading-related actions to impede short selling. There are six cases where firms do splits or distributions which are apparently designed to force short sellers to close out their positions. For example, one firm required holders to send their stock certificates to the firm's transfer agent to be eligible to receive a stock dividend. Another firm did what was effectively a 1.1 for 1 stock split, with the same intention.

In three other cases, firms initiated trading halts explicitly in response to short sellers. The policy of the New York Stock Exchange is that firms should warn the NYSE ten minutes

prior to major announcements, and sometimes the NYSE halts trading for a brief period, often 10 or 20 minutes, while the information is disseminated. One of these cases is described by Asensio (2001). After Asensio (a short-seller) had released a negative report on a firm, the firm informed the NYSE that a major announcement was forthcoming and trading stopped at 10.44 am. Trading did not finally resume until 3.52 pm, eight minutes before the exchange closed, and in those eight minutes the price rose. According to Asensio, "someone had done a helluva job rallying the troops...By that time the institutions had galvanized enough buyers to run up the stock." The firm did not make a major announcement, but only released a press release denouncing Asensio.

D. Limitations of the database

The database is surely an incomplete record of anti-shorting action taken by firms. First, it does not reflect private anti-shorting actions, such as private lawsuit threats made by firms. Many events only appear in the sample because they are deemed interesting or newsworthy. It is undoubtedly the case that many anti-short selling actions do not get into the database because they are not reported in the media. As a result, the database is only a partial reflection of reality, and in particular it is likely that when firms take multiple actions, only some of them are reflected in the database. Coverage is particularly incomplete in the early years of the sample.

Some firms appear multiple times in the database since they took multiple actions. For this reason, the totals in the rightmost column of Table I are not always the sum of the individual categories. My coding strategy is to stop collecting belligerent statements on the first date that technical or legal events take place, so by construction the sample contains no belligerent statements after a legal or technical event. Probably many of the firms making belligerent statement subsequently take technical/legal actions that are not reflected in the database because

they are not reported in the media. In addition, in each subcategory I collect only the first event and so subsequent instances are ignored.

E. Excluded cases

I exclude a variety of other forms of harassment of short sellers and suppression of criticism, since these anti-shorting actions were difficult to systematically classify. These cases range from the farcical to the tragic.

According to sworn testimony, Charles Keating Jr. (of the famous Keating Five) wanted to buy every copy of Forbes magazine sold near branches of his Lincoln Savings, because the magazine contained critical comments (The Dallas Morning News, 1991). In other cases, firms attempt to prevent short sellers from asking questions at conference calls or annual meetings. In one case, when a short seller tried to ask a question at the annual meeting of Cineplex Odeon, he was drowned out by a "prolonged and very loud coughing fit" which made his question inaudible (Hubbard, 1990). Both Keating's firm and Cineplex are included in the sample because of other reported incidents.

There are various reports of short sellers (and sometimes journalists or analysts) receiving death threats, requiring bodyguards, and arming themselves. In at least one case, someone may have been killed because of short selling. The case involves Tel-Com Wireless Cable TV, whose official spokesperson was Ivana Trump. On 12/14/1998, *Barron's* reported that "several terrified investors told Barron's and the police that their families had been threatened by convicted criminals who accused the investors of selling short" (the firm gets in the sample, not because of this accusation, but because of the firm's subsequent rebuttal). A year later, 11/01/1999 , *Barron's* reported that one of the threatened individuals had been found murdered, execution-style, in Colts Neck, New Jersey.

The sample includes only explicit anti-shorting actions. I exclude from the sample some events which seemed to be anti-shorting but where the participants denied trying to hurt short sellers. For example, octogenarian potato tycoon J.R. Simplot was a major shareholder of Micron Tech, and also controlled an unrelated firm, the J.R. Simplot Company. He offered to his workers at Simplot the following employee benefit: "Mr. Simplot will make whole any loss" on Micron shares they buy (essentially giving employees a put option as long as they bought shares) (Lowenstein, 1989). Although it was speculated in the press that this was intended to hurt short sellers (by increasing share prices and putting more shares into friendly hands), the J.R. Simplot Company denied this allegation.

In addition to the public manipulation of the stock loan market discussed previously, there are also allegations of private manipulation by institutional owners. One such accusation (Browning, 1996) is that Fidelity Investments deliberately withdrew its shares of Chesapeake Energy from the stock loan market in order to drive up the price. Fidelity denied this allegation.

An extreme example of stock loan manipulation the "corner". Suppose B borrows shares from A and sells them short. Now A acquires 100 percent of the shares (or at least 100 percent available in the market) of the stock and demands that B return the shares. In this case the only way B can return the shares is to buy them (at an inflated price) from A. Corners probably occurred (in US equity markets) more frequently in the late 19th and early 20th century, a prominent late case being the Stutz Motor corner of 1920 (Meeker, 1932). Two recent cases in the US occurred in the late 1980's. The president of Southland Communications was tried and convicted for driving his stock price up by cornering the firm's stock through secret trades (Lansner, 1998). In another case, the SEC determined that two individuals had orchestrated a corner in Chase Medical and that they controlled 109% of the public float (Siconolfi, 1989).

Neither of these cases are reflected in the sample since they were not public anti-shorting actions.

III.   Characteristics of the sample

Table II shows the characteristics of the 266 firms in the sample. It shows the characteristics of the firms in the month prior to the month in which the first event takes place. For example, in the "all events" row, the statistics are for the month end preceding the first event, even if multiple events take place. The table shows the percentile ranking of the variable relative to all stocks in CRSP in the same month.

Looking first at size, the average ranking for all events is 67 percent, so that event firms are above median relative to the universe of firms in CRSP. This characteristic may reflect the fact that larger firms are more newsworthy. Market-book ratios show that event firms are growth firms, since they are in the upper quartile of valuation. Strikingly, event firms have very high trading volume in the month before the event (trading volume is measured as share turnover relative to other stocks on the same exchange). Part of this high volume of 87 percentile may reflect information released around the event date. However, 12 months before the event month, it is still the case that event firms have percentile turnover of 77 percent. One interpretation is that volume proxies for differences in opinion (agents trade when they disagree), and thus these are firms where investors have very dispersed opinions. Under short sale constraints, high volume may predict low future returns (see for example Diether 2004). Looking at pre-event returns, the differences are less dramatic. Prior one year returns are slightly above median and prior month returns are about the same as the median stock. Thus events do not seem to be triggered by extreme stock price movements at the monthly or yearly level. Last, looking at the ratio of short interest to shares outstanding, it is not surprising to see that immediately prior to the event, firms have very high short interest relative to the other stocks.

In summary, event firms are high volume, high short interest, growth firms of above median size.

IV. Long run returns

A. Event time returns

Under the overpricing hypothesis, post-event returns should be low. Table III shows monthly returns subsequent to the event, for different time horizons. It shows event time returns with a very simple risk-adjustment procedure: returns are market-adjusted by subtracting out the return on the CRSP value weighted index (later I show calendar time returns with different risk adjustments). The table shows average monthly returns earned by buying the event stock on the last day of the month in which the event is publicly observed. Thus it measures post-event long-term performance.

First looking at the all event, one year cell, Table III shows that event firms have very low returns.[2] In the twelve months subsequent to any event, firms have returns that are a whopping 2.34 percent per month lower than the market, and this difference is highly statistically significant. In terms of the magnitude, the two percent per month is in the same ballpark as the large estimates found in other cases of extreme short sale constraints. Jones and Lamont (2002) found that highly constrained firms had abnormal returns of -1 percent per month in the year subsequent to becoming constrained, for the period 1926-1933. Lamont and Thaler (2003) find abnormal returns of -10 percent per month over an approximately six month period for a sample of six cases involving short sale constraints, for the period 1998-2001. Ofek, Richardson, and Whitelaw (2003) find abnormal returns of about -2 percent per month for a sample of short sale constrained stocks, for the period 1999-2002.

Looking now at the different time horizons, two facts emerge. First, the low returns are highly persistent, and continue for years. In the 36 months after any event, the market adjusted returns are -1.48 percent per month, so that the cumulative fall is 42 percent. The last column shows that, even after excluding the first year (so that the sample is firms which had an event in the past three years but not in the last year), market adjusted returns are a substantial -0.89 percent per month. While this number has a t-statistic that is less than two, partially because the sample contains fewer observations since many have gone bankrupt or been delisted, it is economically large. Thus the time pattern is consistent with overpricing that is only slowly corrected through time. The effect is not primarily a short-term under-reaction to bad news that gets quickly corrected. Rather, it is a long-term overpricing phenomenon, with time pattern similar to the value effect.

Second, it is clear that the returns are lowest immediately after the event, and gradually the effect weakens over time. Thus there is no evidence in Table III to support the idea that one should buy stocks after an event occurs, in anticipation of a short squeeze (Section VI examines in more detail a subset of these events, and look at daily returns around event dates).

Looking across the different types of events, there does not seem to be much difference in mean returns. In drawing inferences about the effect of short sale constraints, the legal and technical categories may be more reliable, since the belligerent statement category is somewhat more ambiguous. Belligerent statements are just cheap talk, and require more researcher judgment to define the event. In contrast, technical and legal events are tangible actions. Since all three categories of events predict large and statistically significant underperformance of returns in the subsequent year, it is not necessary to use the belligerent category to draw inferences about the effect of events. Even excluding belligerent statements, there is strong

evidence that anti-shorting events are followed by very low returns. In regressions not shown, there is no statistically significant difference in returns between the three classes of events (belligerent, legal, and technical). Measurement error may be responsible for some of these similarities, since some belligerent firms probably also take unobserved legal or technical actions. Since there are not detectable differences between the categories, the rest of the paper discusses the "all events" row only.

The effect is robust to different methods. First, the calculations in Table III include the effects of delisting returns: 30 of the 266 firms delist in the twelve months after the event. Excluding these delisting returns, the average market adjusted return at the one year horizon is -2.05 instead of -2.34.[3] Second, the effect is large and significant both before and after 1990.

B. Calendar time

Table IV reports calendar time portfolio returns for the one year horizon, showing both market adjusted returns and two other adjustment methods. One should be cautious using calendar time returns here, since in the early years there are very few firms per month in the event portfolios, often only one. As it turns out, calendar time and event time calculations give about the same answer. The first column shows market adjusted returns. For all events, market adjusted returns are -2.85 percent per month over the 257 months of the sample, slightly higher than Table III's number.

As shown in Table II, event firms tend to be growth firms, so it is important to test whether the return effect reflects only this fact. The next column of Table IV shows characteristic adjusted returns which control for size, value, and momentum. Following Daniel, Grinblatt, Titman, and Wermers (1997), it subtracts from the event firm return the return on a portfolio of firms matched on market equity, market-book, and prior one-year return quintiles (a

total of 125 matching portfolios).[4] As expected, this adjustment decreases the magnitude of the effect, but the remaining effect is still strikingly large and significant.

An alternate way to adjusted for value, size, and momentum is to calculate alpha's from a factor regression. The last column of Table IV reports intercepts from a four factor model where the factors are the market, size, and value as in Fama and French (1993), augmented with a prior year return factor as in Carhart (1997).[5] Again, after this risk adjustment, a large and significant effect remains.

The last row of Table IV shows the value weight instead of equal weight returns. Here the returns are somewhat less dramatic, though the effect is still substantial and statistically significant (it is significant for the two-sided hypothesis for the factor regression, and for the one-sided hypothesis for the market adjusted and characteristic adjusted means). The fact that value weighting gives a smaller effect is consistent with the idea that smaller stocks are more difficult to short and thus can be more overpriced.

Table V shows the coefficients from the four factor regressions. Most notable are the coefficients on value and momentum factors. For the value factor, the coefficient is insignificantly different from zero, suggesting that these firms' returns do not behave much like other growth firm returns. For the momentum factor, the coefficient is significant and negative, suggesting these firms returns are behaving like firms with negative momentum. This finding is not surprising: these firms have falling prices during the 12 month post-event period in which these factor loadings are estimated, so one might expect their returns to be correlated with other firms with falling prices. Table II showed that prior to the event, the firms had positive (not negative) momentum since their prior year returns were above median. If one re-estimates the regression for the one month after the event (rather than the 12 months), one gets a positive

loading on the momentum factor. So going into the event the firms have positive momentum, after the event they have negative momentum.

In summary, event firms have extremely low subsequent returns that are not explained by value, size, or momentum, using either characteristic adjustment or factor models. Event firms have returns are two to three percent lower than non-event firms.

V.   Effect on shorting costs and short interest

This section looks at direct evidence on the ability to short the event firms. One measure of the cost and difficulty of shorting comes from the stock lending market. While I do not have access to data on rebate rates in the stock lending market for the sample firms (these data are proprietary and generally go back only a few years), I can compare the sample with a list of high cost stocks provided in D'Avolio (2002). He lists 35 firms with very high shorting cost in his sample of April 2000 – September 2001 (the annual shorting costs range from 10% to 79%). In April 2000, there are 6647 valid firms in the CRSP database, so about 0.5% of the universe has very high shorting costs. I compare his list to the firms in my sample with initial events between April 1999 (one year before his sample starts) to September 2001 (when his sample ends). There are 36 firms in my sample during this period. The overlap of the two groups consists of six firms; thus 16% of the event firms have very high shorting costs, a much higher rate than the 0.5% in the general population of stocks. It is clear that the probability of such a high degree of overlap is miniscule. Thus the sample is much more expensive to borrow than a random sample of firms, consistent with the hypothesis that the sample firms are subject to short sale constraints.

Other evidence comes from reported short interest for each stock. Here, one lacks a natural null hypothesis to test. Unlike the case of returns, where the natural null hypothesis is that post-event returns are unpredictable, it is difficult to tell simple by looking at the quantity of

shorting whether the anti-shorting events have any effect.

Figure 1 shows the average ratio of short interest to shares outstanding in event time.[6] Six months prior to the event, the ratio is already elevated at around 5.5% (a level which is the 78th percentile relative to the universe of all stocks). It rises steadily over time, peaking two months after the event at 10.7% (the 92nd percentile), and remains roughly constant thereafter. One interpretation is that the rising level of short interest causes the firms to take the anti-shorting actions.

While it is difficult to interpret these results in the absence of a null hypothesis, it seems clear that something is happening around the event date, since the rapid rise in short interest halts. In that sense, it could be that the anti-shorting actions are effective at stopping the growth of short interest. On the other hand, the actions certainly do not cause the level of short interest to substantially and rapidly decrease. Since one doesn't know what short interest would have been in the absence of an anti-shorting event, it is impossible to draw solid inferences from this evidence.

In summary, the anti-shorting firms are expensive to short, and there is a large increase in short interest prior to the event itself.

VI. Short squeezes

This section examines in more detail the events where firms attempt to coordinate a short squeeze by asking their shareholders to withdraw shares from the stock loan market. I focus on this event since it is the most common of the technical events designed to create a squeeze.

Journalists and market participants often cite short squeezes as explanations for movements in stock, bond, and commodity markets. One common definition is that a short squeeze occurs when the price of a security rises, causing the short sellers to experience a decline

in net wealth. Either because of lower wealth, increased risk aversion, fear of further price rises, or margin calls, the short seller then covers his position, increasing the demand for the security and driving the stock further up. In contrast, the definition of a short squeeze used here is when a short seller is involuntarily forced to cover his short position because he is no longer able to borrow the security. Most of the literature on short squeezes focuses on either theoretical issues or empirical findings in the bond, commodity, and derivative markets (for example Jarrow 1992, 1994, Jegadeesh 1993, Kumar and Seppi 1992, Merrick, Naik, and Yadav 2002, Nyborg and Sundaresan 1996, and Pirrong 1993, 2001). D'Avolio (2002), using data from the stock lending market, finds little evidence for short squeezes in his 18 month sample.

Wall Street wisdom suggests that high short interest stocks are good to own because they may rise due to a short squeeze. According to this view, one should be willing to buy overpriced stock in anticipation of a short squeeze that will drive prices still higher. An example of this idea is given in the case is GenesisIntermedia (which also illustrates direct manipulation in an attempt to enrich specific individuals). On April 25, 2001, Chief Executive Ramy El-Batrawi sent a letter to shareholders asking them to contact their brokers and have shares put into cash accounts, making the shares unavailable for lending to short sellers. Between April 25 and May 25, the stock rose 39%.

GenesisIntermedia was 92% owned by a group of four insiders, including 45% owned by its chairman, Saudi financier and arms merchant Adnan Khashoggi (a central figure in the Iran-Contra affair). According to Hirsch (2001):

> "I think that after our chairman sent out his letter, our shareholders started to take possession of some of their shares, forcing the shorts to cover their positions," said Douglas Jacobson, the company's chief financial officer. "There also may be upward pressure on the stock from people seeing the letter and then buying in anticipation that the short squeeze will get more dramatic." Indeed, Jacobson conceded that Khashoggi might be among those investors and might eventually sell shares to bring his holding

closer to the third of the company he owned previously. According to documents filed with the Securities and Exchange Commission, Khashoggi purchased more than 60,000 shares at about $11.30 each since El-Batrawi's letter. "It could end up being very good for him to have the shorts buy back shares from him," Jacobson said.

There are 29 cases where firms attempt a coordinated loan withdrawal. For the purposes of this section, I discarded five of these. Two had event dates that were identified only by month (these events are reflected in the long term returns shown in section IV). Three have no clear event date, since media reports simply mentioned that discouraging lending was a continuing policy of the firm (these events are reflected in the long term returns shown in section IV, with the event date set equal to observation date). Of the remaining 24 cases, 22 were clearly public information that was available in real time, and in two cases the event was semi-private, and only appeared in the media subsequent to the event (these two cases are reflected in the long term returns shown in section IV, with the event date set equal to observation date).

Before reviewing the evidence on these actions, it is instructive to consider how these events differ from other events typically studied in financial economics. First, these events are not clean and exogenous. Unlike, for example, earnings announcements, which come at pre-announced and regular intervals, these events are entirely endogenous and occur partly in response to the level of stock prices. Other news (including about other anti-shorting activities) may also be occurring in the same window. Second, these events are not only information events, but also technical events reflecting the operations of the stock loan market. In a world with frictions (as opposed to the standard assumption of frictionless and informationally efficient markets), it is not clear whether one would expect prices to immediately reflect the short squeeze, or to slowly respond as the squeeze is put in effect. It presumably takes some time for investors, after receiving the suggestion, to contact their brokers to withdraw their shares from the loan market, and short sellers who have their loans withdrawn have several days to deliver

the shares. Last, the evidence will necessarily have a limited ability to measure the efficacy of anti-shorting actions. It is hard to tell whether an anti-shorting action has any effect because one doesn't know how much shorting there would be in the absence of action. It could be that prices would have fallen faster if the action had not been taken. All that can be said is that one can be fairly confident that the anti-shorting actions did not make life easier for short sellers.

Figure 2 shows volume around event days (days are trading days, not calendar days). The volume is expressed as the percentile of exchange-adjusted turnover relative to the CRSP universe. As shown in Table II, event firms tend to be high volume firms in general, and before the event the firms tend to be in the top quartile of turnover. Volume spikes up on the event date, suggesting that something is indeed happening on that day. Even with only 24 firms, this spike in volume on the event day is statistically significant. D'Avolio (2002) reports that high recall days have extremely high trading volume, consistent with the event causing recall of stock loans. Of course, this spike does not prove that the anti-shorting action is causing volume to increase; it could be that the action is taken in response to higher volume or to some other unobserved event.

Figure 3 shows cumulative average market adjusted returns around event days. Since returns are so volatile and there are only 24 firms, standard errors are large, and one would need incredibly large mean returns in order to get statistical significance. Figure 3 shows that cumulative returns are not incredibly large, and thus there is generally nothing in Figure 3 that is statistically significant. Looking at the point estimates, there is some evidence that the actions do succeed in slightly raising prices temporarily. Cumulative returns are 4.6 percent from day t-5 to day t+5. By day t+20, a month after the event, however, nothing much has changed. The most notable feature of Figure 3 is the pre-event increase in returns, reflecting perhaps insider buying in anticipation of the squeeze, or perhaps other events. Figure 3 also shows cumulated

alpha's from the Fama-French 3-factor model estimated on daily data, which are about the same as cumulated average market adjusted returns.

Summarizing, these actions do not seem to have much ability to raise prices, although it could be that absent these events prices would have fallen more. What is clear is that this ability, if it exists, is only temporary, and that long-term returns on these stocks are abysmal.

VII. Conclusion

The evidence shows that when firms take anti-shorting actions, their stock returns are extraordinarily low over the subsequent months and years. The evidence confirms the hypothesis that short sale constraints allow stocks to become overpriced. While the underperformance of -2 per month is very large, it is similar in magnitude to the -1 to -10 range found in other studies of stocks with very high short sale constraints.

The 25 years of evidence studied here is valuable because of the difficulty of finding direct data on short sale constraints. Jones and Lamont (2002) find data for six years (1926-1933) while Lamont and Thaler (2003), and Ofek, Richardson, and Whitelaw (2003) studied data for a few years around the year 2000. Each one of these four data sets has unique characteristics, and it is conceivable that any one result reflects chance or an unusual sample period. But taken together, the evidence shows that in extreme cases where short sellers want to short a stock but find it difficult to do so, overpricing can be very large.

What should an investor do if he sees a firm taking an anti-shorting action? The evidence here cannot say whether it is a good idea to short this stock. Although one can make large gross returns on average if one is able to maintain a short position for months, maintaining the short position might be difficult or expensive. Even if there are no problems borrowing the stock, a short seller may need to spend time and money dealing with lawsuits and investigations. It is

unclear how these costs and benefits net out. It is clear, however, that it is a bad idea in general to own stock in a firm that is taking these actions. Investors seeking high returns should look elsewhere.

The fact that firms take anti-shorting actions tells us that they must believe these actions are worth doing. A substantial body of research studies whether firms opportunistically take advantage of mispricing by issuing equity when it is overpriced and buying it back when it is underpriced (for example Loughran and Ritter, 1995). Corporate managers certainly say they are trying to time the market (Graham and Harvey, 2001). However, it is usually difficult to discriminate between the hypothesis that firms are responding to rational changes in discount rates as opposed to over- or under-pricing (see for example Lamont (2000), Polk and Sapienza (2004)). The anti-shorting actions studied here show that firms are not just passively responding to market signals, but are in fact actively trying to prop up their stock prices. In this respect the phenomenon is similar to the evidence on earnings accruals, which can be interpreted as firms actively manipulating accounting numbers to cause overpricing. Similarly, firms encourage analysts to issue optimistic forecasts, and reward optimistic analysts with investment banking business (see for example Michaely and Womack 1999).

Although I interpret the evidence as consistent with short sales constraints causing overpricing, there are two alternative explanations of the results. The first alternative explanation is that anti-shorting actions are a signal that insiders know that the firm is overvalued, so that the low returns reflect inside information instead of short sale constraints. While it is certainly true that anti-shorting actions may reveal negative inside information, this story does not explain why it takes so long for the information to be reflected in stock prices. With no frictions, the information should be immediately incorporated. In contrast, short sale

constraints provide an explanation for the slow reaction of prices to information. Since the effect persists for years, the low returns are not primarily a short-term under-reaction to bad news. Rather, the low returns reflect persistent overpricing.

A second alternative explanation, favored by the firms used in the sample, is that short sellers are actually manipulating prices, driving prices down over long periods of time. The problem with this explanation is that many of the sample firms are subsequently revealed to be fraudulent. Thus the short sellers are identifying firms having bad fundamental value. This paper has presented a rogues gallery of shady characters, ranging from Charles Keating to Adnan Khashoggi. In public battles between short sellers and firms, short sellers usually are vindicated by subsequent events. The evidence suggests that short sellers play an important role in detecting not just overpricing, but also fraud. Policy makers might want to consider making the institutional and legal environment less hostile to short sellers.

Consider, for example, one episode from the sample. In 1989 Congress held hearings about the evils of short selling, featuring testimony from supposedly victimized firms. During the hearings, Congressman Dennis Hastert (later speaker of the US House of Representatives), described short selling as "blatant thuggery". But who was the victim and who was the thug? During the hearings, an SEC official testified that "many of the complaints we receive about alleged illegal short selling come from companies and corporate officers who are themselves under investigation by the Commission or others for possible violations of the securities or other laws." (U.S. House of Representatives, 1991, Pages 434-435). Officials from three firms testified. Subsequent to this testimony, the presidents of two of these three firms were prosecuted for fraud (for the third firm, the SEC determined the company had made materially false and misleading statements, but that the evidence was insufficient to prosecute). [7]   More

systematic evidence on this point comes from Dechow et al (1996), who study SEC enforcement actions for earnings manipulation, and Griffin (2003) who studies earnings restatements leading to shareholder lawsuits. Both find that short interest rises surrounding these negative events, and starts to rise several months prior to the public announcement of bad news. This evidence indicates that short sellers are able to anticipate bad news about earnings and identify fraud.

Most firms do not take anti-shorting actions, and for most large cap stocks it is not difficult to sell short. Thus one cannot conclude from the evidence that short sale constraints are pervasive phenomena in stock pricing. What we do know is that for most stocks, very little short selling occurs (relative to other trading activity) and most investors never go short. Thus *something* is constraining short selling, perhaps lack of knowledge about shorting, institutional constraints, risk, or cultural issues. Generalizing from the narrow (but dramatic) evidence presented in this paper, one can speculate that these more general short sale constraints also affect stock prices.

ENDNOTES

[1] One complication is that these letters were not always reported in the media in real time (in the case of Solv-Ex, the February letter was not reported until August). Thus sometimes these letters are semi-public information, known to large shareholders but not necessarily to all investors. When examining long-term returns, I use only completely public information (in section VI, I look at event studies and consider the semi-public information as well).

[2] There are a small number of firms for which the event date is clear and occurs in a month prior to the observation date (the first time the event is mentioned in the media). These firms are included in the long-term returns after the observation date, but the "first 12 months" is in reference to event date. So if the event occurs in January and I observe it in March, it gets into long-term return portfolio in March but stays for only 10 months not 12. The same holds true for firms which are not in CRSP in the event month but are subsequently added. In cases where there is no well defined event date, I use the observation date for the event date. To eliminate double counting, a firm only is reflected in a given average once in any given month. For example, a firm is included in the all event calculation in month t if any event occurred in months t-12 to t-1.

[3] I plugged in the delisting return from CRSP into the monthly return sequence in the month after the last available regular return. So if a firm delists in February, has the last monthly return in January, and CRSP records a delisting return in April, I plug that delisting return in for February. Following Shumway (1997), in the very few cases where no delisting return is available, I plug in -30%.

[4] These 125 portfolios are reformed every month based on the market equity, M/B ratio, and

prior year return from the previous month. However, following Fama and French (1993), the M/B ratio is only updated annually in July, based on the value as of the previous December.

[5] I am grateful to Ken French for this data. All four factors come from his web page. They are RMRF, the excess market return, SMB (the return on small stocks minus big stocks) and the HML (the return of high book-market stocks minus low book-market stocks), and a price momentum factor, UMD (the return of stocks with high prior year returns minus stocks with low prior year returns). UMD is created by French and is slightly different from the factor constructed by Carhart (1997).

[6] The data on short interest is limited (from 1992 to 2001 for the NYSE, and from 1995 to 2001 for NASDAQ) and data availability cuts the sample by more than half.

[7] The three firms, with citations to the subsequent SEC charges, were American City Business Journals (Wall Street Journal, 1991), Carrington Laboratories (U.S. House of Representatives, 1991, p. 513), and IGI, Inc. (Wall Street Journal, 2002). As mentioned in Section II, there are a total of eight firms involved in the Congressional hearings, but these were the only three in which company officials actually testified.

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Table I
Distribution of events

The sample is firms which have at least one monthly return in the 12 months following the event.

Description	Comment	Number Events	Number Firms
Claims conspiracy	Conspiracy/bear raid/manipulation/illegal	29	29
Alleges lies	Lies/rumors/planting stories/inaccurate statements	125	125
Considering options	Consider options or conducting investigation using outside counsel or private investigator	21	21
All belligerent		175	159
Requests investigation	Requests investigation by authorities (usually SEC or exchange), or claims one is underway, or media reports that authorities are investigating shorters	66	66
Lawsuit	Announcement of lawsuit or of retraction based on litigation	35	35
All legal	All legal	101	98
Exchange switch	exchange switch/seeking exchange switch	6	6
Urge not lend	Urges (or "suggests") that shareholders not lend shares to shorters	29	29
Friendly owners	CEO sets up system to buy own stock, or firm announces repurchase explicitly in response to shorters, Friendly owners withdraw shares from lending market, lending by firm to shareholders, or employee stock ownership plan buying shares	7	7
Other technical	Split/distribution/halt	9	9
All technical		51	43
All events		327	266

Table II
Characteristics of event firms (percentiles) in month prior to event

Percentile variables in the month prior to event, compared to the universe of CRSP firms. For firms which do not have data for the month prior to the event, the characteristic is from the month preceding the first return observation. Size is market equity. M/B is market-book ratio (market value of equity divided by Compustat book value of equity). The timing of M/B follows Fama and French (1993) and is as of the previous December year-end. Volume is monthly turnover (volume divided by shares outstanding) minus the median turnover of all stocks on the same exchange. Short interest ratio is the ratio of short interest to shares outstanding.

	Number	---------------------- Percentiles ----------------------				
	Firms	Size	M/B	Volume	$R_{t-12,t-1}$	$R_{t-1,t}$	Short interest ratio
Claims conspiracy	29	68	78	95	71	49	89
Alleges lies	125	72	75	88	68	53	88
Considering options	21	78	81	89	61	60	86
All belligerent	159	72	76	89	67	52	88
Requests investigation	66	67	81	85	69	58	86
Lawsuit	35	60	84	86	56	49	92
All legal	98	64	82	85	65	54	88
Exchange switch	6	67	96	68	42	76	82
Urge not lend	29	55	71	81	47	43	87
Friendly owners	7	76	66	84	75	75	74
Other technical	9	46	83	89	71	58	76
All technical	43	56	77	81	56	52	81
All events	266	67	77	87	64	53	86

Table III
Market adjusted returns subsequent to events

Average monthly market-adjusted returns in percent. Market-adjusted returns are returns minus the return on the CRSP value weighted index. The t-statistics, in parenthesis, use standard errors adjusted for the clustering of dates in calendar time.

	One month	Three month	One year	Three years	2 to 3 Years
	t to t+1	t to t+3	t to t+12	t to t+36	t+12 to t+36
Claims conspiracy	-2.64 (0.33)	-2.28 (0.68)	-4.37 (2.73)	-2.77 (2.54)	-1.63 (1.22)
Alleges lies	-1.62 (0.67)	-2.08 (1.61)	-1.71 (1.96)	-1.31 (2.03)	-1.06 (1.55)
Considering options	-5.10 (0.63)	-8.19 (2.48)	-5.79 (3.44)	-2.76 (2.53)	-0.82 (0.62)
All belligerent	-2.63 (1.00)	-2.70 (2.08)	-2.28 (2.86)	-1.62 (2.73)	-1.19 (1.93)
Requests investigation	-4.59 (1.52)	-1.30 (0.66)	-1.99 (2.17)	-1.19 (1.73)	-0.72 (0.81)
Lawsuit	-3.48 (1.15)	-3.30 (1.03)	-2.65 (1.72)	-1.44 (1.48)	-0.59 (0.48)
All legal	-4.22 (1.87)	-1.89 (1.09)	-2.24 (2.59)	-1.31 (2.04)	-0.73 (0.92)
Exchange switch	3.54 (0.47)	-1.69 (0.38)	0.12 (0.06)	-2.84 (2.37)	-4.26 (2.95)
Urge not lend	-4.55 (1.00)	-4.66 (1.82)	-3.17 (1.65)	-2.66 (2.29)	-2.14 (1.54)
Friendly owners	-11.46 (0.87)	-10.07 (1.66)	-4.96 (1.90)	0.23 (0.07)	3.01 (0.60)
Other technical	-8.17 (1.35)	-12.39 (2.93)	-8.54 (2.61)	-5.60 (2.23)	-1.52 (0.40)
All technical	-3.86 (1.08)	-5.19 (2.62)	-2.66 (1.95)	-2.04 (2.13)	-1.50 (1.14)
All events	-3.09 (1.85)	-2.58 (2.63)	-2.34 (3.69)	-1.48 (2.80)	-0.89 (1.51)

Table IV
Calendar time portfolio returns for one-year horizon returns

Monthly returns in percent for the twelve months following an event, calculated using calendar time portfolios. Portfolios are equal weighted except for last row, which is value weighted. Market adjusted returns are returns minus the return on the CRSP value weighted index. Characteristic adjusted are returns minus the returns on a value weighted portfolio of all CRSP firms in the same size, market-book, and one year momentum quintile. Four-factor alpha is the intercept from a regression of returns in excess of t-bills on the three factors of Fama and French (1993), size, value, and market, plus a fourth price momentum factor similar to Carhart (1997). "N months" is the number of calendar months available for market adjusted returns (the number may be lower for the other columns). T-statistics in parentheses.

Description	N months	Market adjusted	Characteristic adjusted	Four-factor α
Claims conspiracy	166	-3.33 (2.22)	-2.77 (2.05)	-2.06 (1.32)
Alleges lies	229	-2.06 (2.22)	-1.09 (1.32)	-1.76 (1.79)
Considering options	125	-5.46 (3.37)	-4.66 (3.05)	-4.90 (2.91)
All belligerent	251	-2.26 (2.66)	-1.36 (1.85)	-1.94 (2.31)
Requests investigation	220	-2.67 (2.94)	-2.04 (2.47)	-2.11 (2.17)
Lawsuit	179	-3.07 (2.06)	-1.95 (1.39)	-2.93 (1.88)
All legal	241	-2.82 (3.32)	-1.91 (2.48)	-2.55 (2.89)
Exchange switch	53	0.58 (0.27)	1.32 (0.70)	-0.83 (0.33)
Urge not lend	132	-4.52 (3.07)	-4.55 (3.18)	-4.00 (2.48)
Friendly owners	51	-4.69 (1.82)	-3.15 (1.25)	-6.95 (2.19)
Other technical	58	-8.81 (2.45)	-7.26 (1.99)	-9.93 (2.42)
All technical	180	-2.79 (2.36)	-1.97 (1.87)	-2.90 (2.33)
All events	257	-2.85 (4.32)	-1.88 (3.41)	-2.40 (3.81)
All events, value weighted	257	-1.31 (1.81)	-1.23 (1.72)	-1.95 (3.22)

Table V
Four factor regressions for one-year horizon returns

Regression results using calendar time monthly returns in percent for the twelve months following an event. Portfolios are equal weighted except for last row, which is value weighted. RMRF is returns on the CRSP value weighted portfolio minus T-bill returns. HML is the value factor (the return of low M/B stocks high M/B stocks), SMB is the size factor (the return on small stocks minus big stocks), and UMD is the momentum factor (the return of stocks with high prior year returns minus stocks with low prior year returns). T-statistics in parentheses.

Description	α	RMRF	HML	SMB	UMD	R2
Claims conspiracy	-2.06 (1.32)	1.19 (3.07)	-0.33 (0.60)	1.88 (3.93)	-1.17 (2.89)	0.26
Alleges lies	-1.76 (1.79)	0.89 (3.48)	-0.56 (1.52)	1.36 (4.32)	-0.47 (1.77)	0.25
Considering options	-4.90 (2.91)	1.45 (3.95)	0.20 (0.31)	1.59 (2.91)	-0.56 (1.07)	0.20
All belligerent	-1.94 (2.31)	1.23 (6.16)	-0.42 (1.35)	1.53 (5.54)	-0.58 (2.54)	0.36
Requests investigation	-2.11 (2.17)	1.31 (5.71)	0.00 (0.01)	0.75 (2.25)	-0.79 (2.70)	0.23
Lawsuit	-2.93 (1.88)	0.73 (1.97)	-0.60 (1.10)	1.58 (3.19)	-0.37 (0.94)	0.16
All legal	-2.55 (2.89)	0.99 (4.73)	-0.14 (0.42)	1.34 (4.63)	-0.40 (1.69)	0.25
Exchange switch	-0.83 (0.33)	1.59 (2.34)	-0.07 (0.07)	1.95 (2.35)	0.79 (0.81)	0.22
Urge not lend	-4.00 (2.48)	0.86 (2.45)	0.25 (0.38)	1.28 (2.29)	-0.45 (1.11)	0.15
Friendly owners	-6.95 (2.19)	2.73 (2.86)	1.51 (1.39)	1.79 (1.83)	0.43 (0.43)	0.19
Other technical	-9.93 (2.42)	2.71 (1.96)	-2.08 (1.14)	0.81 (0.48)	-0.67 (0.41)	0.17
All technical	-2.90 (2.33)	1.28 (4.40)	0.55 (1.10)	1.70 (4.05)	-0.02 (0.05)	0.22
All events	-2.40 (3.81)	1.06 (7.11)	-0.34 (1.47)	1.50 (7.21)	-0.55 (3.24)	0.44
All events, value weighted	-1.95 (3.22)	1.45 (10.19)	0.02 (0.09)	0.74 (3.75)	-0.47 (2.89)	0.43

Figure 1: Short interest ratio for all events

The figure shows the monthly ratio of short interest to share outstanding, in event time. Month zero is the first month that any anti-shorting event takes place for the firm.
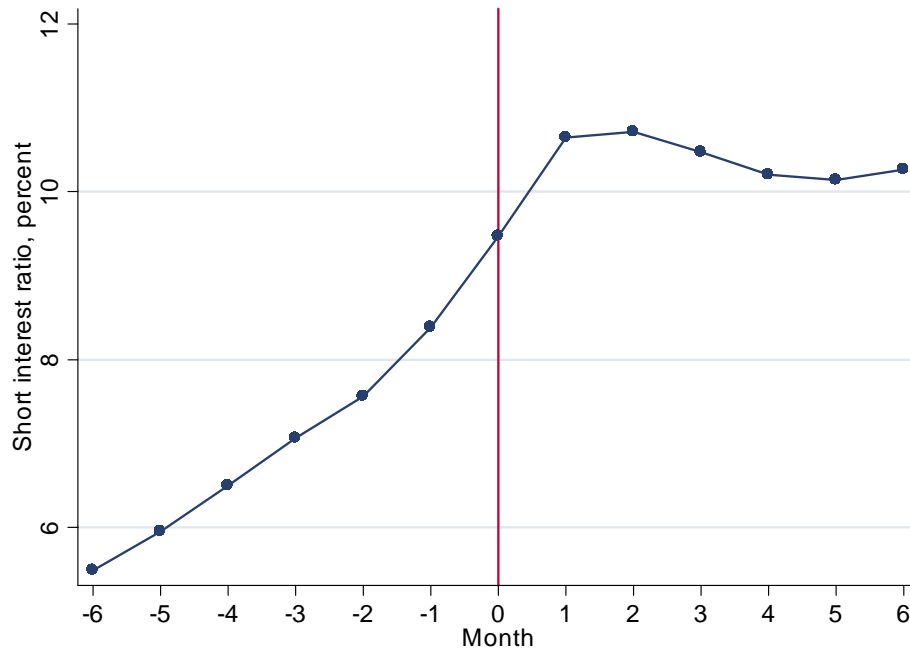
Figure 2: Volume for urge events

The figure shows trading volume in event time. Trading volume is measured as share turnover, and is expressed as percentile turnover relative to other stocks on the same day and in the same exchange. Day zero is the trading day on which the first urge event occurs, where the firm urges shareholders not lend shares to shorter sellers
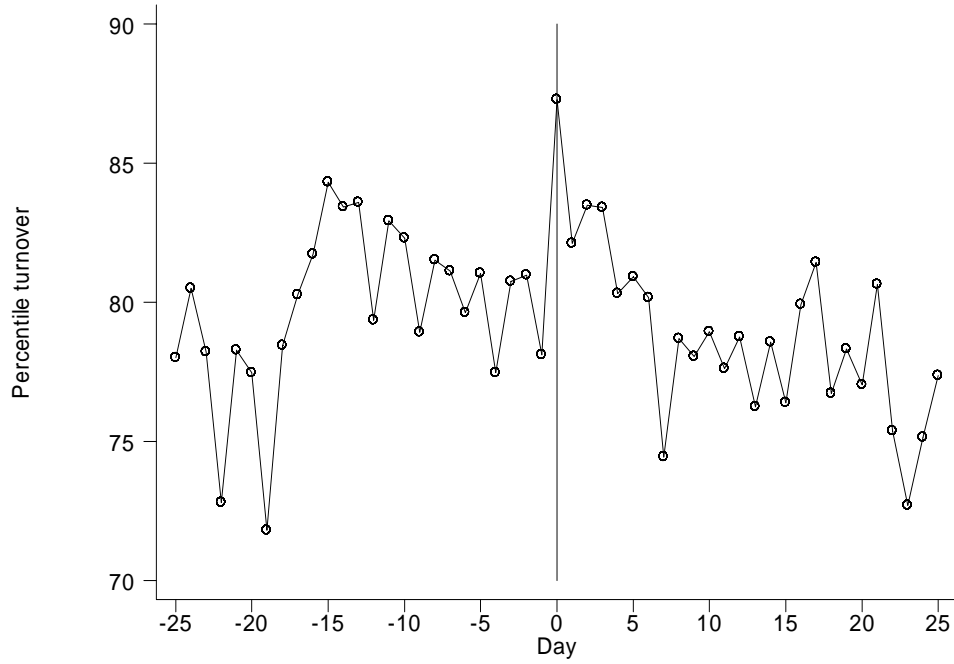
Figure 3: Cumulative returns for urge events

The figure shows cumulative returns in event time. Market adjusted returns are returns minus the return on the CRSP value weighted index. Three-factor alpha is the intercept from a regression of returns in excess of t-bills on the three factors of Fama and French (1993), size, value, and market. Day zero is the trading day on which the first urge event occurs, where the firm urges shareholders not lend shares to shorter sellers