Impacts of Short Sale Disclosure

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In the aftermath of the recent financial crisis, more than a dozen exchanges revised short sale regulations and increased disclosure requirement in order to curtail aggressive shorting and stabilize stock prices. While numerous studies have shown that prohibition of short selling (including recent bans) can significantly decrease market quality, to our knowledge we are the first to examine the market impact of increased information disclosure of short selling. Using a unique and hand-collected dataset on disclosed large short trades, we find that institutional short sellers do not excessively target depressed stocks. More importantly, we show that disclosures taken as a whole provide information to the market and reduce information uncertainty, narrowing price spreads. Overall, our results suggest that despite strong opposition from the hedge fund industry, the required disclosure of short selling is beneficial to the market.

1. Introduction

Recently, numerous academic studies advocate the informational role of short sellers by showing that short sellers provide important private information to the market. Using NYSE order book data, Boehmer, Jones, and Zhang (2008) (BJZ hereafter) find that large institutional shorts are followed by significant negative return. Short sellers are also informative in the context of corporate events as they tend to accumulate large short positions in stocks prior to bad news announcement. Specifically, BJZ (2010) show that a significant fraction (23%) of the overall underperformance of heavily shorted stocks is concentrated in periods prior to earning restatements and analyst downgrades. In addition, number of studies advocate the role of short sellers in liquidity provision and in general promote pricing efficiency (Boehmer and Wu, 2008; Diether, Lee, and Werner, 2008).

However, regulators tend to be skeptical about the beneficial role of short selling. For example, short sellers' inefficiency to impound negative information into stock prices during the IT bubble raised skepticism, although Lamont and Stein (2004) argue that part of the inefficiency was due to short sale constraints. Despite limited empirical evidence, shorts seller are often blamed for increasing share price volatility (Culp and Heato, 2008), intensifying price drops, and distressing stock prices thereby undermining confidence and making fund raising for companies more difficult (SEC, 2008). Especially in crisis environments, like in the aftermath of the financial crisis of 2008, institutional short sellers, (e.g., hedge funds) are often identified as culprits for the market wide price declines.

In an attempt to stabilize declining equity prices following the collapse of Lehman Brothers, the US Security Exchange Commission (SEC) introduced a short sale ban on nearly one thousand financial stocks in September 2008. In response to the US ban, a number of

countries, mostly European countries, without delay, implemented temporary or long term short sale ban and revised their short sale regulations, which included the disclosure of large short positions.[1] The Financial Services Authority (FSA) of the Japanese Government announced, on Oct. 27, 2008, following other exchanges, that it will introduce a disclosure regime, initially intended until the end of 2008. For all traders the mandatory disclosure of their aggregate short positions above the reporting requirement took effect, Nov. 7. 2008. As markets continued to suffer, a second wave of restrictions and disclosures was introduced in 2009, for example in India, Germany, and in the Netherlands.

But, there is no consensus even among regulators regarding the costs and benefits of the disclosure of short position. The Singapore government has completed a study about estimating the cost and benefits for increasing transparency on short selling and concluded that further disclosure was not necessary.[2] Also, the Hong Kong Stock Exchange did not require any new disclosure, emphasizing the suitability of their current regulation.[3] More importantly, hedge fund managers argue that it is costly for them to implement a trading strategy as they pay for their investment research, when other investors can mimic their positions by observing the disclosed positions. Recently, a hedge fund commissioned study shows that price spreads significantly increased among stocks with disclosure requirements on the London Stock Exchange, as institutional investors became reluctant to short (and provide liquidity) when they had to disclose their positions (Financial Times, 2010).

[1] The regulators in the following countries introduced disclosure measures: Australia (Sept. 2008), Belgium (Sept. 2008), France (Sept.2008), Germany (Sept.2008), Greece (Sept.2008), Hungary (Sept.2008), India (Oct.2008); Ireland (Sept.2008), Japan (Nov.2008), the Netherlands (Oct. 2009), Portugal (Sept. 2008), Spain (Sept. 2008), United Arab Emirates (Oct. 2008), and the United Kingdom (Sept. 2008).

[2] In 2008, the Singapore Stock Exchange (SGX) conducted a policy consultation on transparency measures in relation to short-selling. After thorough analysis including public feedback, the SGX concluded that further limitation on short selling is not needed as the market generally attract long traders. SGX requires only marking of the trades, that is among sell trades, outright sells and short sales must be disclosed (SGX, 2010).

[3] The exchange regularly monitor the market quality and only about 200 selected and carefully reviewed large, liquid stocks are allowed to be shorted where the probability of price depression is relatively low.

In this study, we aim to provide important insights about the impact of disclosure of short selling. We hand collect daily data on all large short positions from the Tokyo Stock Exchange (TSE) from Nov. 2008 to Jan. 2010. Using this unique dataset, we find that institutional short sellers do not excessively target depressed stocks and that the large institutional shorts on average do not earn significant profit on the long term. These findings suggest that at least when disclosure is required, institutional short sellers do not always create downward price spiral, which is a potential benefit of disclosure requirement.

In examining the information content of disclosures, we find that there is a significant price decline on the day following large shorts, suggesting that these trades convey new negative information. While recent studies argue that large short sales are informational trades, shorts are also executed for hedging and arbitrage reasons. Additionally, we find evidence that retail investors increasingly short these stocks, confirming that new negative information conveyed by the disclosures. While there is no significant increase in turnover, there is a significant declining trend in price spread following the disclosure.

Overall, consistent with recent studies (e.g., Boehmer and Kelley, 2009 and Boehmer, Huszar and Jordan, 2010) we show that high short selling increase pricing efficiency. Our contribution is that a potential channel, the decrease in stock price uncertainty, for the pricing efficiency. In the context of disclosures large short sales on the Tokyo Stock Exchange, we find that large short sales conveying new negative information to the market and investors immediately react, the stock price negatively adjust on the day of the disclosure. Furthermore, there is an increase in consensus among traders captured by the relatively stable (or even decreasing turnover), increasing shorting and decreasing price spread.

Our paper proceeds as follows: The next section reviews the literature. In Sections 3, we describe our data and develop our hypotheses. Section 4 presents our findings and Section 5 concludes.

2. Literature review

2.1 Information dispersion, uncertainty – short sellers

When investors have strikingly different beliefs and shorting is costly, Miller (1977) shows that stocks tend to be overvalued as the marginal investors are optimists. A number of recent studies fins that stocks with high information uncertainty tend to underperform (Diether, Malloy, and Scherbina, 2002; Zhang, 2006), especially in the presence of binding short sale constraints (Boehme, Danielsen, B. R., Sorescu, 2006). Zhang (2006), focusing on the role of uncertainty in price continuation anomalies and cross sectional returns, finds that price drifts for both good and bad news events are greater with uncertainty.

Since short sellers are viewed to be relatively informed traders, they may have key role in reducing information asymmetry, by providing timely information to the market. Analyst downgrades, earnings revisions, and revelation of aggressive accounting practices are all known to provide important information to the market. Short sellers found to be forerunners of firm specific information; for example, Christophe, Ferri, and Hsieh (2009) find that short sellers have good timing ability in their trades as shorts tend to supersede analysts' downgrades. Thus, short selling can provide important information to the market in advance.

2.2 Short selling and pricing efficiency

Boehmer and Kelley (2008) show that stocks with higher level of institutional ownerships are more efficiently priced, and suggest that this pricing efficiency is likely the result of

nonbinding short sale constraints that is crucial in incorporating negative information into prices. Short sales are also more likely to be informed trades because of the higher costs of shorting, the concentration of informed traders, such as institutions, is also higher among short sellers (Diamond and Verrecchia, 1987). Diether, Lee, and Werner's (2008) study short sellers, as contrarian traders, are useful in providing liquidity to the buying pressure. Empirical studies (e.g., Aitken, Frino, McCorry, and Swan, 1998; BJZ, 2008) also suggest that large shorts convey significant negative information, because large short sale trades are followed by significant negative returns on the Australian Stock Exchange and on the NYSE. Overall, short sellers are considered to be beneficial not only in the US market, but internationally (Bris, Goetzman, and Zhu, 2007; Saffi and Sigurdsson, 2010).

Still despite the overwhelming evidence on the benefits of short selling, the public and regulators often argue (especially in the context of a crisis) that short sellers are aggressive traders as they profit by targeting distressed stocks. Fishman, Hong, and Kubik (2008) argue that arbitrageurs (including short sellers) magnify economic shocks and cause value destruction. While SEC chairman Mary Schapiro (2010) admits that short selling provides the market with important benefits such as liquidity and pricing efficiency, she stresses that some short sellers may be still responsible for illegally manipulating stock prices, especially during bear raids.

2.3 Short sale bans and disclosure regimes

In 2008, the SEC introduced a temporary short sale ban on primarily financial stocks to stall price declines and began debating the reintroduction of the previously lifted uptick rule. The SEC's objective was to protect stocks that experiencing significant downward price pressure in

continuing efforts to increase regulatory oversight.[4] In Sept. 2008, a number of countries have introduced temporary short sale ban on financial stock, following the SEC. And despite the negative views and evidence about the inefficiency of the short sale ban, new bans are introduced even in the mid 2009, in India.[5]

BJZ (2009) and Loanova, Hamod, and Prakash (2010) provide strong empirical evidence on the negative relationship between the US the short sale ban and the market quality. They show that the declines in shorting activity was partiality responsible for the liquidity dry up and resulted in sharp increase in spread and volatility. More importantly, BJZ (2009) show that the sharp temporary price increase in the banned stocks disappeared fast and it is unlikely that the temporary value preservation justified the cost of the ban.

Battalio and Schultz (201) and Grundy et al. (2010) show that the short ban had unintended disruptive effects in the equity option markets as well. Overall traders looking for short exposure in the financial stocks did not migrate to the option market, rather the existing option holders were adversely affected. The trading costs increased dramatically, resulting in decoupling of the option and underlying stock prices. While numerous arbitrage opportunities arise, the increased trading cost prohibited traders from exploring any of the opportunities.

Interestingly, many stock exchanges have opted for a more permanent disclosure requirement. As of mid 2010, more than a dozen national exchanges require traders with large short trades or large aggregate short position to disclose their trades or holdings to the authorities. Most countries require short sellers to disclosure their short exposure when they hit a relatively high aggregate threshold. For example, Ireland, the Netherlands, and Japan use a

[4] In Feb. 24, 2010, the SEC announced the adaptation of a alternative uptick rule, that aims to help distress stocks by allowing short selling only if the if the trade price is above the current national best bid for stocks that experience a greater than 10% price decline over the previous day.

[5] See Gruenewald et al (2010) for a complete list of short sale bans and disclosure regimes by countries.

0.25% threshold, requiring shorts sellers (both individuals and institutions) with aggregate short positions greater than 0.25% of the total shares outstanding to report. The regulators at the Tokyo Stock Exchange (TSE) took a step further and decided to release the collected reports to the public twice a day.

3. Data and research hypotheses

3.1 Data

At the end of October 2008, the Financial Services Authority (FSA) in Japan announced that all short sellers must disclose large short trades (both opening and closing of the trades) in access of 0.25% of shares outstanding, effective November 7, 2008. We manually combine all daily reports that are released by the TSE and create a database of all daily large short positions with unique short seller IDs (i.e., institution names). Among the institutions there are a number of well known international institutions, such as Goldman Sachs and Deutsche Bank Securities, as well as Japanese brokerages such as Nomura Securities. Although individual investors also have to report their large short trades (above the 0.25% threshold), their positions are excluded from this study as they account for less than 1% of the sample. Also, the large short positions of individual investors do not contain the individual names and the positions cannot be followed over time.

We start our analysis at the first disclosure date, Nov. 11, 2008 (until Jan. 31st of 2010) and compute the number of large short positions (and the combined shorted value) for each stock every day and the daily outstanding large short positions for each institution.[6] We complement our data with stock prices, trading volumes, daily returns, and corporate information (sales, asset,

[6] Each position is measured from the first day the institution's short position reaches the disclosure requirement (the number of outstanding shorts shares reach 0.25% of the total shares outstanding for the specific institution) until the position is closed out or reduced below the threshold level (0.25%).

book value and institutional ownership) from FactSet. We also obtain weekly aggregate open margin position information for all stocks compiled by Nikkei to calculate weekly aggregate short interest ratio (number of total shorted shares outstanding relative to the number of shares outstanding) and the days-to-cover ratio (i.e., the number of shorted shares outstanding relative to the daily trading volume).

3.2 Research hypotheses

Since 2008, stock exchanges around the world started to require disclosure of information on large short positions, with the objective that the increased transparency may deter aggressive short sellers from trading. Following major European Exchanges, the authorities in Japan began disclosing information about large short positions in October, 2008. The market, especially retail investors tend to closely follow the disclosures and internet sites have been established to provide consolidated reports to interested parties based on the reports.

First, we examine the price implications of short sale market disclosure. Specifically, we are concerned whether transparency improves market efficiency and reduces spreads or whether investors overreact and stock price volatility increases due to the increase of noise trading. Institutions may trade on private information which could be beneficial to the market but institutions have up to two days to disclose their position, which is in turn a delay release to the market. If institutions trade on private information, the market might react to the information conveyed to the market by the disclosure of large short sales two days after the actual trade.

The main objective of the exchanges for the disclosure was the stabilization of the market, deterring aggressive sorts. Interestingly, we are not aware of yet any imposed fines or prosecution of aggressive short sellers by the authorities in Japan in conjunction with the

disclosure regime. We address regulatory concerns whether disclosure of short positions promote pricing efficiency.

Recent studies (e.g., Christophe et al., 2010) show that short sellers are able to identify overvalued stocks suggesting that short sellers are informed traders. In Boehmer et al. (2008), large institutional trades are followed by significant negative returns, suggesting that institutions are informed traders. While the negative price adjustment following large institutional trades could be the result of price impact, there would be a price reversal, if the institutional trades are non-informative.

H1. Disclosed large positions convey new information reflected by significant negative abnormal returns.

Our main hypothesis examines the intended impact of the disclosure. If the disclosure reports of large short positions reveal new information then we would expect to observe immediate price correction. However, it is important to note that the disclosure requirement may have unexpected consequences. The market, especially small retail traders may not be able to interpret the disclosure correctly, and may over or under-react to the disclosure.

H2. The price volatility declines as new information is disseminated and uncertainty about the stock is reduced.

Since institutional traders tend to improve pricing efficiency (Boehmer and Kelley, 2008) the disclosure of large shorts may convey delayed information to the market and in turn can reduce disagreement among retail investors. If retail investors see that major quant funds (e.g., AQR, Goldman Sachs) short a stock they are less likely to buy it and revise their opinion to be negative or more negative, resulting to an increased consensus among traders which can improve pricing. But, retail trades may increase volatility and result in higher spreads (Foucault, Sraer,

Thesmar, 2010) as Bloomfield, O'Hara, and Saar (2006) suggest that retail traders, as noise traders, destabilize share prices and slow down the price discovery. Thus, retail trades could be harmful (in terms of increased volatility, spreads, and price depression) if the increased shorting is executed based on misinterpreted negative information from the disclosure.

4. Empirical analysis

4.1 Summary statistics and multivariate test

In the U.S., short selling is heavily dominated by institutions, about 98% of the trades (BJZ, 2008). We find that the large institutional short positions on average account for about 40-50% of the total outstanding short positions in Japan, suggesting that short sellers are primarily institutions like in the U.S. A unique feature of the Japanese lending market is that it consists of a two tier system. Institutional investors dominate the decentralize market (i.e., negotiated market), where the terms are negotiated between the lender and the borrower (or the borrower's broker) like the one in the US. The negotiated market existed from the late 1980s for institutional investors and has been formally regulated since 1998. Individual investors mostly use the standardized market where the Japan Securities Finance Companies manage a centralized facility for margin trading. Anecdotal evidence suggest that institutions prefer the negotiated market because they can use their bargaining power and reduce borrowing costs, while in the standardized market the same fees apply for each transaction irrespective of loan size.

Lamont and Stein (2004) show that market makers account for a significant portion (at least ¼) of the daily short selling which is unlikely to reflect firm specific information. The commonly used Regulation SHO data include intraday trades of market makers shorts and other

intraday trades that aim to exploit very short term price deviation.[7] In the US, information only on the initiation of the shorts, not the closure (i.e., covering of the shorts) is collected, which hinders the differentiation between short term (intraday) and long term trades. One of the advantages of our hand collected data of daily disclosed large short positions that it contains no market makers shorts, or intraday shorts, but only relatively long term large short positions, which are more likely to be information based shorts.

In Figures 1 and 2, we show our data coverage. Panel A of Figure 1 shows that unlike in the US, the aggregate shorting did not change in response to the Financial crisis. The shorting level is relatively stable about 20% of the total trading volume on the TSE. It is interesting to note in Panel B of Figure 1, that according to the Nikkei compiled short positions data, the standardized margin shorts account for 70% of the total shorts, which would reflect that in Japan retail investors are very active in shorting, maybe more active than institutions. The total margin shorts slightly decline after 2006 in terms of shares, but that event does not affect our sample period.

[Figure 1 about here]

More importantly, using propriety lending market information from Data Explorers, we find that the total shorting is almost double that of the margin shorts by Nikkei. In Panel A of Figure 2. The SIR calculated as the total margin shorts relative to the shares outstanding is on average about .55% while the SIR calculated as the total outstanding shorts reported by Data Explorers relative to the shares outstanding is about 1.1%. Thus, about half a percent shorts are not captured by the margin trading which are more likely to be institutional shorts. This evidence suggest that about this half percent plus .15% negotiated shorts in total account for .65%

[7] Regulation SHO, Securities and Exchange Commission, 17 CFR Parts 240, 241, and 242Short Sales; Final Rule and Notice, Aug. 2004, http://www.sec.gov/rules/final/34-50103.pdf

institutional shorts in Japan, making the Japanese market in terms of institutions involvement in shorting similar to that of the US market.

[Figure 2 about here]

While the daily outstanding total shorted value is about 4.5 Billion shares, the large shorts account for about 700 Million shares, suggesting that the large shorts (in Panel B of Figure 2), on average account for about 15% of the total shorts. We use the information from Data Explores as the total shorting because they collect data from all brokerages around the worlds, which is more comprehensive and also likely to include at least part of the margin shorts.

[Table 1 about here]

Table 1 shows our sample coverage for the 15 months, from Nov. 2008 to Jan. 2010. On average, each month about 450 stocks have reported large positions, shorted by approximately 70 distinct institutions. There is some overlap in the data, as some stocks are shorted by more than one institution in a month, but these cases are rare. The summary statistics in Table 2 show that the majority of TSE first section stocks (approximately 900 stocks) are in the sample, versus 680 stocks that are not in the sample. Panel A of Table 2 shows that the in-sample stocks (stocks that have at least one large short positions reported during Nov. 2008 to Jan. 2010) are similar in terms of size, price volatility, age, and leverage than the non-shorted stocks. The difference is in terms of institutional ownership (IO) and market-to-book ratios, the shorted stocks have higher market-to-book ratios and higher IO (i.e., that higher IO as proxy for lending supply facilitates shorting).

[Table 2 about here]

Panel B of Table 2 shows that on average our sample stocks (with large reported short positions) have higher levels of negotiated and standardized shorts. Consistent with prior studies,

we show that institutions prefer liquid large stocks for shorting and there is some evidence of contrarian trading. Both the raw and market adjusted lagged returns are higher for the disclosure stocks. Interestingly, not only the lagged returns but also the contemporaneous returns are higher for the stocks with large shorting positions which cast doubt on the profitability of large shorts at the first glance. These summary statistics suggest that the regulatory concerns, that short sellers primarily focus on small, illiquid, and distressed stocks, is unfounded.

In analyzing the return and holding periods of the positions in Table 3, we show that institutions hold their short positions relatively long, on average for 40 days (median 16 days). In extreme cases, the short positions are maintained for more than six months, and even up to a year, suggesting that these shorts are not executed based on temporary overvaluation. Interestingly, we do not find that on the median weekly returns are negative around the short sales, which suggest a significant variation across returns, consistent with the different institutional strategies. Furthermore, if the TSE is efficient, the weekly returns may not be significantly negative even if institutional trades convey information to the market.

[Table 3 about here]

Next, following Diether et al (2008) we examine short sellers' stock preferences in Table 4. The large short positions tend to be greater the lower is past return. But despite regulatory concerns, we do not find that the large positions are concentrated in loser stocks, only that short selling is significantly lower in winner stocks. The negative coefficient on the *LagAgg_SIR* implies that large short positions are more likely to be established in stocks that are already relatively highly shorted. Our results from Table 4, do not suggest that institutions prefer volatile or older stocks in establishing large short positions. Our evidence that short sellers prefer high market-to-book value stocks is consistent with prior studies (e.g., Diether et al. 2008; Boehmer et

al. 2010). The significant negative coefficient in liquidity has to be interpreted with caution, since the *LagAgg_SIR* variable takes on higher values in more liquid stocks.

[Table 4 about here]

4.2 Market reaction to disclosure

An important concern for regulators is the market reaction to the disclosure. First, we report summary statistics around disclosures in Table 5. The mean and median SIR gradually increases after the disclosure. The turnover peaks about two days prior to disclosure, most likely as the large shorts are executed. Volatility, measured by the spread between the day open and close prices, also peaks with the large trade (at event day -2) and significantly declines thereafter. This trend (and the generally high volatility prior to disclosure) suggests that there was high uncertainty about the stock in the market and the large institutional trade (which was revealed to the market) reduced somewhat the uncertainty. Figure 3 visualizes the trend in returns (in Panel A) and turnover and volatility (in Panel B) around disclosure date for all stocks with large short positions outstanding.

[Table 5 about here]

[Figure 3 about here]

In Table 6, in a regression analysis framework we examine the impact of disclosure on return and stock price volatility. In Panel A of Table 6, we find show that the returns are significantly negative around the disclosure, suggesting that institutional shorts do convey information to the market. While part of the negative return could be driven by driven by information, there is a concern that retail investors may overreact and increasing short the stocks which are known to be shorted by be relatively informed institutions. Such overreaction would

result in an increase in retail shorting (noise trading) which is likely to increase volatility as shown recently by Foucault, Sraer, and Thesmar (2010). In Panel B of Table 6, we show that there is no increase, rather a decrease in the daily price spread and this results is robust after controlling for lagged volatility.

[Table 6 about here]

Lastly, we test one possible source of the negative price and decrease in volatility following the announcement, by testing whether there is increased shorting, which would reflect an increase in consensus about the relative overvaluation of the stock. In Table 7, using retail and total margin short positions, we test whether short selling increases around or after disclosure. After controlling for stock characteristics that tend to encourage or discourage short selling, we find that the standardized margin shorts are higher the higher the disclosed large institutional short positions.

[Table 7 about here]

We also find that short sellers also tend exploit the short term price trends and short stocks with declining prices in Japan. Still, both the standardized shorts and the total margin shorts as reported by Nikkei positively associated with disclosure, suggesting increase in negative opinion about the stock. The contemporaneous relationship between increased shorting and the decrease in volatility, is likely to be driven by increased trading in similar direction. Thus, we suggest that the fear that short selling feeds volatility is unfounded.

4.3 Robustness analysis

It is well known that retail investors have homebias which manifest in their preference in investing in companies they are familiar with. Thus, to test whether the price depression and volatility change following disclosure is driven by retail traders, we test whether there is a

difference in return patterns for stocks that are shorted by securities firm versus non securities firms. The securities firms (brokerages), such as Deutsche Securities, Merrill Lynch Securities, Mitshubishi UFJ, Nomura, are well-known by most market participant and retail investors may consider these institutions are informed traders, and assume that their short sales are executed based on private information and react to disclosure. Consistent with this hypothesis, Figure 4 shows that the market reaction following securities firms disclosure of large short position.

[Figure 4 about here]

5. Conclusion

Numerous studies revealed that short sale constraints may result in overvaluation and in general cause less pricing efficiency. Still, at the onset of the financial crisis, like in the aftermath of the Great Depression, short sellers were blamed for the extreme price decline and volatility. And in response, exchanges around the world introduced new temporary and long term short sale bans. Recent studies that examine the impact of short sale on the equity market and the options market show again that the bans at best offered temporary solution as markets continued to deteriorate for months after the Lehman Brother Collapse. Some exchanges have taken a new approach: instead of a ban or together with a ban, introduced increased disclosure, requiring short sellers with large positions to disclose their trades to regulators. The Tokyo Stock Exchange (TSE) took a step further and disclosed publicly all collected information on large positions.

In this study, to our knowledge we are the first to examine the market reaction and pricing efficiency implication of increased information disclosure of short selling. We show that public disclosures reveal negative information by institutions. The disclosure of these informed trades further facilitates price adjustment and the delivery of information, which in turn reduces

uncertainty. Indeed, we find evidence that stock price volatility (proxied by price spreads) continues to decline following the disclosures. Overall our findings strongly suggest that despite opposition from hedge funds and other entities, the required disclosure tend to benefit the market.

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Table 1. Summary Statistics
Summary statistics of daily large institutional short sale positions from the Tokyo Stock Exchange (TSE) for November 2008 to January 2010.

Month	N	Number of Institutions	Number of Stocks
Nov., 2008	3,685	57	309
Dec., 2008	8,967	65	429
Jan., 2009	10,012	73	492
Febr., 2009	13,742	76	621
Mar., 2009	16,450	75	622
Apr., 2009	16,089	81	580
May, 2009	13,113	74	553
June, 2009	14,486	80	518
July, 2009	13,631	77	483
Aug., 2009	11,667	69	450
Sept., 2009	10,546	64	432
Oct., 2009	11,065	65	431
Nov., 2009	8,995	67	406
Dec., 2009	8,795	52	372
Jan., 2010	5,530	53	317

Table 2. Summary statistics of TSE first section shorted stocks for November 2008 to January 2010

Marketcap is the number of shares times the share price in billion ¥. *Volatility* is standard deviation of the share price during the previous year. *Inst. Ownership (IO_%)* and *Insider Ownership (in %)* is the number of shares held by institutions and by insiders, respectively relative to the total shares outstanding in percentage. *Firmage* is the number of years the firm is listed on the exchange. *Market-to-book* is the market capitalization relative to the book value of common equity. *Leverage ratio* is the total debt relative to common equity. *Turnover (in %)* is the daily traded shares relative to the total number of shares outstanding. *RetD_bp* and RetD_Adj_bp are the daily raw and market adjusted stock returns. *Lag_AdjRet$_{-5days}$ (in bp)* and *Lag_AdjRet$_{-5days}$ (in bp)* are the previous five days cumulative raw and market adjusted returns. *Lag_RawRet$_{-1month}$ (in bp)* and *Lag_AdjRet$_{-1month}$ (in bp)* are similarly calculated for the previous month. *Large_SIR%* is the total number of shares shorted and disclosed to the market absolute and relative to the total number of shares outstanding. *Negotiated_SIR* and *Standardized_SIR* are the number of shares shorted in the negotiated market and the standardized market relative to total shares as reported by Nikkei. *Totalmarginshorts_SIR* is the total number of shares shorted as reported by Nikkei relative to the number of shares outstanding, as reported by Nikkei.

Panel A. Financial information of TSE first section stocks with large short positions (Sample) versus other stocks without large short positions (Other).

	Mean		Diff	Median		Diff
	Sample	Other	*p*-value	Sample	Other	*p*-value
Market Cap (Billion ¥)	150.03	156.19	*0.794*	43.99	21.24	*<0.001*
Market-to-book	1.04	0.79	*<0.001*	0.82	0.67	*<0.001*
Volatility	1,179.55	724.23	*0.071*	87.11	52.16	*<0.001*
Inst. Ownership (IO_%)	14.31	8.39	*<0.001*	13.27	5.94	*<0.001*
Insider Ownership (in %)	37.37	42.40	*<0.001*	36.18	42.01	*<0.001*
Firmage (Year)	18.87	18.68	*0.596*	24.00	22.00	*0.084*
Leverage ratio	2.03	2.08	*0.740*	1.47	1.57	*0.187*

Panel B. Daily trading information of TSE first section stocks with large short positions (Sample) versus other stocks without large short positions (Other)

	Mean		Diff	Median		Diff
	Sample	Other	*p*-value	Sample	Other	*p*-value
Turnover (in %)	2.45	0.99	*<0.001*	0.38	0.18	*<0.001*
RetD_bp	11.68	4.82	*<0.001*	0.00	0.00	*0.119*
RetD_Adj_bp	6.66	4.26	*0.016*	-11.32	-7.29	*<0.001*
Lag_RawRet$_{-5days}$ (in bp)	66.25	32.07	*<0.001*	0.00	0.00	*<0.001*
Lag_AdjRet$_{-5days}$ (in bp)	40.60	20.84	*<0.001*	-18.78	-19.70	*0.188*
Lag_RawRet$_{-1month}$ (in bp)	280.43	183.50	*<0.001*	82.71	60.99	*<0.001*
Lag_AdjRet$_{-1month}$ (in bp)	175.89	103.37	*<0.001*	-2.15	-21.85	*<0.001*
Large_SIR%	0.79	NA.	NA.	0.51	NA.	
Negotiated_SIR	0.45	0.30	*<0.001*	0.15	0.04	*<0.001*
Standardized_SIR	1.33	0.53	*<0.001*	0.24	0.10	*<0.001*
Totalmarginshorts_SIR	1.78	0.82	*<0.001*	0.49	0.18	*<0.001*

Table 3. Summary statistics of institutional large short positions

Short position returns and holding period (i.e., position durations) are measured from the first day the short position reaches the disclosure requirement by $institution_i$ (the number of outstanding shorts shares reach 0.25% of the total shares outstanding for the specific institution) until $institution_i$ closes out the position or reduces to below the threshold level. *Sample SIR* (%) is the number of shorted shares (from reported large short positions) relative to the total shares outstanding. *Cumulative lag returns at position starts* are the returns in stocks with large shorts before the disclosure date. *Cumulative position raw returns* at the averages of all holding period stock returns (with reported large short positions) for the entire position period, for the first week, and for the second week. The *Cumulative positions market adj. returns* are reported similarly for the entire holding period, for the first week and for the second week, where the returns are the stock returns minus the Nikkei index returns for the corresponding period. While the cumulative position raw and adjusted returns are averages or equal weighted returns of the daily stocks returns with large sort positions, the money weighted positions raw and adjusted returns take into account (weights the returns) the market capitalization of the stock.

	N	Mean	25^{th}%	Median	75^{th}%
Sample SIR (%)	156,580	0.54	0.30	0.39	0.58
Positions durations (days)	3,992	40.03	5.00	16.00	53.50
Cumulative lag return at position starts (basis points)					
1-week raw returns	3,991	170.21	-432.69	38.41	607.74
1-week market adj returns	3,991	176.49	-346.92	66.32	553.54
1-month raw returns	3,991	434.43	-835.32	116.29	1339.04
1-month market adj returns	3,991	458.45	-688.49	182.09	1234.03

Table 4. Regression analysis of large short positions

The dependent variable is the large short position ratio, the number of shares shorted by institutions as disclosed on the TSE website relative to the total number of shares outstanding. *LagRet* $_{-5days}$ and *LagRet* $_{-1month}$ are the previous five days and one month cumulative returns in basis points, respectively. *WinnerD*$_{-5days}$ and *LoserD*$_{-5days}$ are winner and loser dummies that take on the value one if the stock return is in the top or bottom 30th percentile during the last five days. *WinnerD*$_{-1month}$ and *LoserD*$_{-1month}$ are winner and loser dummies that take on the value one if the stock return is in the top or bottom 30th percentile during the previous month (previous 22 trading days). *RetD_bp* is the contemporaneous daily return in basis point. *LagTurnover* is the previous one month (22 trading days) turnover. *LagAgg_SIR* is the lagged (previous day) aggregate short interest ratio, which is the total number of shorted shares relative to the total number of shares outstanding. *LogMarketcap* is the natural logarithm of the number of shares times the share price in billion ¥. *Market-to-book* is the market capitalization relative to the book value of common equity. *Leverage ratio* is the total debt relative to common equity. *Volatility* is standard deviation of the share price during the previous year. Inst. *Ownership* (IO_%) is the number of shares held by institutions relative to the total shares outstanding in percentage. *Insider Ownership* is number of shares held by Insiders relative to the total shares outstanding in percentage. *Firmage* is the number of years the firm is listed on the exchange. The coefficients are reported with corresponding standard errors, clustered by firms, in square brackets. To save space the coefficient estimates and the relevant standard errors for the constant terms are not reported.

	(1)	(2)	(3)	(4)
LagRet $_{-5days}$ (in bp)	-0.0019***			
	[0.0005]			
LagRet$_{-1\ month}$ (in bp)		-0.0004**		
		[0.0002]		
WinnerD$_{-5days}$			-2.8241***	
			[0.8300]	
LoserD$_{-5days}$			-0.6477	
			[0.9822]	
WinnerD$_{-1month}$				-1.2069*
				[0.6655]
LoserD$_{-1month}$				-1.5182
				[0.9626]
RetD_bp	-0.0103***	-0.0102***	-0.0102***	-0.0102***
	[0.0021]	[0.0021]	[0.0021]	[0.0021]
LagTurnover	-5.8237**	-5.9647**	-5.8214**	-5.9727**
	[2.6312]	[2.6717]	[2.6274]	[2.6829]
LagAgg_SIR	0.9028***	0.9028***	0.9028***	0.9028***
	[0.0102]	[0.0103]	[0.0102]	[0.0102]
LogMarketcap	-0.4269	-0.4311	-0.4409	-0.4466
	[0.3411]	[0.3414]	[0.3428]	[0.3432]
Market-to-book	0.8833**	0.8807**	0.8770**	0.8574**
	[0.4163]	[0.4207]	[0.4143]	[0.4159]
Volatility	-0.0001	-0.0001	-0.0001	-0.0001
	[0.0001]	[0.0001]	[0.0001]	[0.0001]
IO_%	-0.0141	-0.014	-0.0064	-0.0085
	[0.0632]	[0.0633]	[0.0646]	[0.0636]
Firmage	0.1342	0.1344	0.1336	0.1323
	[0.0831]	[0.0831]	[0.0833]	[0.0831]
Adj R-sq	0.6252	0.6252	0.6252	0.6252
Observations	461,258	461,258	461,258	461,258

Table 5.

Summary statistics of stocks with large short positions around disclosure dates

MeanRawRet and *Median RawRet* are the mean and the medians for the daily raw return for all stocks with high short positions 10 days prior to disclosure to 10 days after disclosure where disclosure date (i.e., Event day=0) is the date when the position information is released to the public. *Mean SIR* and *Median SIR* are the average and median of the total shares shorted relative to the total shares outstanding (as reported by DataeExplorer), respectively. *Mean Turnover* and *Median Turnover* are average and the median of daily turnover in percentage. *Mean Spread* and *Median price spreads* are the mean and median daily price spread (high price minus low price relative to high price) in percentage around disclosure dates.

Event Day	Mean RawRet	Median RawRet	Mean SIR	Median SIR	Mean Turnover	Median Turnover	Mean Spread	Median Spread
-10	8.927	0.000	0.118	0.019	3.817	0.637	4.572	3.825
-9	48.862	0.000	0.119	0.019	4.080	0.646	4.650	3.791
-8	39.110	0.000	0.120	0.019	3.992	0.652	4.519	3.828
-7	49.124	0.000	0.120	0.019	4.436	0.659	4.461	3.776
-6	30.219	0.000	0.121	0.019	4.430	0.665	4.402	3.825
-5	18.558	0.000	0.123	0.019	4.698	0.677	4.433	3.796
-4	32.781	0.000	0.125	0.019	4.358	0.663	4.426	3.857
-3	30.242	0.000	0.127	0.020	4.636	0.693	4.485	3.846
-2	6.630	-14.367	0.130	0.020	6.965	0.751	4.761	3.991
-1	11.274	0.000	0.131	0.020	4.627	0.668	4.375	3.785
0	-13.427	-24.024	0.134	0.020	4.277	0.649	4.370	3.768
1	-0.836	-13.039	0.138	0.021	4.018	0.657	4.348	3.768
2	8.002	0.000	0.140	0.021	3.638	0.637	4.263	3.692
3	7.955	-15.579	0.141	0.021	3.771	0.644	4.259	3.691
4	8.413	0.000	0.139	0.021	3.516	0.622	4.237	3.712
5	0.950	0.000	0.139	0.021	3.527	0.620	4.180	3.636
6	9.694	0.000	0.139	0.021	3.762	0.606	4.144	3.629
7	13.917	0.000	0.139	0.020	3.756	0.602	4.179	3.567
8	25.610	0.000	0.138	0.020	3.687	0.609	4.270	3.552
9	21.388	0.000	0.138	0.020	3.515	0.606	4.098	3.512
10	14.172	0.000	0.137	0.020	3.709	0.603	4.051	3.504

Table 6. Regression analysis of stock returns around disclosure

The dependent variable in Panel A is daily stock returns and in Panel B is daily volatility (proxied by price spread). The sample includes only stocks with large short positions 10 days around disclosure dates. *Discl_window* is a dummy variable that takes on the value 1 three days around the disclosure date, starting with day -2, the date when the trade generally executed. *AfterDisclosure* dummy variable takes on a value one for all days that are after the disclosure. *NikkeiRet* is the Japanese daily market return, Nikkei 225. *LogMarketcap* is the natural logarithm of the number of shares times the share price in billion ¥. *Market-to-book* is the market capitalization relative to the book value of common equity. *LagVolatility* is the price spread of share prices the day before. The coefficients are reported with corresponding standard errors, clustered by firms, in square brackets, where *** denotes significance at 1 percent level and ** denotes significance at 5 percent level.

Panel A. Daily return regression around disclosure dates

	(1)	(2)	(3)
Discl_window	-0.3817***	-0.2663***	-0.2832**
	[0.1126]	[0.1020]	[0.1132]
NikkeiRet		1.0000***	1.0045***
		[0.0260]	[0.0272]
LogMarketcap			2.2713
			[2.2077]
Market-to-book			6.4134***
			[2.2949]
Intercept	15.7967***	15.1256***	-18.256
	[2.3248]	[2.1382]	[24.9184]
Adj R-sq	0.0003	0.2	0.202
Observations	83,376	83,376	78,049

Panel B. Daily volatility regression around disclosure dates

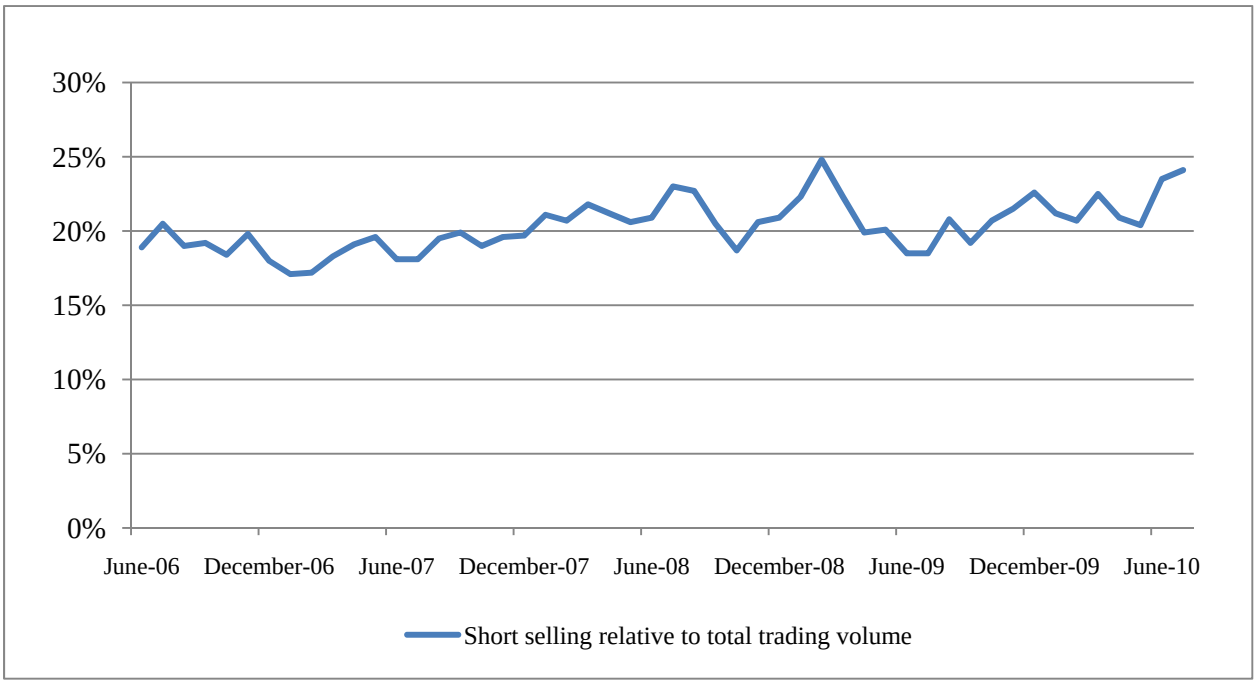
	(1)	(2)	(3)
AfterDisclosure	-0.2219***	-0.1189***	-0.1204***
	[0.0252]	[0.0140]	[0.0146]
LagVolatility		0.5247***	0.5224***
		[0.0128]	[0.0122]
LogMarketcap			-0.1067***
			[0.0229]
Market-to-book			-0.0414
			[0.0263]
Intercept	4.4403***	2.1067***	3.3514***
	[0.0791]	[0.0472]	[0.2579]
Adj R-sq	0.0017	0.2778	0.2868
Observations	83,378	83,096	77,884

Table 7. Regression analysis of market reaction to large short positions

The dependent variable is the short interest ratio based on standardized shorts and total margin shorts in models (1)-(3) and models (4)-(6), respectively. *Avg_Largeshorts SIR* is the number of shorted shares based on large short positions relative to total shares outstanding. $LagRet_{-5days}$ and $LagRet_{-1months}$ are the previous five days and one month cumulative returns in basis points, respectively. *LagTurnover* is the previous one month (22 trading days) turnover. *LagAgg_SIR* is the lagged (previous day) aggregate short interest ratio, which is the total number of shorted shares relative to the total number of shares outstanding. *LogMarketcap* is the natural logarithm of the number of shares times the share price in billion ¥. *Market-to-book* is the market capitalization relative to the book value of common equity. *Leverage ratio* is the total debt relative to common equity. *Volatility* is the standard deviation of the share price during the previous year. IO_%, institutional ownership, is the number of shares held by institutions relative to the total shares outstanding in percentage. *Firmage* is the number of years the firm is listed on the exchange. The coefficients are reported with corresponding standard errors, clustered by firms, in square brackets, where *** denotes significance at 1 percent level and ** denotes significance at 5 percent level. To save space the coefficient estimates and the relevant standard errors for the constant terms are not reported.

	Standardized Margin			Total Margin		
	(1)	(2)	(3)	(4)	(5)	(6)
Avg_Largeshorts SIR (in %)	9.9616***	9.9456***	9.9831***	17.9792***	17.9394***	17.9338***
	[3.0316]	[3.0312]	[3.0326]	[3.3474]	[3.3466]	[3.3469]
$LagRet_{-5days}$ (in bp)		-0.5197***			-1.2886***	
		[0.1100]			[0.1418]	
$LagRet_{-1month}$ (in bp)			0.1962**			-0.4141***
			[0.0793]			[0.1023]
Lagturnover	-4592.7202**	-4498.8638**	-4678.5075**	-5793.9826*	-5561.2651*	-5612.9377*
	[2300.0]	[2300.0]	[2300.0]	[3000.0]	[3000.0]	[3000.0]
LogMarketcap	-2240.6835***	-2241.4871***	-2239.6625***	-1830.2462***	-1832.2389***	-1832.4009***
	[276.7926]	[276.9543]	[276.6490]	[350.1796]	[350.5640]	[350.8007]
Market-to-book	1907.0819**	1918.1488**	1890.7944**	3348.8751***	3376.3157***	3383.2481***
	[782.2144]	[783.5839]	[784.0109]	[1,000]	[1,000]	[1,000]
Volatility	-0.1339*	-0.1338*	-0.1341*	-0.2284**	-0.2282**	-0.2281**
	[0.0797]	[0.0797]	[0.0796]	[0.0910]	[0.0910]	[0.0911]
IO_%	-282.4532***	-282.4455***	-282.6621***	-425.7305***	-425.7114***	-425.2895***
	[33.8956]	[33.8977]	[33.8802]	[55.4427]	[55.4280]	[55.4077]
Firmage	106.3775	106.2959	106.4126	258.9262***	258.7239***	258.8520***
	[65.2662]	[65.2610]	[65.2657]	[84.4001]	[84.3673]	[84.3695]
Adj R-sq	0.0844	0.0846	0.0845	0.0945	0.0951	0.0948
Observations	95,060	95,060	95,060	95,060	95,060	95,060

Panel A. Weekly aggregate short volume relative to the total trading volume on TSE



Panel B. Weekly outstanding short positions (from the weekly TSE margin reports)

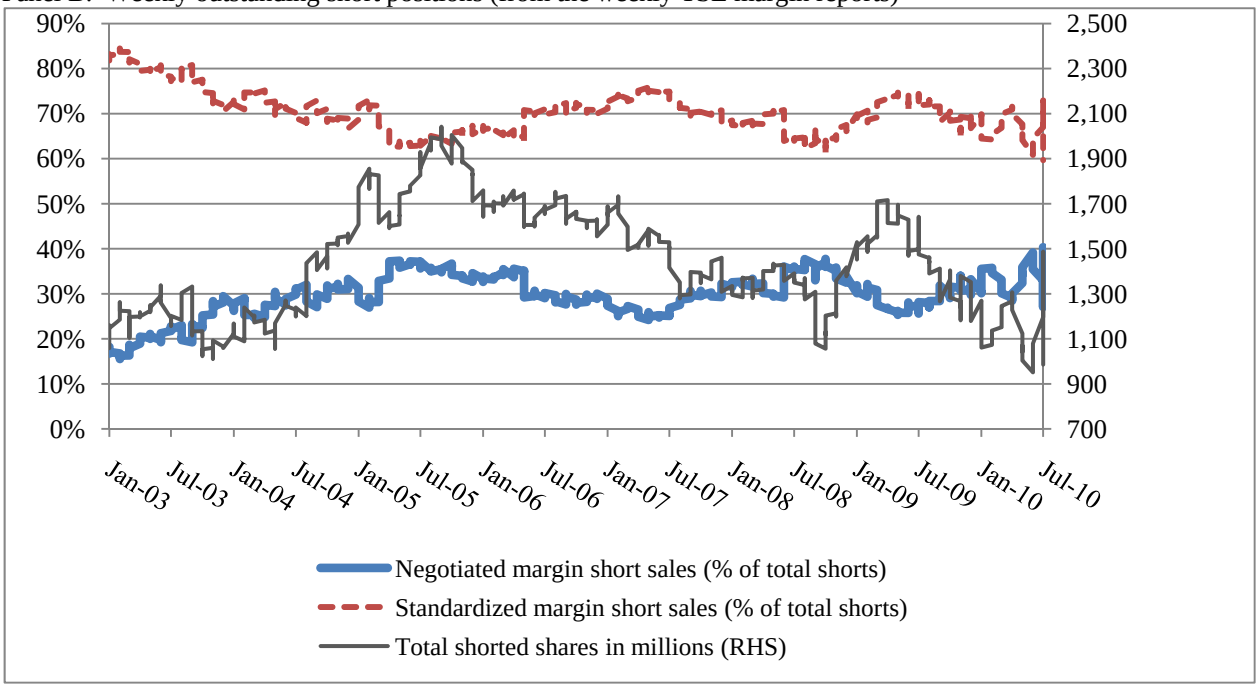
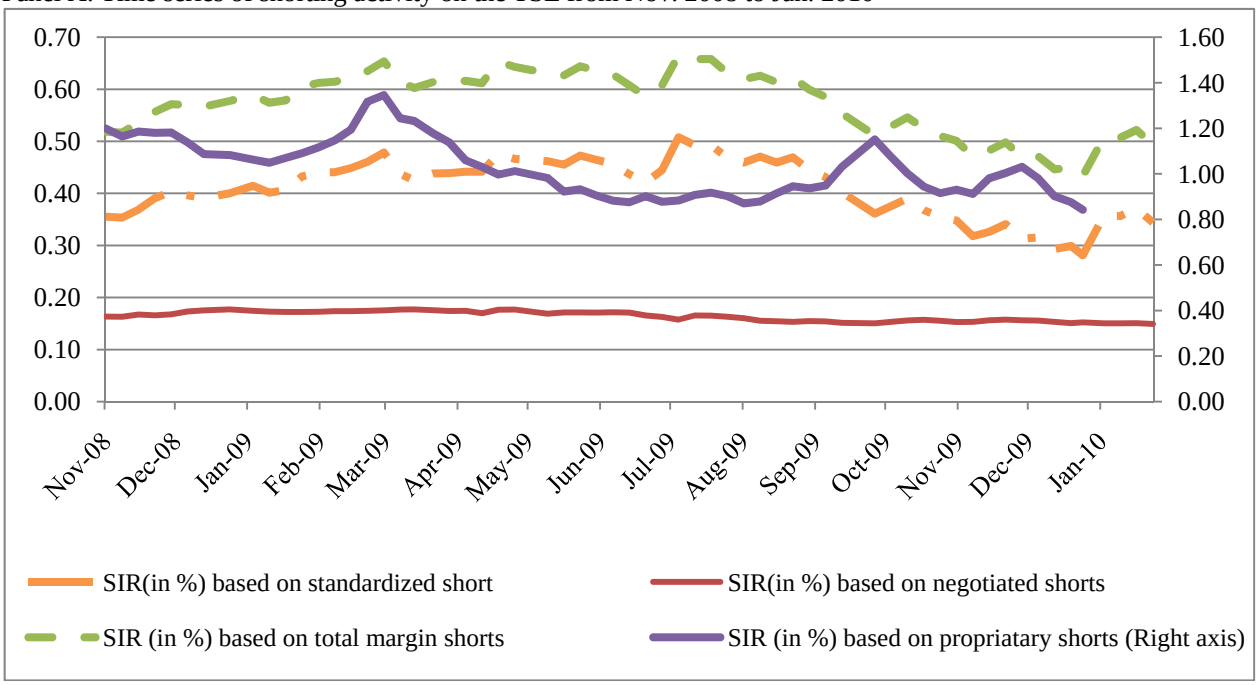


Figure 1.
Monthly aggregate shorting activity relative to trading volume and weekly outstanding short positions on the Tokyo Stock Exchange (TSE) from June 2007 to June 2010.
Weekly short volume relative to trading volume is the number of shares shorted relative to total number of shares that are either bought, sold or shorted. Total shorted shares are from the weekly reports from TSE showing the total number of shares in millions outstanding at the report date. Negotiated margin shorted shares and standardized margin shorted shares are the shares shorted in the negotiated and the standardized market relative to the total.

Panel A. Time series of shorting activity on the TSE from Nov. 2008 to Jan. 2010



Panel B. Time series of the relative importance of large short positions on the TSE from Nov. 2008 to Jan. 2010

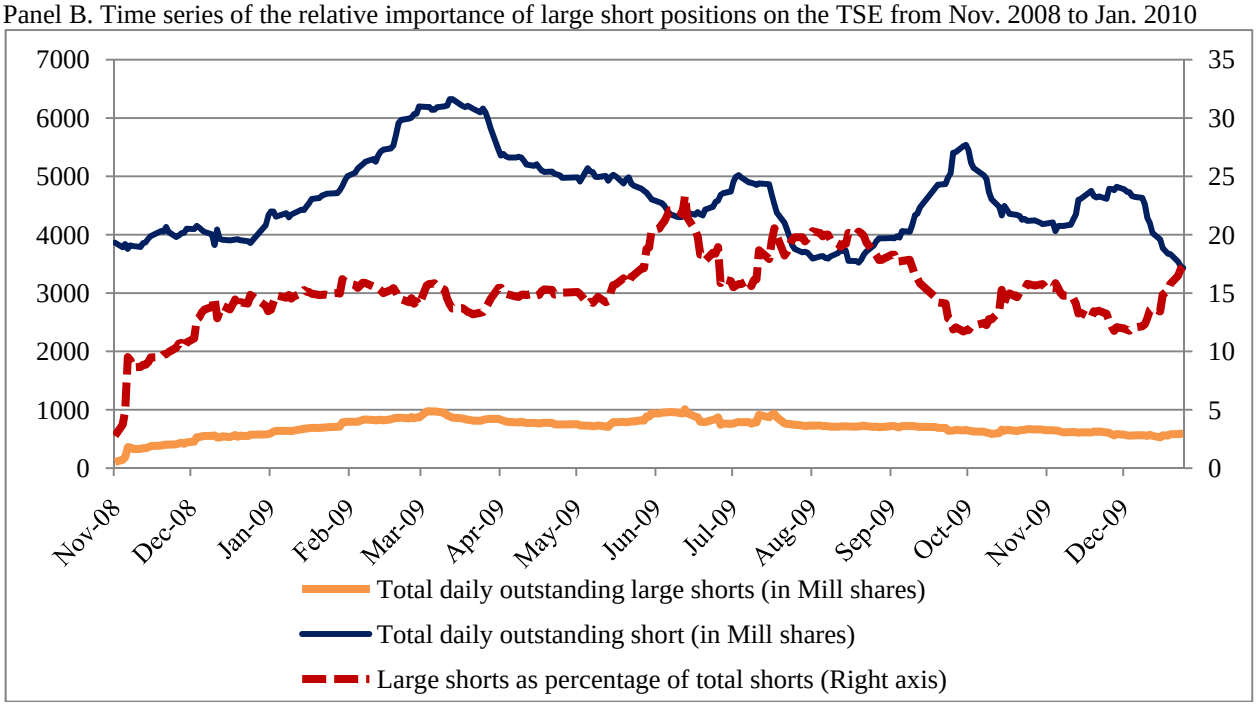
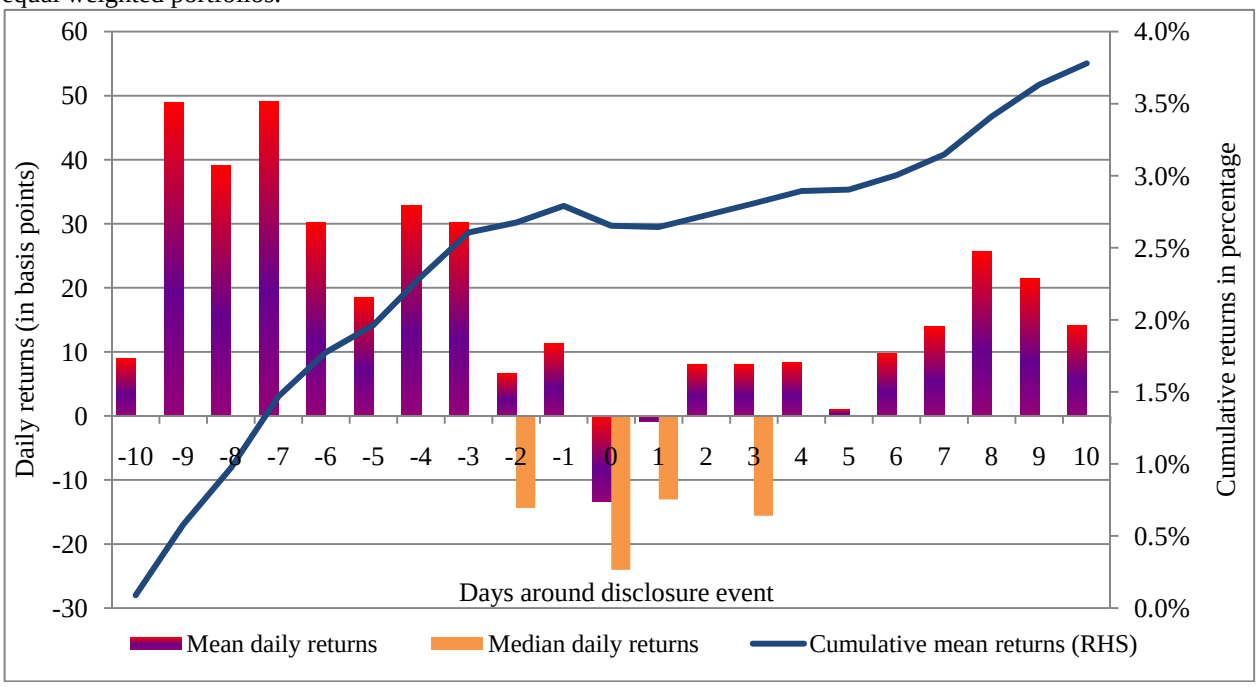


Figure 2.
Daily shorting activity on the TSE from Nov. 2008 to Jan 2010.
The total daily value of outstanding large TSE shorts is the aggregate value of the total shorted disclosed to the TSE and released to the public. The total daily outstanding short value is proxied by the total borrowing demand as reported by Dataexplorer. In panel B, time series of four alternative short interest ratios are calculated with standardized margin shorts, negotiated margin shorts, total margin short and total propriety shorts.

Panel A. Daily stock returns around disclosure
Daily average and median returns for stocks with large positions around disclosure date (date=0).
The cumulative returns are calculated based on the average daily returns, reflecting the holding period returns of equal weighted portfolios.



Panel B. Daily shorting and lending fees around disclosure
Median of the daily aggregate outstanding short positions relative to total shares outstanding for all stocks with large short positions around disclosure date (date=0). The daily lending fees are the median of the value weighted lending fees on all current stock loans.

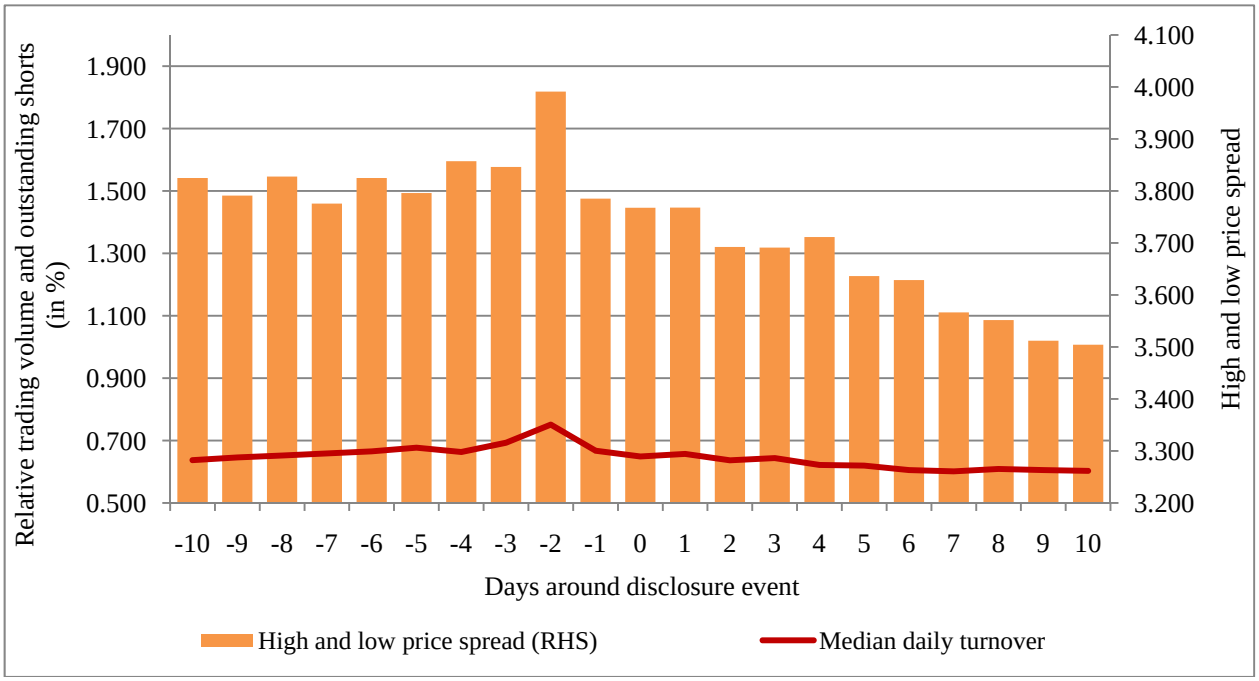
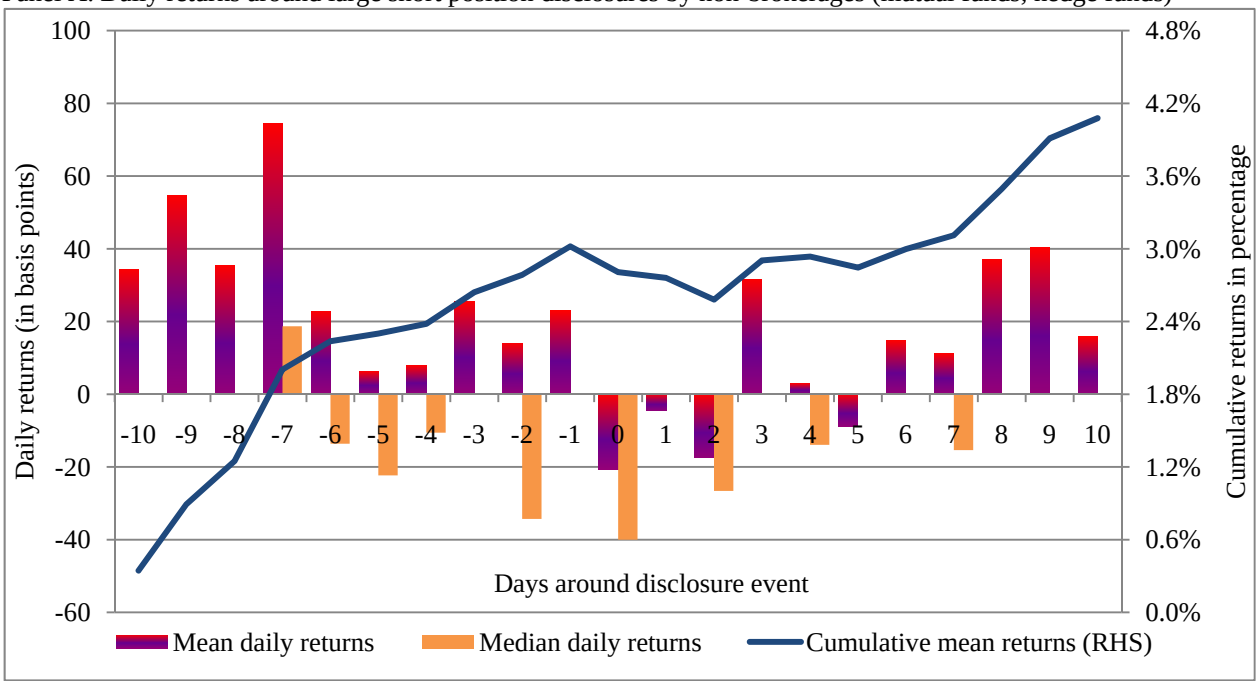


Figure 3.
Daily stocks returns, volatility and turnover around announcement

Panel A. Daily returns around large short position disclosures by non-brokerages (mutual funds, hedge funds)



Panel B. Daily returns around large short position disclosures by brokerages (Japanese securities firms)

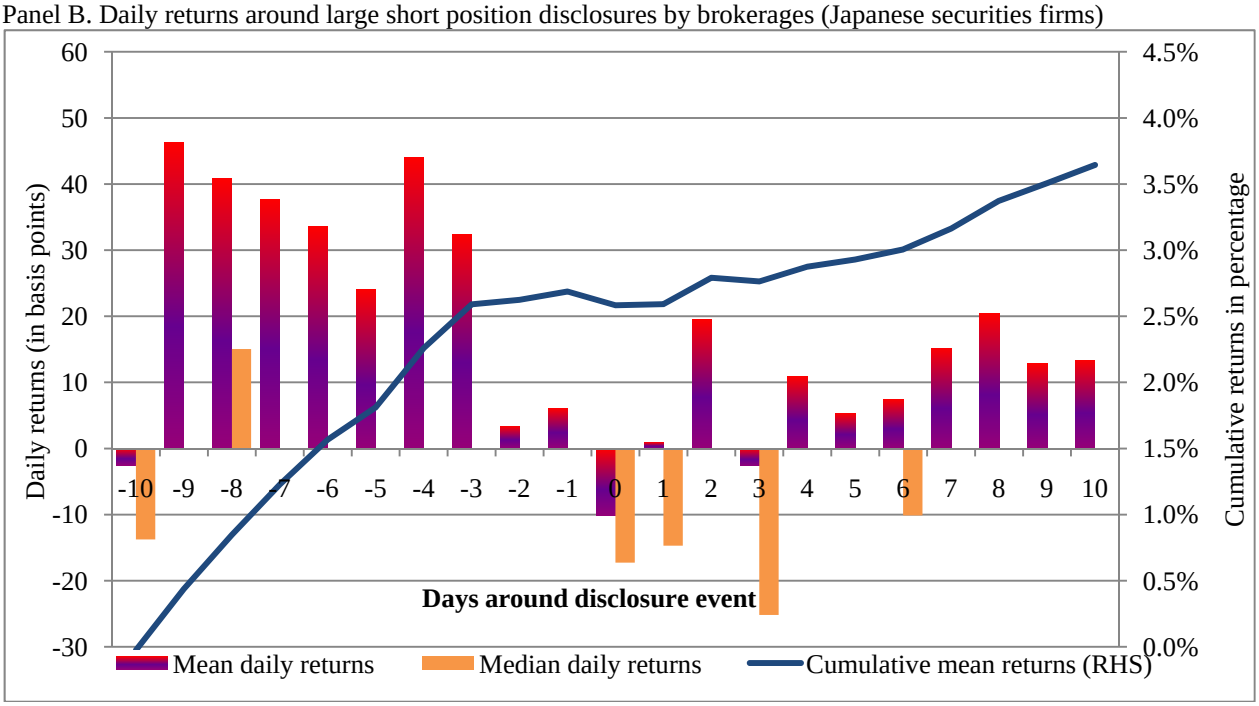


Figure 4.
Daily stocks returns by subsample
Panels A and B show the mean and median daily returns for all stocks with large short positions around disclosure dates, for stocks with large positions that are reported by brokers versus non-brokers.