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Public News Announcements, Short-Sale Restriction and Informational Efficiency

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Abstract

We examine the impact of short-sale restriction on stock price efficiency when firms make public earnings announcements. Using data from the Hong Kong stock market, where some stocks are eligible for and others are prohibited from short selling, we find significantly lower post-announcement returns with high economic magnitude for short-sale prohibited stocks with both positive and negative news shocks. The reduction in informational efficiency due to short-sale restriction persists several months after the earnings announcement. The informational inefficiency due to short-sale restriction is particularly severe for firms with negative announcement period shocks and subject to greater differences in opinion.

Keywords: public news, short-sale constraint, differences in opinion, informational efficiency

JEL classification: G14

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1. Introduction

“They [short sellers] are like looters after a hurricane.”

---- Mr. Andrew M. Cuomo, attorney general of New York State³

“A market without bears would be like a nation without a free press.”

--- Bernard M. Baruch, financier⁴

The debate on the consequences of short selling interests academics, regulators and market participants alike.⁵ Miller (1977) predicts overvaluation when short-sale constraints drive pessimists out of the stock market and the overvaluation is more severe for more dispersed opinions. Short-sale constraints coupled with differences of opinion thus hinder the price adjustment response to negative views and reduce informational efficiency.⁶ Besides the pricing efficiency, regulators are concerned about allegations that short-sellers adopt a predatory strategy against stocks with recent price declines. Brunnermeier and Oehmke (2013) provides a model that temporarily depressed stock prices from short selling force a financial institution to fire sell long-term assets in order to repay debt and satisfy the leverage constraint. The resulting losses for the financial institution allow predatory short sellers to make a profit on their short positions. There have been studies on the effect of short-sale constraints on stock prices. However, finding a proper measure of short-sale constraint can be a challenge in the U.S. because all stocks listed on the NYSE and NASDAQ can be short sold in principle, and thus proxies such as institutional holdings or short loan rates are often used to measure the extent of short-sale constraint.⁷

³ The New York Times, September 19, 2008.

⁴ The New York Times, April 30, 2008

⁵ Rubinstein (2004) has a comprehensive survey on this topic.

⁶ Other theoretical models on overvaluations include Harrison and Kreps (1978), Scheinkman and Xiong (2003), and Hong and Stein (2003). Diamond and Verrecchia (1987) build a rational expectation model and show that prices incorporate negative information slowly in the presence of short-sale constraints.

⁷ For example, Chen et al. (2002), Jones and Lamont (2002) and Asquith et al. (2005), among others, have documented instances when short-sale constraints have led to overvaluation by finding a negative future return following a period of costly shorting.

In this paper, we use Hong Kong data and investigate the effect of an *exchange-imposed* and *extreme* form of short-sale constraint, *short prohibition* for some stocks, on price adjustments after major corporate public news events — earnings announcements. The Hong Kong stock market is different from the U.S. market in that Hong Kong Stock Exchange (HKEx) designates some stocks as short-sale eligible and others as short-sale prohibited, based on objective criteria related to firm characteristics. This unique institutional feature allows us to avoid the problem of finding a proxy for short-sale constraint and has certain advantage over proxies for short-sale constraints such as short interests and/or rebate rates, which are equilibrium outcomes from the demand and supply conditions in the security borrowing and lending market. Naturally, variables such as short interests, shorting order flows or rebate rates are related to the views of security borrowers and lenders. An exchange-imposed short-sale constraint can be viewed as exogenous in the sense that this restriction does not depend on the demand for shorting (or supply of lending) a stock. Furthermore, since short-sale prohibition is an extreme form of short-sale constraint, we expect that the Hong Kong setting allows us to obtain strong results and sharper contrasts across short eligibility groups.

Motivated by Engelberg et al. (2012) who find that a substantial portion of a short seller's trading advantage actually comes from their ability to process publicly available information, we investigate the impact of short-sale eligibility on informational efficiency after *public* news announcements—earnings announcements. We use the return following earnings announcements as a proxy for informational efficiency. We argue that more short-sale constrained stocks will take longer to incorporate negative views, resulting in more negative post-earnings announcement returns, especially for stocks that subject to great differences of opinion. A related study by Chang et al. (2007), also using the Hong Kong setting, investigate the effect of lifting the short-sale constraint on returns. They find significantly negative abnormal returns after a stock is first allowed to be short sold. Chen and Rhee (2010) find faster intraday price adjustments after a stock becomes short-sale eligible in Hong Kong. This paper complements Chen and Rhee (2010) in that they investigate intraday price adjustment behavior for sample firms before and after being added to the short-eligible list while we investigate longer-run price efficiency after public

news announcements across short-eligibility groups. Our research design allows us to explore the interplay among short sale constraint, ex-ante differences of opinion and nature of shocks in public news announcements, and how these three factors affect the informational efficiency in the equity market.

Berkman et al. (2009) investigate the implication of the Miller (1977) model that the prices of short-sale constrained stocks subject to substantial differences of opinion are biased upward. They argue that earnings announcements should reduce differences of opinion about future earnings and reduce overvaluation. Indeed, they find that stocks subject to higher differences of opinion earn significantly lower returns during the three-day earnings announcement period. On the other hand, Kim and Verrecchia (1997) developed a model where investors employ private information in anticipation of and in conjunction with a public announcement which are respectively termed as “pre-announcement information” and “event period information”. Their model shows that investors with differential pre-announcement information may generate different private information from public news. Intuitively, earnings announcements may resolve (reduce) uncertainty about the current period (near term) earnings, but, differences of opinions about security valuation may still exist as investors and analysts will shift their attention to the next period (or further future periods) earnings. Furthermore, earnings announcements contain more than simply an earnings figure for the current period. Managers may discuss the progress of existing projects, firm’s future prospects, opportunities and challenges. Hence, there is much more news contained in an earnings announcement than the earnings figure per se (e.g. Beckman et al. (2009, p. 377), Brand et al. (2008)). If different investors interpret the same public announcements differently (e.g., Bamber et al (1999), Kandel and Person (1995), Kim and Verrecchia (1997)) and pessimistic investors (those who read the announcements as negative) cannot short sell, their negative views cannot be reflected immediately in the stock price at the earnings announcement. We should observe a negative post-announcement return for these stocks. While Berkman et al. (2009) focus on cross-sectional stock price behavior during the announcement period, we focus on cross-sectional differences in the speed at which public news is incorporated into stock prices in the post-announcement period due to differences in short-sale constraints, differences in opinion, and whether the announcement

is perceived as a positive or a negative shock. Our paper also compliments Boehmer and Wu (2012) who find that shorting increases after negative earnings surprises and greater shorting flow reduces post-earnings announcement drift for negative earnings surprises.⁸ Our research design allows us to ask the question that, with the presence of differences in opinion in reality, how short-sale constraints affect relatively more pessimistic views being reflected under *either positive or negative* announcement period shocks.

In the empirical implementation, we carefully control for firm characteristics because the exchange, after all, revise the short eligibility status according to objective criteria based on firm characteristics as detailed in the Data and Variables section. We find that stocks restricted from short selling have significantly lower post-announcement returns. This inefficiency persists several months after earnings announcements. Our regression analyses indicate that short-sale prohibited stocks have returns of -2.95% (-0.99%) to -3.92% (-1.54%) during the three-month (*one-month*) period after the announcement, which are roughly equivalent to -12% to -16% on annual basis.⁹ Our results are obtained from security-level (not portfolio-level) regressions and therefore are of high economic significance. The negative post announcement drift due to short-sale restriction is particularly severe for firms with negative announcement period shocks and subject to greater ex ante differences in opinion measured by turnover and return volatility. Our results are robust in subsample analysis or when a different benchmark model is used to calculate abnormal returns. To mitigate concerns that the results are driven by different firm characteristics across eligibility groups, we also conduct analyses using a size-matched subsample and find similar results.

⁸ Under the assumption of delayed recognition of earnings surprises, Boehmer and Wu (2012) examine the responses of short sellers specifically to negative surprises. They do this because “it is not clear how to interpret changes in short selling after positive surprises” (Boehmer and Wu (2012), P.303). In our empirical model, with the presence of differences in opinion, even in the case of positive news shocks, optimistic investors may cause overvaluations and short seller may have the incentive to exploit the opportunity.

⁹ See Table 2. When interaction terms with differences in opinion proxies are included in regression analyses, the coefficients for *Short_Prob* are even more negative, see Table 3.

The remainder of this paper is organized as follows. Section 2 discusses our motivation and hypotheses. Section 3 describes the data sources and variables used in the analysis. Section 4 presents empirical results, and Section 5 provides further robustness checks. Finally, Section 6 concludes the paper.

2. Hypothesis Development

We study the effect of exchange-imposed short-sale prohibition on informational efficiency, using post announcement returns. Typically, besides earnings per share, firms also release other important information in their announcements, which may cover the progress of existing projects and future prospects, opportunities and challenges. Hence, there is much more information contained in an earnings announcement than just the earnings figure, and different investors may interpret the same information in an announcement differently (e.g., Bamber et al (1999), Kandel and Person (1995), Kim and Verrecchia (1997)). As Engelberg et al. (2012) suggest, public information can provide profitable opportunities for short sellers. Blau and Pinegar (2013) further find that short sellers are not incrementally more informed in the pre-announcement period than the non-announcement period, implying that short sellers generate private signals based on public information. Furthermore, several studies in the U.S. find that there is a decrease in the proportion of the total information set that is common across all analysts after earnings announcements and suggest that analysts acquire more private information from the public announcements (Barron et al. (2002), Barron et al. (2008), and Barron et al. (2017)). According to Miller (1977), those who hold a positive view about the firm will buy, whereas those who hold a negative view will sell or even short sell. When short-sales are prohibited, potential short sellers are unable to do so, meaning that more optimistic views are reflected around earnings announcement days. This will result in negative future returns when negative opinion is eventually incorporated in the stock price. We conjecture

that there is a negative drift for stocks that are short-prohibited.¹⁰ Therefore, we formulate the following two hypotheses:

Hypothesis 1: Ceteris paribus, short prohibition will on average have a negative impact on post-earnings announcement period returns.

According to Miller (1977), short-sale constraints will result in overvaluation only when there are differences in opinions and the extent of overvaluation is more severe for more dispersed opinions. Because the extant literature has suggested that firm earnings announcements may generate disagreement (e.g., Bamber et al (1999), Kandel and Person (1995), Kim and Verrecchia (1997)) and negative news are generating more volatility in general (e.g. Black (1976), Glosten et al. (1993)), we should expect more disagreements in the case of bad news, resulting in more negative drifts. Furthermore, in the case of bad news for short-prohibited stocks, in addition to the negative drift caused by optimists, less fundamental information is reflected because short-sale constraint is binding, leading to stronger negative price drifts. Therefore, if short-sale constraint hinders the reflection of pessimists' opinion during the announcement period as predicted by Hypothesis 1, one should expect post-announcement returns to be more negative conditional on bad news under short-sale constraint.¹¹ Moreover, the effect should be stronger among short-prohibited stocks subject to great differences of opinion because one should expect that even more disagreement is generated at bad news for these stocks. The above discussion leads to hypotheses 2 and 3 as follows.

Hypotheses 2: Ceteris paribus, short-prohibited stocks with negative a shock during the announcement period will experience even more negative price drifts in post-earnings announcement period.

¹⁰ Depending on the short-selling cost, some short-sale eligible stocks may also be subject to the overvaluation in Miller's context but the contrast will be sharper across the eligible v.s. prohibited groups.

¹¹ In fact, Nagel (2005) finds that stocks with low institutional ownership (a proxy for short sell constraints) underreact to bad news about future cash flows.

Hypothesis 3: Short-prohibited stocks subject to greater differences in opinion will show more negative post-earnings announcement drifts.

In our regression specifications, we control for the impact of earnings surprise on post announcement returns by including the magnitude of earnings surprises, so that we can isolate the return effect across short-eligibility groups from the conventional earnings surprise impact which is unconditional on short-sale restrictions (Ball and Brown (1968), and Bernard and Thomas (1989)). Our hypotheses therefore suggest that short-prohibited stocks should have lower or more negative returns than short-eligible stocks in post-announcement periods after controlling for earnings surprises.

3. Data and Variables

Our sample period is from 1 January 1994 to 31 December 2012. Short-selling in Hong Kong stock market was not allowed until after 1 January 1994 and is restricted to a list of stocks designated by the Hong Kong Stock Exchange. The exchange revises the list of designated stocks for short-selling on a quarterly basis according to the following criteria during most of our sample period:

Constituent stocks of the underlying indices of equity index products; the underlying stocks for options and futures;

Stocks with a public float capitalization of not less than HK \$1 billion;

Stocks with market capitalization of not less than HK \$1 billion and an aggregate turnover during the preceding 12 months to market capitalization ratio of not less than 40%;

Effective on 3 July 2012, the threshold of being short eligible has been increased requiring a market capitalization not less than HK \$3 billion and turnover rate during the past 12 months of not less than 50%.¹²

¹² For a detail description, see http://www.hkex.com.hk/eng/market/sec_tradinfo/regshortsell.htm

Short-selling on these stocks are subject to an uptick rule that disallows a short sale be made below the best current ask price. The uptick rule was briefly lifted from March 1996 to September 1998.

We obtain data for firms listed in Hong Kong Stock Exchange from various sources. Daily stock return, trading volume, firm size, market-to-book ratio, annual earnings announcement dates and earnings per share are obtained from DataStream. We manually collect both the short eligibility announcement and effective dates for changes in short eligibility status.¹³ Industry classification for stocks, listing and delisting dates for futures, options and Hang Seng Index constituents are from the exchange's website. In the case of an unassigned industry classification from the exchange, classification from DataStream is used to make a match. Thereafter, we refer earnings announcements as 'announcements' for brevity and other types of announcements (e.g. short eligibility) will be specified explicitly.

Chang et al. (2007) find that firms added to the short eligibility list experienced a significantly negative abnormal return. Therefore, to avoid possible confounding effects from a change in short selling membership during the announcement and post-announcement period, a firm-announcement observation is removed if the firm is added or removed from the designated short selling list starting a month before the announcement date.¹⁴ In addition, we remove firms with a market capitalization of less than HKD\$100 million¹⁵ one month before the announcement to reduce the chance that the results being driven by tiny firms. This brings a total of 9,882 firm-announcement observations, with 6,537 from short-prohibited firms.

[Insert Table 1 here]

Table 1 provides summary statistics for the firms included in our sample. We report the annualized turnover and return volatility over the past three months of the announcements. The market capitalization is measured one month before the announcement. We also report the market-to-book ratio

¹³ The authors thank Craig Doidge for providing part of the data on changes in short eligibility status.

¹⁴ Results are very similar for alternative screening windows after the announcement dates.

¹⁵ Approximately US \$12.9 million using an exchange rate of US \$1 = HK \$7.75, which is roughly constant over the sample period.

provided by DataStream for the corresponding fiscal year. Panel A reports the summary statistics of firm characteristics for the overall sample. Over the 1994-2012 sample period, the average turnover rate is around 78% with a median 35%. Average (median) return volatility three months prior to announcement is 55% (48%). The average market capitalization is HK\$ 11,084 million while the median market capitalization is HK\$ 932 million, suggesting a large variation in firm size. The average (median) market-to-book ratio is 1.78 (0.99).

We also split our sample into two equal sub-periods: 1994-2002 and 2003-2012. It can be seen that return volatilities are similar across sub-periods, while the average market capitalization, turnover, and market-to-book ratios are higher in the second period. The number of firm-year observations has increased from 2,499 in the first period to 7,383 in the second period, mainly reflecting increases in firms being listed in HKEX over time. We also report the summary statistics for short eligible and short prohibited firms in Panels B and C, respectively. Short-eligible firms on average have higher turnover and lower return volatility. The average and median market capitalization for short-eligible firms are much larger than those of short-prohibited firms. The market-to-book ratio is also on average higher for short-eligible firms. The difference in firm size between the two groups is partly due to the selection criterion by the exchange that market capitalization should be at least \$1 billion Hong Kong dollars for a stock to become short-eligible, but it is also to large extent driven by giant Hang Seng Index component stock firms. If we exclude Hang Seng Index component stocks, which consist of around 400 observations, in the short-eligible group, the mean market-cap for short-eligible firms drops sharply from HK\$29,696 million to HK\$9,617 million. In sum, short-eligible firms on average are with large market capitalization, higher turnover ratio, lower return volatility, higher market-to-book ratio. Some of these firm characteristics are also used by the exchange as selection criteria for determining the short eligibility status. In our empirical analyses, we will control for firm characteristics to address the concern that our results might be driven by firm characteristics rather than short-sale constraints.

Our main measure of abnormal return calculated from the market model, using value-weighted market return as the benchmark return. We estimate the market model using daily return data for eleven

months up to one month before the announcement date and require the firm to have at least 6 months of data. We calculate post announcement returns by cumulating abnormal returns +2 days after the announcement. Our main dependent variable is the cumulative abnormal return up to 20 or 60 trading days after the announcement, denoted as $CAR(2,20)$ or $CAR(2,60)$. Our results are not sensitive to the choice on windows over which the CARs are measured. The choice of up to 20 or 60 trading days window roughly represents one month or three months in calendar time.¹⁶ We mainly report results using $CAR(2,60)$ to conserve space. Size-adjusted abnormal returns using size-matched portfolios and industry-size adjusted abnormal returns using industry and size matched portfolios are also used for robustness check. Variable definitions are in the Appendix A. Extreme values of abnormal returns are winsorized at percentiles 1% and 99%, respectively.

We define the announcement as good news if the three-day market-model adjusted announcement abnormal return is positive and larger than 1.0%, and as bad news if the three-day abnormal return is negative and smaller than -1.0%, with the remaining defined as no news.¹⁷ After removing no news cases and those with missing market-to-book ratio, there are total 9,882 firm announcement observations, with 6,537 of them from short-prohibited firms. Return volatility and turnover prior to the announcements are used as proxies for ex ante opinion dispersion. They are also used in a number of papers, e.g. Boehme et al. (2006), and Berkman et al. (2009).¹⁸

In the literature, IBES analyst forecast data are often used to compare with the actual earnings value, and define good news or bad news when the actual value is above or below the average analysis'

¹⁶ While quarterly earnings announcement is not mandatory, some firms in the Hong Kong Stock Exchange do report quarterly earnings but DataStream does not have a complete record on interim announcement dates. Our post-announcement window ends at +60 days to avoid results confounded by the next earnings announcement if the firm reports quarterly. Only annual earnings announcements are used in this paper.

¹⁷ We also used an alternative definition of “neutral cases” as $CAR(-1, +1)$ being within the band of $(-0.5\%, +0.5\%)$. The qualitative results remain similar.

¹⁸ Measures on opinion dispersion generated at the announcements are not readily available. For example, the literature is still unresolved on the interpretation of a turnover shock at the announcement: it can proxy a change in visibility, a change in risk, or disagreement (for example, Garfinkel and Sokobin (2006) and Lerman et al (2008)).

forecasts, respectively. We did not use analyst earnings forecast data for two reasons. First, IBES database does not have a comprehensive coverage on firms in Hong Kong, both in terms of number of firms covered and number of analysts following for each firm.¹⁹ Second, Brandt et al. (2008) argues that earnings announcement period return captures better the market reaction to unexpected information contained in the firm's earnings release. During the earnings announcement period, management may release more information than just earnings and may also include information on sales, cost structure, margin, future investment, etc.

4. Empirical Results

4.1 Short-Sale Prohibition and Post Earnings Announcement Drift

To investigate the effect of short-sale prohibition on post announcement abnormal returns, we run the following regression:

$$CAR(2, X)_{i,a} = b + c * Short_Prob_{i,a} + d * NSign_{i,a} * Short_Prob_{i,a} + control + \varepsilon \quad \text{-----}(1)$$

where $CAR(2, X)_{i,a}$ is the post announcement excess return for stock i after announcement a, from +2 up to X trading days. $Short_Prob_{i,a}$ is a dummy variable equals to “1” when stock i is short-prohibited on date a, and “0” otherwise. $CAR(-1,1)_{i,a}$ is the 3-day announcement period market-model adjusted cumulative abnormal return for stock i on announcement a. $NSign_{i,a}$ is a dummy variable equals to one if $CAR(-1,1)_{i,a}$ is negative, and zero otherwise. The coefficient of the term $Short_Prob$ is the main focus of this paper. Hypothesis 1 predicts it to be **negative**. The interaction term, $Short_Prob * NSign$, is designed to capture any difference in post announcement returns between short eligible and short

¹⁹Data errors in the IBES announcement dates also deter us from using IBES. Upon manual check with the exchange website, there are frequent cases when announcement dates from IBES does not match with the actual one and the mismatches are sometimes greater than one week. In contrast, DataStream's announcement dates are correct in general. Acker and Duck (2009) also find significant errors from IBES database using U.K. firm announcements.

prohibited firms conditional on whether they have good or bad news.²⁰ To the extent that short-sale constraint restricts the reflection of negative information during the announcement period, we should expect the impact of short-sale constraint on post announcement returns to be more negative conditional on bad news. Therefore we should see a **negative coefficient** for *Short_Prob*NSign* under Hypothesis 2.

As presented in Table 1, short-eligible firms are on average larger ones with higher turnover, lower return volatility and higher market-to-book ratio. To ensure that difference in return behavior across short eligibility groups is not due to other factors, we include all the variables in the eligibility criteria and other control variables as follows: 1) the quintile ranking of $CAR(-1,1)_{i,a}$, $Quin_CAR(-1,1)_{i,a}$, to control for the impact of earnings surprises on post announcement returns that have been documented in the accounting literature (e.g., Ball and Brown (1968), Bernard and Thomas (1989)), 2) the log of market capitalization one month prior to the announcement date, 3) the annualized return volatility over the past 3 months and ending a week prior to the announcement date, 4) the cumulative abnormal return starting 3 months and ending a week prior to the announcement to control for possible short-term return momentum and/or reversal, 5) the annualized turnover starting 3 months and ending a week prior to the announcement, 6) the log of market to book ratio at the end of previous calendar year, and 7) a dummy variable *Derivatives*, that indicate the existence of stock futures or stock options for a firm.²¹

[Insert Table 2 here]

We present the regression results when CAR (2, 60) is used as the dependent variable in Table 2. Column 1 shows that short-prohibited stocks have three-month post announcement abnormal returns 2.95% lower than that of short-eligible stocks and the difference is statistically significant. When we include other variables that control for differences in firm characteristics, announcement abnormal returns and past returns, *Short_Prob* is still significantly negative and even smaller than -2.95%. The economic

²⁰ Notice that including *Short_Prob*, *NSign*, and *Short_Prob*NSign* in the same specification introduces the issue of multi-collinearity because they are all binary variables

²¹ The status of being an index component is often accompanied by the existence of stock futures or equity options, and therefore index status is a subset of the *Derivatives* dummy.

significance of this result can be understood by comparing to the findings in the literature related to PEAD (unconditional on short-sale constraints). For example, Bernard and Thomas (1989) report that “a long position in the highest unexpected earnings decile and a short position in the lowest decile would have yielded an estimated abnormal return approximately 4.2% over 60 days subsequent to the earnings announcement” in the U.S. The regression results in Column 3 of Table 2 also illustrate the high economic significance of short-sale prohibition in the Hong Kong context. The significant coefficients for short-sale prohibition status support Hypothesis 1 that short-sale prohibition impedes the reflection of negative opinion around public news announcements. When investors have differential interpretations on public news, optimistic views are reflected faster than pessimistic views under short-sale constraints. While such constraints may also exist in short-eligible stocks, they are manifested to the extreme among short-sale prohibited stocks. A slower reflection of negative views implies relatively more negative returns after earnings announcements among short-prohibited stocks than short-eligible stocks and this implication is strongly supported in our results. The coefficient for our control variable *Quin_Car(-1,1)* is 0.49, which means the difference between the top and bottom quintiles in PEADs is about 1.96% for the 60-day period after the earnings announcement while the coefficient for *Short_Prob* is -3.92%.

Regarding whether the nature of news matters for the difference in post announcement returns across short-eligibility groups, Column 2 shows that the coefficient estimate for *Short_Prob*NSign* is significantly negative, meaning that in the case of bad news, short-prohibited stocks experience even more negative returns after announcements. The result of Column 2 supports Hypothesis 2 that more disagreement is generated in the case of bad news and the wider spread of opinion means that there exist investors with even more pessimistic views. When the more pessimistic views are not reflected among short-prohibited stocks at the bad news announcements, these stocks have even more negative post announcement returns compared to short-prohibited stocks with good news. The result of Column 2 helps us distinguish from the alternative explanation that it is only the prohibition of short-sale *per se* (i.e. as a stock characteristic with an unconditional effect) that drives the negative returns, rather than short-sale constraints lead to impediment of incorporating negative opinion during the earnings announcements. In

Column 3, we include the quintile ranking of CAR (-1, 1) to control for the possible effect of earnings momentum documented in the literature. The *Short_Prob* coefficient is still significantly negative. In Column 4 when both *Short_Prob*NSign* and *Short_Prob*Quin_CAR* are included, their coefficients are insignificant due to their high correlation.²² Nonetheless, *Short_Prob* still bears a significant and negative coefficient.

To examine whether our results depends on the choice of the post-announcement window, we regress *CAR* (2, 20), on the same set of variables in equation (1). The results are reported in Columns 5-8 of Table 2. In Column 5, we can see that on average *CAR* (2, 20) for the short-prohibited stocks is 1.14% *lower* relative to those short-eligible ones. The significant difference in post announcement return remains after including various control variables in Columns 6 to 8. The estimates for *Short_Prob* dummy are all significantly negative even after controlling for firm characteristics. Overall, the results from the two different post-announcement windows are consistent.

In sum, from the results in Table 2, we can conclude that short-sale prohibition can result in negative post announcement returns and even more negative when firms announce a bad news that are short prohibited, regardless of the return horizons, either up to 20 trading days (one month) or 60 trading days (three months).

4.2 Differences in Opinion, Short-Sale Prohibition and Informational Efficiency

To gain further insights into the mechanism of overvaluation for short-prohibited stocks, return volatility and turnover are used as ex ante proxies for disagreement and interacted with the short-prohibition dummy in regression:

$$CAR(2,60)_{i,a} = b + c * Short_Prob_{i,a} + d * NSign_{i,a} * Short_Prob_{i,a} + Diff_opin * Short_Prob_{i,a} + control + \varepsilon$$

----- (2)

²² By construction, *Short_Prob*NSign* and *Short_Prob*Quin_CAR* are highly correlated. Coefficients for these two variables should be interpreted with caution.

Return volatility and turnover have often been used as proxies for differences of opinion in the literature (e.g., Berkman et al. (2009) and Chang et al. (2007)).²³ Under Hypothesis 3, we should expect a negative sign for the interaction terms between short-prohibition dummy and differences of opinion: higher differences of opinion coupled with short-sale constraint result in more overvaluation and hence more negative drifts. Table 3 shows the following results. First, the coefficients for *Short_Prob* and *Short_Prob*NSign* have similar magnitudes and significance as in Table 2, that is, Hypotheses 1 and 2 are well supported when we introduce the interaction terms for differences of opinion. Second, in Column 1, we see a significantly negative coefficient of -0.12 for the interaction term *Ret_vol*Short_Prob*. The result is of economic significance: a standard deviation increase in annualized return volatility of 34% among short-prohibited stocks will bring in a drop of 4.08% ($-0.12 \times 34\%$) in post announcement returns in the following three months. Results are very similar when *Quin_CAR* is included in Column 2 and when both *Short_Prob*NSign* and *Quin_CAR* are included in Column 3. Columns 4 to 6 show the regression results when *Turnover* is used as a proxy for the differences of opinion. The coefficient of -0.026 for the interaction term *Turnover*Short_Prob* is significantly negative. One standard deviation increase in annualized turnover of 126% among short-prohibited stocks will bring in a decrease of 3.28% ($-0.026 \times 126\%$) of post announcement returns in the following three months. Our results are hence consistent with Hypothesis 3 and support our proposed mechanism on short-sale prohibition impeding reflections of pessimistic views: Pessimists without holding shares are forced to stay at the sideline in the presence of short-sale prohibition, implying that the effect of negative price drifts are stronger for stocks with higher differences in opinion. The R-square values in Table 3 are consistently higher than 10%, which is very impressive given the fact that our regression analyses are on individual securities level.

[Insert Table 3 here]

5. Robustness Checks

²³ Note that turnover is but return volatility is not a criterion used by the exchange to decide short eligibility status.

5.1 Size-adjusted abnormal returns

Our main results in Section 4 are based on cumulative abnormal returns using the market model. Next, we check if the main results can hold if alternative benchmark returns are used. To this end, we construct equally-weighted quartile portfolios based on market capitalizations at the previous year end. For a firm-announcement observation, we exclude stocks in the corresponding size-quartile portfolio throughout the holding period if these stocks also have earnings announcement around the one month period. This is to mitigate potential confounding effects on the benchmark returns due to other firm-specific drifts. We calculate the size-adjusted CAR as the cumulative abnormal return between the daily returns of the firm and its corresponding size-matched portfolio. We replace $CAR(2, 60)$ by 60 days size-adjusted CAR in equation (1) and report results in Table 4. Our results regarding the effect of short-prohibition on post announcement returns are qualitatively unchanged when size-adjusted abnormal returns are used. In Table 5, we again use size-adjusted CAR as the dependent variable and augment the regression specification by including interaction terms between difference in opinion proxies (return volatility or turnover) and short-prohibition dummy. Results are also qualitatively similar to Table 3 when the market model adjusted CARs are used.

We also construct industry-size adjusted CAR by forming industry and size-matched quartile portfolios and repeat the regression analysis. Results are again qualitatively similar and are not reported for brevity.

[Insert Tables 4 and 5 here]

5.2 Sub-period analyses

To check whether our results hold throughout the sample period and are not dominated by more firms in recent years, we conduct a sub-period analysis. In Table 6, we report regression results when the sample is split into two periods of roughly equal length and report results for year 1994 to 2002 and for year 2003 to 2012, separately. In Panel A, that is the first period, the coefficient of short-prohibition dummy is also significantly negative in Columns 1 to 3 and the coefficients for the interaction terms,

*Ret_vol*Short_Prob* and *Turnover*Short_Prob*, are also significantly negative in Columns 4 and 5 respectively. Results are qualitatively similar when we run regression using sub-sample for year 2003 to 2012. Once again, the coefficients for the interaction terms between the *Short_Prob* and proxies for differences in opinion are consistently significantly negative for the second sub-period. The coefficient of *Short_Prob*NSign* is insignificant in the first sub-period in Column 1 while it is significantly negative in the second sub-period in Column 6. Nonetheless, the coefficients of *Short_Prob*NSign* are consistently negative in all specifications. In an unreported table, we remove the observations at the height of the global financial crisis in 2008 and 2009 and find that results are also similar.

[Insert Table 6 here]

5.3 Reduced sample using size-matched firms

Although we include firm size as a control variable in our previous regression analyses, from Table 1 we learn that short-eligible firm are on average much bigger than short-prohibited ones. To investigate whether our results is driven by firm size rather than short eligibility status, we did additional analyses where we match, without replacement, a short-eligible firm to a short-prohibited firm based on size information in the same fiscal year with the market capitalizations between the pair not different by more than 30%. The matching procedure results in 1559 pairs of eligible-prohibited firm-year observations. Panel A of Table 7 shows that the average sizes and average return volatility between both groups are very similar. The average turnover, however, is still higher for the short-eligible group but regression results are similar when we match by size and turnover. Panel B in Table 7 shows that the regression results for *Short_Prob*, *NSign*Short_Prob* and *Diff_opin*Short_Prob* are qualitatively similar to those in Tables 2 and 3, except a slight drop in significance due to a reduced sample size.

[Insert Table 7 here]

The size-matched sample results may help alleviate concerns that the post announcement returns across groups are driven by firm characteristics stipulated by HKEx's short-eligibility listing criteria. While the biggest difference across groups is on firm sizes, there are other differences such as higher

turnover and higher market-to-book ratio among short-eligible firms in the full sample. Suppose that there are missing return driving factors related to these firm characteristics and are therefore correlated with short-eligibility status. If our linear regression specification with turnover and market-to-book variables inadequately controls for the exact functional form of these missing factors, it might be argued that these missing factors drive the return difference across eligibility groups. However, this potential concern is going to work against the results. For example, if liquidity channels through turnover to *Short_Prob*, we should see short-prohibited stocks to have higher average returns because they are less liquid (Amihud, 2002). On the other hand, if a missing factor channels through market-to-book ratio to *Short_Prob*, we should see short-prohibited stocks having higher returns because M/B bears a negative coefficient in Table 2 and short-prohibited stocks on average have lower M/B ratios.

5.4 Including Year-fixed effects and random effects

We investigate the effects of including year fixed effects and firm random effects on our regression results. Results with year-fixed effects are reported in Table 8 and are qualitatively similar to results in Tables 2 and 3, except that the inclusion of year-fixed effects has increased the regression adjusted R-squared by several percentages. Table 9 reports results when both firm random effects and year fixed effects are included, with coefficient standard errors clustered by firm. Again our results are qualitatively unchanged. We do not include firm fixed effects due to the high collinearity between firm-specific intercepts and short-prohibition dummies on a firm level.

[Insert Tables 8 and 9 here]

5.5 Other robustness checks

We also run regressions on samples split into positive and negative announcement returns respectively and find similar results to those in Tables 2 and 3. The results are not reported for brevity and are available upon request.

Most companies in our sample (composing of 86%) report earnings twice a year. Compared to firms with semi-annual announcements, it is possible that firms reporting at quarterly frequency will have

different dynamics in post announcement returns because earnings information is disseminated at different frequencies. We restrict the sample to firms making semi-annual announcements in the fiscal year and find similar regression results. Note that we are still focusing on returns after annual announcements, in view of the general incomplete record of interim announcement dates in DataStream.

6. Conclusion

In this paper, we examine the impact of short-sale prohibition on informational efficiency after public news announcements. By taking the advantage of the unique institutional feature in Hong Kong where short eligibility of traded stocks is determined by the Hong Kong stock exchange, we can mitigate the endogeneity issue related to identifying short-sale constraint in the U.S. setting. This exchange-imposed short-sale constraint is exogenous to the demand for and supply of shorting a stock. As short-sale prohibition is an extreme form of short-sale constraints, empirical study in this setting is expected to generate sharper contrasts between short-eligible and short-prohibited groups and stronger empirical results when compared with the U.S. setting where all stocks are theoretically eligible for short sales. Indeed, we find strong and consistent evidence that short-sale prohibition reduce the long run informational efficiency by hindering pessimistic views being reflected unconditional on the nature of shocks. Further analyses suggest that, short-sale restriction coupled with negative news shock and ex ante higher degree of differences in opinion that causes more overvaluation during the announcement period. The results from this paper compliment those in Nagel (2005) and Boehmer and Wu (2012) who find that short-sale constrains help explain cross-sectional stock mispricing and, in particular, more short-sale constrained stocks underreact to bad news. Our results are consistent with the notion that reduction in informational efficiency arises because pessimists are driven out of the market due to short-sale prohibition, and negative information gets slowly incorporated over months. Our contributions are at least two folds. First, when there is a short prohibition, negative views are not fully reflected during the announcement periods even with positive shocks. Second, informational inefficiency is more severe for stocks with negative news shocks and high level of ex ante differences in opinion.

References

- Acker, Daniella, and Nigel W. Duck, 2009, On the reliability of I/B/E/S earnings announcement dates and forecasts, *working paper*.
- Amihud, Yakov, 2002, Illiquidity and stock returns: cross-section and time-series effects, *Journal of Financial Markets* 5, 31-56.
- Asquith, Paul., Parag. A. Pathak, and Jay. R. Ritter, 2005, Short interest, institutional ownership, and stock returns, *Journal of Financial Economics* 78, 243-276.
- Ball, Ray, and Philip Brown, 1968, An empirical evaluation of accounting income numbers, *Journal of Accounting Research* 6, 159-178.
- Bamber, Linda Smith, Orie E. Barron, and Thomas L. Stober, 1999, Differential interpretations and trading volume, *Journal of Financial and Quantitative Analysis* 34, 369-386.
- Barron, Orie E., Donal Byard, and Oliver Kim. 2002, Changes in analysts' information around earnings announcements. *The Accounting Review*, Vol. 77 (4): 821-846.
- Barron, Orie E., Donal. Byard, and Yong Yu. 2008, Earnings surprises that motivate analysts to reduce average forecast error. *The Accounting Review*, Vol. 83 (2): 303-325.
- Barron, Orie E., Donal Byard, and Yong Yu. 2017, Earnings Announcement Disclosures and Changes in Analysts' Information. *Contemporary Accounting Research*, 34 (1): 343-373.
- Beber, Alessandro, and Marco Pagano, 2013, Short Selling Bans Around the World: Evidence from the 2007-09 Crisis, *Journal of Finance* 78, 343-381.
- Bernard, Victor L., and Jacob K. Thomas, 1989, Post-earnings-announcement drift: delayed price response or risk premium? *Journal of Accounting Research* 27, 1-36.
- Berkman, Henk, Valentin Dimitrov, Prem C. Jain, Paul D. Koch, and Sheri Tice, 2009, Sell on the news, differences of opinion, short-sales constraints, and returns around earnings announcements, *Journal of Financial Economics* 92, 376-399.
- Black, Fischer, 1976, Studies of Stock Price Volatility Changes. In: Proceedings of the 1976 Meeting of the Business and Economic Statistics Section, American Statistical Association, Washington DC, 177-181.
- Blau, Benjamin M., and J. Michael Pinegar, 2013, Are short sellers incrementally informed prior to earnings announcements? *Journal of Empirical Finance* 21, 142-155.
- Boehme, Rodney D., Bartley R. Danielsen, and Sorin M. Sorescu, 2006, Short-sale constraints, differences of opinions, and overvaluation, *Journal of Financial and Quantitative Analysis* 41, 455-487.
- Boehmer, Ekkehart, and Juan (Julie) Wu, 2012, Short selling and the price discovery process, *Review of Financial Studies* 26, 287-322.

- Brandt, Michael W., Runeet Kishore, Pedro Santa-Clara, and Mohan Venkatachalam, 2008, Earnings announcements are full of surprises, *working paper*.
- Bris, Arturo, William N. Goetzmann, and Ning Zhu, 2007, Efficiency and the bear: Short sales and markets around the world, *Journal of Finance* 62, 1029–1079.
- Brunnermeier, Markus K., and Martin Oehmke, 2014, Predatory short selling, *Review of Finance* 18, 2153–2195.
- Chang, Eric C., Joseph W. Cheng, and YingHui Yu, 2007, Short-sale constraints and price discovery: evidence from the Hong Kong market, *Journal of Finance* 62, 2097–2121.
- Chen, Joseph, Harrison Hong, and Jeremy C. Stein, 2001, Forecasting crashes: trading volume, past returns, and conditional skewness in stock prices, *Journal of Financial Economics* 61, 345–381.
- Chen, Joseph, Harrison Hong, and Jeremy C. Stein, 2002, Breadth of ownership and Stock returns, *Journal of Financial Economics* 66, 171–205.
- Chen, Crystal Xiaobei, and S. Ghon Rhee, 2010, Short sales and speed of price adjustment: Evidence from the Hong Kong stock market, *Journal of Banking and Finance* 34, 471–483.
- Diamond, Douglas W. and Robert E. Verrecchia, 1987, Constraints on short-selling and asset price adjustment to private information, *Journal of Financial Economics* 18, 277–311.
- Engelberg, Joseph E., Adam V. Reed and Matthew C. Ringgenberg, 2012, How are shorts informed? – Short sellers, news and information processing, *Journal of Financial Economics* 105, 260–278.
- Garfinkel, Jon A. and Jonathan Sokobin, 2006, Volume, opinion divergence, and returns: A study of post-earnings announcement drift, *Journal of Accounting Research* 44, 85–112.
- Glosten, Lawrence R., Ravi Jagannathan, and David E. Runkle. 1993, On the relation between the expected value and the volatility of the nominal excess return on stocks. *Journal of Finance* 48 (5): 1779–1801.
- Harrison, J. Micheal and David M. Kreps, 1978, Speculative investor behavior in a stock market with heterogeneous expectations, *Quarterly Journal of Economics* 92, 323–336.
- Hong, Harrison. and Jeremy C. Stein, 2003, Differences of opinion, short-sales constraints and market crashes, *Review of Financial Studies* 16, 487–525.
- Jones, Charles M. and Owen A. Lamont, 2002. Short-sale constraints and stock returns, *Journal of Financial Economics* 66, 207–239.
- Kandel, Eugene and Neil D. Pearson, 1995, Differential interpretation of public signals and trade in speculative markets, *Journal of Political Economy* 103, 831–872.
- Kim, Oliver and Robert E. Verrecchia, 1997, Pre-announcement and event-period private information, *Journal of Accounting & Economics* 24, 395–419.
- Lerman, Alina, Joshua Livnat, and Richard R. Mendenhall, 2008, The dynamics of high-volume return premium around earnings announcements, *working paper*.

- Miller, Edward M., 1977, Risk, uncertainty, and divergence of opinion, *Journal of Finance* 32, 1151-1168.
- Nagel, Stefan, 2005, Short sales, institutional investors and the cross-section of stock returns, *Journal of Financial Economics* 78, 277-309.
- Rubinstein, Mark, 2004, Great moments in financial economics: short-sales and stock prices, *Journal of Investment Management* Vol 2.
- Scheinkman, Jose A. and Wei Xiong, 2003, Overconfidence and speculative bubbles, *Journal of Political Economy* 111, 1183–1219.

Table 1. Summary Statistics

Table 1 reports summary statistics for firm-year observations in the sample: Panel A for all stocks, Panel B for short-eligible stocks and Panel C for short-prohibited stocks. Summary statistics for firm-year observations are reported for the whole sample period starting from 1994 to 2012, as well as two sub-periods: 1994-2002 and 2003-2012. The sample selection criteria are as follows. Firms with market capitalizations lower than HKD\$100 million one month before the announcement are excluded. A firm-announcement observation is removed if the firm is newly added to or removed from the designated short selling list starting from one month before the earnings announcement date. We also require sample firms to have non-missing market-to-book ratio in DataStream for the previous fiscal year before the earnings announcement and to have continuous return observations over the past year for the market model estimations. Market capitalization is in million Hong Kong dollars with an exchange rate 1 USD = 7.75 HKD over the sample period. Detailed variable definitions are in the Appendix.

Panel A. Summary statistics for firm-year observations for the full sample.

Sample period	1994-2012			All stocks 1994-2002			2003-2012		
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std
Turnover (%)	77.97	34.71	118.99	74.10	31.19	117.77	79.28	36.26	119.38
Return volatility (%)	55.26	47.91	30.95	55.56	47.86	32.05	55.16	47.93	30.57
Market cap (HKD Million)	11084	932	71438	8145	753	44522	12079	997	78462
Market-to-book ratio	1.78	0.99	2.62	1.39	0.78	2.09	1.91	1.08	2.76
Firm-year obs	9882			2499			7383		

Panel B. Summary statistics for firm-year observations for short-eligible stocks.

Sample period	Short Eligible Stocks								
	1994-2012			1994-2002			2003-2012		
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std
Turnover (%)	89.29	53.77	104.17	88.10	47.63	113.42	89.66	56.07	101.20
Return volatility (%)	46.86	43.01	22.37	53.65	47.66	27.93	44.79	42.06	19.93
Market cap (HKD Million)	29696	5568	120052	22033	3280	76435	32033	6338	130412
Market-to-book ratio	2.01	1.31	2.40	1.49	0.87	2.05	2.17	1.48	2.47
Firm-year obs	3345			782			2563		

Panel C. Summary statistics for firm-year observations for short-prohibited stocks.

Sample period	Short Prohibited Stocks								
	1994-2012			1994-2002			2003-2012		
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std
Turnover (%)	72.18	25.05	125.51	67.72	23.26	119.19	73.76	25.75	127.66
Return volatility (%)	59.56	51.38	33.73	56.42	48.08	33.74	60.67	52.37	33.65
Market cap (HKD Million)	1561	500	8564	1819	485	9931	1469	507	8020
Market-to-book ratio	1.66	0.85	2.72	1.34	0.76	2.11	1.78	0.89	2.89
Firm-year obs	6537			1717			4820		

Table 2. Short-Sale Eligibility and Cumulative Abnormal Returns after Earnings Announcement

Table 2 reports the regression results when CAR (2, X), the market-model adjusted cumulative abnormal returns over [2, X] window, is regressed on the short-sale prohibition dummy (*Short_Prob*) and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the abnormal returns over the past three months (*Past_CAR*), the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). In each entry, the upper number is the coefficient estimate and the lower number is the t-value. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. We report the results for X=60 and X=20.

	CAR(2,60)				CAR(2, 20)			
	1	2	3	4	5	6	7	8
Intercept	-2.01 *** -4.28	-0.66 -0.12	-1.52 -0.28	-1.20 -0.22	-0.23 -0.99	0.52 0.19	-0.07 -0.02	0.04 0.02
Short_Prob	-2.95 *** -5.12	-3.00 *** -3.64	-3.92 *** -5.30	-3.43 *** -3.79	-1.14 *** -3.99	-0.99 ** -2.34	-1.54 *** -4.05	-1.37 *** -2.96
Short_Prob*NSign[CAR(-1,1)]		-1.65 ** -2.57		-0.88 -0.95		-0.98 *** -2.98		-0.30 -0.63
Quin_Car(-1,1)			0.49 *** 2.65	0.31 1.16			0.33 *** 3.54	0.27 ** 2.01
Log(size)		-0.05 -0.19	-0.07 -0.31	-0.06 -0.26		-0.03 -0.21	-0.05 -0.37	-0.04 -0.34
Log(M/B)		-3.44 *** -12.03	-3.44 *** -12.02	-3.44 *** -12.03		-1.05 *** -7.13	-1.05 *** -7.12	-1.05 *** -7.13
Past_CAR		0.18 *** 17.35	0.18 *** 17.34	0.18 *** 17.35		0.07 *** 12.02	0.07 *** 12.02	0.07 *** 12.03
Derivatives		1.38 0.91	1.47 0.97	1.44 0.94		-0.67 -0.86	-0.61 -0.78	-0.62 -0.79
Ret_vol		-0.12 *** -11.65	-0.12 *** -11.58	-0.12 *** -11.60		-0.04 *** -7.94	-0.04 *** -7.85	-0.04 *** -7.86
Turnover (coeff x10)		-0.39 *** -16.47	-0.39 *** -16.48	-0.39 *** -16.45		-0.11 *** -9.08	-0.11 *** -9.07	-0.11 *** -9.06
Adj. R-squared	0.25%	10.40%	10.41%	10.41%	0.15%	4.35%	4.39%	4.38%
Num Obs	9882	9882	9882	9882	9882	9882	9882	9882

Table 3. Differences in Opinion, Short-Sale Prohibition and Cumulative Abnormal Returns after Earnings Announcement

Table 3 reports the regression results when CAR (2, 60), the market-model adjusted cumulative abnormal returns over the [2, 60] window, is regressed on the short-sale prohibition dummy (*Short_Prob*) and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of the firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), the abnormal returns over the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). We use *Ret_vol* and *Turnover* as proxies for differences in opinion. In each entry, the upper number is the coefficient estimate and the lower number is the t-value. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

	CAR(2,60)					
	1	2	3	4	5	6
Intercept	-1.39 -0.26	-2.30 -0.43	-2.06 -0.38	-2.58 -0.48	-3.46 -0.64	-3.20 -0.59
Short_Prob	-3.55 *** -4.28	-4.45 *** -5.97	-4.08 *** -4.49	-2.73 *** -3.32	-3.59 *** -4.84	-3.21 *** -3.56
Short_Prob*NSign[CAR(-1,1)]	-1.59 ** -2.47		-0.65 -0.70	-1.54 ** -2.39		-0.67 -0.73
Quin_Car(-1,1)		0.51 *** 2.77	0.38 1.42		0.48 *** 2.63	0.34 1.30
Log(size)	0.02 0.08	-0.01 -0.04	0.00 -0.01	0.03 0.13	0.00 0.01	0.01 0.04
Log(M/B)	-3.38 *** -11.81	-3.37 *** -11.80	-3.37 *** -11.81	-3.43 *** -12.02	-3.43 *** -12.01	-3.43 *** -12.02
Past_CAR	0.19 *** 17.71	0.19 *** 17.71	0.19 *** 17.72	0.18 *** 17.37	0.18 *** 17.37	0.18 *** 17.38
Derivatives	2.19 1.44	2.29 1.50	2.27 1.49	1.25 0.83	1.34 0.88	1.31 0.87
Ret_vol	-0.02 -0.80	-0.01 -0.68	-0.02 -0.72	-0.12 *** -11.48	-0.12 *** -11.40	-0.12 *** -11.42
Turnover (coeff x10)	-0.40 *** -16.85	-0.40 *** -16.87	-0.40 *** -16.84	-0.20 *** -4.64	-0.20 *** -4.59	-0.20 *** -4.60
Ret_vol *Short_Prob	-0.12 *** -5.47	-0.12 *** -5.57	-0.12 *** -5.53			
Turnover (coeff x10) *Short_Prob				-0.26 *** -5.23	-0.26 *** -5.30	-0.26 *** -5.27
Adj. R-squared	10.67%	10.68%	10.68%	10.64%	10.65%	10.65%
Num Obs	9882	9882	9882	9882	9882	9882

Table 4. Short-Sale Prohibition and Size-adjusted Cumulative Abnormal Returns

Table 4 reports the regression results when CAR (2, 60), the cumulative abnormal return over the [2, 60] window using size-matched portfolios, is regressed on the short-sale prohibition dummy (*Short_Prob*) and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of the firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), the abnormal returns in the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). In each entry, the upper number is the coefficient estimate and the lower number is the t-value. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

	CAR(2,60)			
	1	2	3	4
Intercept	1.83 *** 4.96	1.62 *** 4.05	-0.68 -1.10	-0.59 -0.75
Short_Prob	-1.96 *** -4.32	-0.62 -1.09	-1.62 *** -3.33	-1.54 ** -2.43
Short_Prob*NSign[CAR(-1,1)]		-1.93 *** -3.65		-0.14 -0.18
Quin_Car(-1,1)			0.74 *** 4.91	0.72 *** 3.29
Log(M/B)		-0.12 -0.55	-0.14 -0.63	-0.14 -0.63
Past_CAR		0.01 * 1.70	0.02 * 1.72	0.02 * 1.72
Derivatives		0.55 0.49	0.57 0.50	0.57 0.50
Ret_vol		-0.04 *** -5.45	-0.04 *** -5.25	-0.04 *** -5.25
Turnover (coeff x10)		-0.16 *** -7.99	-0.16 *** -7.97	-0.16 *** -7.96
Adj. R-squared	0.18%	1.82%	1.93%	1.92%
Num Obs	9882	9882	9882	9882

**Table 5. Differences in Opinion, Short-Sale Prohibition
and Size-adjusted Cumulative Abnormal Returns**

Table 5 reports results when CAR (2, 60), the cumulative abnormal return over the [2, 60] window using size-matched portfolios, is regressed on the short-sale prohibition dummy (*Short_Prob*) and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of the firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), the abnormal returns over the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). We use *Ret_vol* and *Turnover* as proxies for differences in opinion and interact with *Short_Prob*. In each entry, the upper number is the coefficient estimate and the lower number is the t-value. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

	CAR(2,60)					
	1	2	3	4	5	6
Intercept	2.12 *** 5.14	-0.20 -0.33	-0.23 -0.29	1.39 *** 3.48	-0.90 -1.46	-0.95 -1.22
Short_Prob	-1.10 * -1.90	-2.08 *** -4.21	-2.11 *** -3.27	-0.50 -0.87	-1.43 *** -2.95	-1.47 ** -2.33
Short_Prob*NSign[CAR(-1,1)]	-1.89 *** -3.57		0.04 0.05	-1.82 *** -3.45		0.08 0.10
Quin_Car(-1,1)		0.76 *** 5.03	0.77 *** 3.53		0.74 *** 4.91	0.76 *** 3.49
Log(M/B)	-0.05 -0.25	-0.07 -0.33	-0.07 -0.33	-0.08 -0.38	-0.10 -0.46	-0.10 -0.46
Past_CAR	0.02 ** 2.04	0.02 ** 2.07	0.02 ** 2.07	0.02 * 1.73	0.02 * 1.75	0.02 * 1.74
Derivatives	1.25 1.09	1.29 1.13	1.29 1.13	0.62 0.55	0.64 0.57	0.64 0.57
Ret_vol	0.03 1.63	0.03 * 1.88	0.03 * 1.88	-0.04 *** -5.35	-0.04 *** -5.15	-0.04 *** -5.14
Turnover (coeff x10)	-0.16 *** -8.31	-0.16 *** -8.30	-0.16 *** -8.30	0.03 0.85	0.03 0.96	0.03 0.96
Ret_vol	-0.09 ***	-0.09 ***	-0.09 ***			
*Short_Prob	-4.73	-4.91	-4.90			
Turnover (coeff x10)				-0.26 ***	-0.26 ***	-0.26 ***
*Short_Prob				-6.24	-6.35	-6.35
Adj. R-squared	2.03%	2.16%	2.15%	2.20%	2.32%	2.31%
Num Obs	9882	9882	9882	9882	9882	9882

**Table 6. Short-Sale Prohibition and Cumulative Abnormal Returns after Earnings Announcement:
Sub-period Analysis**

Table 6 reports the regression results when CAR (2, 60), the market-model adjusted cumulative abnormal returns over the [2, 60] window, is regressed on the short-sale prohibition dummy (*Short_Prob*) and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of the firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), the abnormal returns over the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). We use *Ret_vol* and *Turnover* as proxies for differences in opinion and interact with *Short_Prob*. We divide our sample into two sub-periods: 1994-2002 and 2003- 2012 and report results in Panels A and B, respectively. In each entry, the upper number is the coefficient estimate and the lower number is the t-value. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Panel A: Sub-period 1994-2002

	Sub-period 1994-2002				
	1	2	3	4	5
Intercept	10.83 1.09	10.20 1.02	10.33 1.03	8.72 0.87	7.23 0.72
Short_Prob	-5.62 *** -3.73	-6.19 *** -4.62	-6.00 *** -3.58	-6.04 *** -3.60	-5.58 *** -3.32
Short_Prob*NSign[CAR(-1,1)]	-1.01 -0.82		-0.33 -0.18	-0.05 -0.03	-0.13 -0.07
Quin_Car(-1,1)		0.34 0.95	0.27 0.52	0.37 0.69	0.33 0.63
Log(size)	-0.36 -0.80	-0.38 -0.84	-0.38 -0.83	-0.32 -0.70	-0.26 -0.58
Log(M/B)	-3.05 *** -5.16	-3.06 *** -5.18	-3.06 *** -5.18	-3.00 *** -5.08	-3.00 *** -5.08
Past_CAR	0.09 *** 4.40	0.09 *** 4.42	0.09 *** 4.42	0.10 *** 4.48	0.09 *** 4.29
Derivatives	0.68 0.23	0.72 0.25	0.72 0.24	1.83 0.62	1.10 0.38
Ret_vol	-0.13 *** -6.96	-0.13 *** -6.94	-0.13 *** -6.94	-0.05 -1.32	-0.13 *** -6.85
Turnover (coeff x10)	-0.26 *** -5.38	-0.26 *** -5.36	-0.26 *** -5.36	-0.27 *** -5.58	-0.05 -0.54
Ret_vol				-0.11 ***	
*Short_Prob				-2.76	
Turnover (coeff x10)					-0.30 ***
*Short_Prob					-3.13
Adj. R-squared	7.51%	7.52%	7.48%	7.73%	7.81%
Num Obs	2499	2499	2499	2499	2499

Panel B: Sub-period 2003-2012

	Sub-period 2003-2012				
	6	7	8	9	10
Intercept	-7.05 -1.10	-7.96 -1.24	-7.54 -1.17	-7.25 -1.13	-9.08 -1.41
Short_Prob	-1.92 * -1.94	-2.91 *** -3.24	-2.29 ** -2.13	-3.13 *** -2.85	-2.16 ** -2.00
Short_Prob*NSign[CAR(-1,1)]	-1.77 ** -2.36		-1.10 -1.03	-0.94 -0.88	-0.90 -0.84
Quin_Car(-1,1)		0.49 ** 2.30	0.27 0.87	0.31 1.02	0.29 0.97
Log(size)	0.17 0.60	0.15 0.51	0.16 0.55	0.18 0.62	0.22 0.75
Log(M/B)	-3.23 *** -9.81	-3.22 *** -9.78	-3.23 *** -9.79	-3.21 *** -9.73	-3.24 *** -9.83
Past_CAR	0.22 *** 17.74	0.22 *** 17.71	0.22 *** 17.74	0.22 *** 17.99	0.22 *** 17.81
Derivatives	0.92 0.51	1.01 0.57	0.97 0.54	1.68 0.94	0.69 0.39
Ret_vol	-0.12 *** -10.11	-0.12 *** -10.05	-0.12 *** -10.07	-0.03 -1.11	-0.12 *** -9.91
Turnover (coeff x10)	-0.43 *** -15.85	-0.44 *** -15.89	-0.43 *** -15.85	-0.44 *** -16.11	-0.25 *** -4.85
Ret_vol				-0.11 ***	
*Short_Prob				-3.85	
Turnover (coeff x10)					-0.25 ***
*Short_Prob					-4.33
Adj. R-squared	11.57%	11.57%	11.57%	11.73%	11.78%
Num Obs	7383	7383	7383	7383	7383

Table 7. Size-matched Sample and Regression Results

Table 7 reports the summary statistics and regression results from size-matched sample. We match, without replacement, a short-eligible firm to a short-prohibited firm with the closest market capitalization in the same year, with the market caps between the pair not different by more than 30%. CAR (2, 60), the market-model adjusted cumulative abnormal returns over the [2, 60] window, is regressed on the short-sale prohibition dummy (*Short_Prob*) and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of the firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), the abnormal returns over the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). We use *Ret_vol* and *Turnover* as proxies for differences in opinion and interact with *Short_Prob*. In each entry, the upper number is the coefficient estimate and the lower number is the t-value. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Panel A. Summary statistics for size-matched sample

	Overall			Short Eligible Stocks			Short Prohibited Stocks		
	Mean	Median	Std	Mean	Median	Std	Mean	Median	Std
Turnover (%)	84.40	40.65	120.53	94.94	53.59	117.05	73.86	28.73	123.06
Return volatility (%)	52.05	45.88	28.30	50.15	45.57	24.99	53.95	46.21	31.15
Market cap (HKD Million)	4646	1943	16711	4662	1972	16382	4630	1890	17039
Market-to-book ratio	1.97	1.12	2.85	1.52	0.98	2.00	2.43	1.31	3.44
Firm-year obs	3118			1559			1559		

Panel B. Regression results.

	CAR(2,60)					
	1	2	3	4	5	6
Intercept	-1.85 *** -2.68	11.97 1.14	10.67 1.02	10.83 1.03	7.88 0.75	9.52 0.91
Short_Prob	-3.43 *** -3.52	-1.32 -1.11	-2.37 ** -2.50	-2.05 -1.56	-2.42 * -1.84	-2.25 * -1.72
Short_Prob*NSign[CAR(-1,1)]		-1.87 -1.43		-0.58 -0.35	-0.19 -0.11	-0.23 -0.14
Quin_Car(-1,1)			0.63 * 1.92	0.54 1.32	0.63 1.54	0.62 1.51
Log(size)		-0.64 -1.32	-0.67 -1.37	-0.67 -1.36	-0.53 -1.09	-0.62 -1.28
Log(M/B)		-3.98 *** -7.90	-3.98 *** -7.90	-3.98 *** -7.90	-3.80 *** -7.52	-3.94 *** -7.83
Past_CAR		0.21 *** 11.00	0.21 *** 11.02	0.21 *** 11.02	0.21 *** 11.18	0.21 *** 10.85
Derivatives		5.51 1.19	5.54 1.20	5.53 1.20	5.37 1.16	5.85 1.27
Ret_vol		-0.10 *** -5.23	-0.10 *** -5.14	-0.10 *** -5.14	-0.01 -0.47	-0.10 *** -4.99
Turnover (coeff x10)		-0.36 *** -8.30	-0.36 *** -8.31	-0.36 *** -8.30	-0.37 *** -8.59	-0.20 *** -3.35
Ret_vol					-0.14 ***	
*Short_Prob					-4.06	
Turnover (coeff x10)						-0.31 ***
*Short_Prob						-4.09
Adj. R-squared	0.36%	11.45%	11.50%	11.47%	11.91%	11.92%
Num Obs	3118	3118	3118	3118	3118	3118

Table 8. Year Fixed Effect Regressions and CAR (2, 60)

Table 8 reports results when CAR (2, 60), the market-model adjusted cumulative abnormal return over the [2, 60] window, is regressed on the short-sale prohibition dummy (*Short_Prob*), yearly fixed effects and other variables. We include the quintile ranking of the three-day announcement abnormal returns (*Quin_CAR(-1,1)*), a dummy variable when the three-day announcement abnormal return is negative (*NSign[CAR(-1,1)]*), the natural logarithm of the firm's market capitalization (*Log(size)*), the natural logarithm of the market-to-book ratio (*Log(M/B)*), the abnormal returns in the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). We use *Ret_vol* and *Turnover* as proxies for differences in opinion and interact with *Short_Prob*. In each entry, the upper number is the coefficient estimate and the lower number is the t-value. Standard errors are clustered by firm. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

	CAR(2,60)					
	1	2	3	4	5	6
Intercept	6.01 *** 3.65	-6.67 -1.05	-7.49 -1.18	-7.31 -1.15	-8.49 -1.34	-9.30 -1.47
Short_Prob	-3.44 *** -6.57	-1.99 ** -2.27	-2.74 *** -3.47	-2.50 *** -2.70	-3.10 *** -3.22	-2.30 ** -2.50
Short_Prob*NSign[CAR(-1,1)]		-1.34 ** -2.02		-0.43 -0.50	-0.25 -0.29	-0.24 -0.28
Quin_Car(-1,1)			0.45 ** 2.42	0.36 1.50	0.42 * 1.74	0.40 * 1.66
Log(size)		0.35 1.31	0.32 1.21	0.33 1.23	0.39 1.48	0.40 1.50
Log(M/B)		-2.57 *** -7.88	-2.57 *** -7.88	-2.57 *** -7.88	-2.57 *** -7.85	-2.58 *** -7.88
Past_CAR		0.17 *** 12.56	0.17 *** 12.55	0.17 *** 12.56	0.17 *** 12.71	0.17 *** 12.56
Derivatives		-0.25 -0.21	-0.17 -0.14	-0.18 -0.15	0.47 0.39	-0.28 -0.24
Ret_vol		-0.12 *** -9.05	-0.12 *** -9.01	-0.12 *** -9.01	-0.04 -1.42	-0.12 *** -8.86
Turnover (coeff x10)		-0.36 *** -12.40	-0.36 *** -12.38	-0.36 *** -12.36	-0.37 *** -12.59	-0.18 *** -4.44
Ret_vol					-0.10 ***	
*Short_Prob					-3.89	
Turnover (coeff x10)						-0.25 ***
*Short_Prob						-4.89
Adj. R-squared	6.91%	14.70%	14.70%	14.70%	14.90%	15.00%
Num Obs	9882	9882	9882	9882	9882	9882

Table 9. Random Effects, Year Fixed Effects Regressions and CAR (2, 60)

Table 9 reports results when $CAR(2, 60)$, the market-model adjusted cumulative abnormal return over the [2, 60] window, is regressed on the short-sale prohibition dummy (*Short_Prob*), yearly fixed effects, firm level random effects and other variables. We include the quintile ranking of the three-day announcement abnormal returns ($Quin_CAR(-1,1)$), a dummy variable when the three-day announcement abnormal return is negative ($NSign[CAR(-1,1)]$), the natural logarithm of the firm's market capitalization ($Log(size)$), the natural logarithm of the market-to-book ratio ($Log(M/B)$), the abnormal returns over the past three months (*Past_CAR*), a dummy variable *Derivatives* = 1 when the stock has publicly traded derivatives contracts, the annualized return volatility using daily returns over the past three months (*Ret_vol*), and the annualized average turnover over the past three months (*Turnover*). We use *Ret_vol* and *Turnover* as proxies for differences in opinion and interact with *Short_Prob*. In each entry, the upper number is the coefficient estimate and the lower number is the t-value. Standard errors are clustered by firm. The coefficient estimates for *Turnover* are multiplied by 10 for ease of presentation. Significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

	CAR(2,60)					
	1	2	3	4	5	6
Intercept	5.03 *** 3.43	-4.77 -0.79	-5.57 -0.92	-5.37 -0.88	-6.12 -1.01	-6.92 -1.14
Short_Prob	-3.08 *** -5.64	-1.84 ** -2.09	-2.62 *** -3.32	-2.34 ** -2.52	-2.92 *** -3.03	-2.19 ** -2.37
Short_Prob*NSign[CAR(-1,1)]		-1.40 ** -2.10		-0.50 -0.58	-0.33 -0.38	-0.32 -0.37
Quin_Car(-1,1)			0.46 ** 2.48	0.36 1.49	0.41 * 1.72	0.39 1.64
Log(size)		0.34 1.24	0.31 1.14	0.31 1.16	0.37 1.37	0.37 1.36
Log(M/B)		-2.75 *** -8.17	-2.75 *** -8.18	-2.75 *** -8.18	-2.74 *** -8.14	-2.74 *** -8.15
Past_CAR		0.17 *** 12.81	0.17 *** 12.80	0.18 *** 12.81	0.18 *** 12.95	0.18 *** 12.80
Derivatives		0.18 0.15	0.26 0.22	0.25 0.21	0.87 0.72	0.11 0.09
Ret_vol		-0.12 *** -8.88	-0.12 *** -8.84	-0.12 *** -8.84	-0.04 -1.49	-0.12 *** -8.74
Turnover (coeff x10)		-0.38 *** -12.94	-0.38 *** -12.93	-0.38 *** -12.91	-0.39 *** -13.10	-0.21 *** -4.97
Ret_vol					-0.10 ***	
*Short_Prob					-3.80	
Turnover (coeff x10)						-0.23 ***
*Short_Prob						-4.55
Adj. R-squared	6.90%	14.71%	14.73%	14.73%	14.89%	14.95%
Num Obs	9882	9882	9882	9882	9882	9882

Appendix A: Variables Definition

Variable	Definition
CAR(2, 20)	The cumulative abnormal returns over [2, 20] trading days after earnings announcements
CAR(2, 60)	The cumulative abnormal returns over [2, 60] trading days after earnings announcements
CAR(-1, 1)	The cumulative abnormal returns around [-1, 1] surrounding the earnings announcement date
NSign[CAR(-1,1)]	Dummy variable equals to “1” if CAR(-1, 1) is positive, and “-1” otherwise
Short_Prob	Dummy variable equals to one when the stock is short-prohibited on the earnings announcement date, and zero otherwise
Quin_Car(-1,1)	The quintile ranking of the three-day announcement abnormal return
Log(Size)	The natural logarithm of market value of equity in the previous month before the announcement
Log(M/B)	The natural logarithm of market-to-book ratio in the previous year end before the announcement
Past_CAR	The cumulative abnormal return, using the market model, over the window starting three months and ending a week prior to the earnings announcement date
Derivatives	Dummy variable equals to “1” if the firm has futures or options listed in HKEx, and “0” otherwise
Ret_vol	Annualized standard deviation using daily returns over [-70, -10] relative to the earnings announcement date. Ret_vol is expressed as the deviation from the overall mean to facilitate interpretation of the coefficient of Short_Prob when Ret_vol is interacted with Short_Prob in the regression.
Turnover	Annualized average daily percentage turnover over [-70, -10] relative to the earnings announcement date. Turnover is expressed as the deviation from the overall mean to facilitate interpretation of the coefficient of Short_Prob when Turnover is interacted with Short_Prob in the regression.

Appendix B: Benchmark Return Models

Benchmark models	Definition
Market model	Estimation period is [-12,-1] months prior to the earnings announcement, with the value-weighted return of all stocks listed in Hong Kong Stock Exchange as the market return
Size-adjusted model	Previous year end market values of equity are used to divide stocks into quartiles and form size portfolios. Firms with an earnings announcement one month centered are excluded from the size portfolio. Equally weighted return is used as the return for each size quartile portfolio. Size adjusted CAR is defined as the cumulative difference between daily stock return and the return of the size-matched portfolio.
Industry-size-adjusted model	For each industry, previous year end market values of equity are used to divide stocks into quartiles and form industry-size portfolios. Firms with an earnings announcement one month centered are excluded from the industry-size portfolio. Equally weighted return is used as the return for each industry-size quartile portfolio. Industry-size adjusted CAR is defined as the cumulative difference between daily stock return and the return of the industry-size matched portfolio.