Sell on the News, Differences of Investor Opinion, Short-Sales Constraints and Returns Around Earnings Announcements: Evidence from the Stock Exchange of Thailand

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Abstract

Miller's (1977) hypothesis states that stocks with differences of investor opinion and short-sales constraints are overvalued. We study the effects of differences of investor opinion and short-sales constraints on excess returns around earnings announcement dates using a unique setting from the Stock Exchange of Thailand (SET) which offers distinct short-sales constraints. Our results show that stocks with higher differences of investor opinion have lower excess returns around earnings announcement dates. In addition, we find a stronger effect on the stocks that have short-sale constraints. Using the short-sales restriction imposed by the SET, and actual short-sale transaction as the proxies for short-sales constraints, we find that stocks with higher differences of opinion experience even lower returns. Our findings are robust even after controlling for various stock specific variables. This paper provides additional empirical evidence for Miller's (1997) hypothesis.

Keywords: Short Sale, Earnings Announcements, Investor Opinion, Stock Exchange of Thailand

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การขายเมื่อมีข่าว ความแตกต่างของความเห็นของนักลงทุน ข้อจำกัดในการขายชอร์ตและผลตอบแทนในช่วงระหว่างประกาศผลกำไร: หลักฐานเชิงประจักษ์จากตลาดหลักทรัพย์แห่งประเทศไทย

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บทคัดย่อ

ข้อสมมติฐานของมิลเลอร์ (1997) กล่าวว่าหุ้นที่นักลงทุนมีความเห็นแตกต่างกันและมีข้อจำกัดในการขายชอร์ตจะมีราคาที่สูงเกินไป เราทำการศึกษาผลกระทบจากการที่หุ้นที่นักลงทุนมีความเห็นแตกต่างกันและมีข้อจำกัดในการขายชอร์ตกับผลตอบแทนส่วนเกินในช่วงระหว่างวันที่ประกาศผลกำไร โดยใช้สภาพแวดล้อมในตลาดหลักทรัพย์แห่งประเทศไทยซึ่งมีความพิเศษในด้านข้อจำกัดของการขายชอร์ต ผลการศึกษาแสดงให้เห็นว่าหุ้นที่นักลงทุนมีความเห็นแตกต่างกันสูงกว่าจะมีผลตอบแทนส่วนเกินต่ำกว่าในช่วงวันที่มีการประกาศผลกำไร นอกจากนั้น เรายังพบผลกระทบที่มากขึ้นในหุ้นที่มีข้อจำกัดของการขายชอร์ต ซึ่งจากการใช้ข้อจำกัดในการขายชอร์ตของตลาดหลักทรัพย์แห่งประเทศไทย (ตลท.) และยอดธุรกรรมจริงในตลาดฯ เป็นตัวแทนของข้อจำกัดการขายชอร์ต เราพบว่าหุ้นที่นักลงทุนมีความเห็นแตกต่างกันสูงกว่าจะยิ่งมีผลตอบแทนที่ลดลง ผลการศึกษาของเรายังคงไม่เปลี่ยนแปลงแม้เมื่อควบคุมตัวแปรที่เป็นปัจจัยเฉพาะตัวของหุ้นต่างๆ การวิจัยนี้ถือเป็นหลักฐานเชิงประจักษ์อีกชิ้นหนึ่งในการสนับสนุนข้อสมมติฐานของมิลเลอร์ (1997)

คำสำคัญ: การขายชอร์ต, การประกาศผลกำไร, ความเห็นของนักลงทุน, ตลาดหลักทรัพย์แห่งประเทศไทย

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1. Introduction

Miller (1977) hypothesizes that, as long as there are differences of investor opinion on stock's true value, the price will be overvalued which reflects a positive bias from optimistic investors. The relationship between the biasness in price and differences of investor opinion will be stronger if pessimistic investors cannot sell the stocks due to short-sales constraint. Miller (1977) explains that the upward biasness is due to optimistic investors who have beliefs on stock's value higher than the average. When stocks are subject to short-sales constraints, pessimistic investors are unable to exert price pressure as much as they would like, whereas there is no restriction for the optimistic investors to buy stocks.

Brown and Han (1992) shows that differences of investor opinion among investors decrease after a company announces its earnings. On the earnings announcement date, the company attempts to communicate about important information regarding stock valuation to the market. In other words, earnings announcement resolve uncertainty about the company's current earnings and other information which have an effect on stock price.

Nagel (2005) examines portfolios of stocks with different levels of investor opinions and short-sales constraints. He finds that stocks with high differences of investor opinion have worse performances than those with low differences of investor opinion. Furthermore, the performances are even worse in stocks with high short-sales constraints. He concludes that the depressive returns are due to overvalue in price.

Berkman et al. (2009) document that stocks with higher differences of investor opinion have lower excess returns around earnings announcement. Besides, returns of stocks with high differences of investor opinion are even lower if those stocks are difficult to sell short or have high short-sales constraints. They explain that after the firms' relevant information such as their earnings is released, differences of investor opinion decrease and optimistic investors, on average, are disappointed and sell their stocks. As a result, stock prices will move down closer to their appropriate values which are based on their fundamentals. In other words, earnings announcements reduce positive biasness in stock price, which results in depressive stock returns. This event is called sell on the news. Their results support the Miller (1977) hypothesis.

Short-sales constraints in some markets are unable to observe directly. Previous studies use proportion of institutional ownership (see Nagel (2005) and Berkman et al. 2009). They argue that low institutional ownership is a proxy for sell short constraints because those who do stock lending transactions are mostly institutional investors. Our study follow Berkman et al. (2009) and adds on the existing literatures by offering an evidence that supports Miller's hypothesis on the differences of investor opinion and short-sales constraints under a different but clearer settings. We test the hypotheses on

the Stock Exchange of Thailand (SET) which allow short sale restriction. Stocks that can be sold short must be an index constituents of SET50, and extended to SET100 after 2011. Unlike Berkman et al. (2009), we believe that this is a cleaner proxy of short-sales constraints than institutional ownership.

Our findings confirms the Miller (1977) hypothesis that difference in investor opinion causes positive bias in stock prices and lower excess returns around an earnings announcements in stocks with the short-sale constraints. The harder the stock to be sold short, the stronger the effect of differences of opinion on returns around the earnings announcement date as the pessimistic investors cannot reflect their private information into prices. Thus stocks without the short-sale constraint have higher excess returns while those with the short-sale constraint have lower excess returns. Our findings are robust even after controlling for market information and stock specific variables.

The remaining parts of this paper are organized as follows. In section 2, literatures related to the study is reviewed. Section 3 provides definitions of variables used in the study. Section 4 discusses data, sample selection and descriptive statistics. In Section 5, this paper discusses about the methodology and shows empirical results. Section 6 is the conclusion

2. Literatures Review

Various empirical studies test the Miller (1977) hypothesis which states that stock price will be overvalued and reflects positive biasness from optimistic investors as long as there are differences of investor opinion regarding the stock's true value and pessimistic investors cannot sell short the stocks due to short-sales constraints.

Previous studies suggest that trading volume increases prior to an earnings announcement date because investors try to bet on a company's earnings result (Kim and Verrecchia (1991) and He and Wang (1995)). In this case, optimistic and pessimistic investors have incentives to trade and these incentives are larger when there are higher differences of investor opinion. However, due to short-sales constraints, pessimistic investors cannot sell as much as optimistic investors buy. Thus the stock price with differences of investor opinion and short-sales constraints will increase prior to the earnings announcement date. Brown and Han (1992) show that differences of investor opinion decrease after an earnings announcement date because on that date, a company attempts to communicate with investors and releases one of the most important information regarding firm's performance to the market, the earnings. In other words, the earnings announcement resolve uncertainty about the company's current earnings as well as other variables related to stock value.

Diether et al (2002) investigate monthly returns of portfolios of the stocks which have different levels of dispersion of earnings forecast of analysts, proxies for differences of investor opinion. They find that stocks with high dispersion of earnings forecasts generate lower returns in the subsequent period than stocks with low dispersion of earnings forecasts; high dispersion of earnings forecasts represents high differences of investor opinion, which causes overvalue in stock price and subsequent depressive performance. Their study, however, focuses only on the effect of differences of investor opinion on biasness in stock price while ignoring the other important factor, short-sales constraints.

Nagel (2005) extends the previous study by focusing on both the effects of differences of investor opinion and short-sales constraints on biasness in stock price. He suggests that it is hard for investors to sell short stocks with low proportion of institutional ownership because those who lend stocks for short-sale are mostly institutional investors, such as mutual funds or asset managers. Therefore, he uses institutional ownership as a proxy for short-sales constraints. He investigates monthly returns of portfolios of the stocks which have different levels of differences of investor opinion and institutional ownership. He finds that bad performance of stocks with high differences of investor opinion is stronger when firms have low proportion of institutional ownership, or high short-sales constraints. His results are consistent with the Miller (1977) hypothesis.

Berkman et al. (2009) argue that differences of investor opinion would decrease over the time. Lower return is simply a result of reducing positive biasness in stock price or depressive performance since previous studies do not offer the specific event which reduces differences in investor opinion. However, Berkman et al. (2009) focus on excess returns of stocks around earnings announcement dates conditional on both differences of investor opinion and short-sales constraints. They find that stocks with higher differences of investor opinion have lower returns around earnings announcements. Besides, the returns of stocks with high differences of investor opinion are even lower if those stocks are difficult to sell short, or there are high short-sales constraints. They also find that prices of stocks with higher differences of investor opinion and high short-sales constraints move up by the days prior to earnings announcement dates and then fall even larger after the announcements.

Baik et al. (2010), however, argue that level of institutional ownership can be a proxy for institutional investors' informational advantages in stock investments. They find that stocks with higher institutional ownership have higher one-quarter-ahead returns as well as higher returns around earnings announcement dates. Additionally, they find that a change in institutional ownership can predict future returns, both one-quarter-ahead and earnings announcement dates return. Furthermore, they divided institutional ownership into two groups, local and non-local institutional ownership. They argue that local institution investors, investors who are located in the same state as the company's headquarter, have informational advantages over non-local institutional investors. Local institutional ownership have a stronger predictability of future stock returns that non-local institutional ownership.

3. Data and Variables

In order to test Miller's hypothesis under the clearer short sale settings, we analyze the earnings announcement events of listed companies on the Stock Exchange of Thailand from 2 January 2005 to 30 December 2013. Monthly data and daily trading information are obtained and computed by using data from Bloomberg. The quarterly analyst forecasts are also extracted from Bloomberg analyst's estimates. SET50 and SET100 index constituents, short-selling transactions and number of days in the market are from the Stock Exchange of Thailand. The details of each variables used in the study is described as follows.

3.1 Proxies for differences of opinions

Differences of investor opinion are very difficult, if not impossible, to capture or quantify. In order to test the hypotheses, it is important to use various proxies for differences of investor opinion. Following Berkman et al. (2009), this paper uses five variables as proxies for differences of investor opinion as follows.

1) Historical income volatility (INCVOL), defined as a standard deviation of ratios between quarterly operating incomes before depreciations and total assets over eight quarters prior to the earnings announcement quarter. We expect that if a firm's historical earning is very volatile, it is hard for investors to forecast the firm's future earnings as well as the firm's true value. Thus more volatility of historical incomes leads to greater differences of investor opinion.

2) Stock returns volatility (RETVOL), defined as a standard deviation of daily stock returns minus market returns over forty-five-day period ending ten days prior to the earnings announcement date. Stocks with non-traded dates during the period higher than fifteen days are excluded. Because stock price generally reflects expectations of investors on its value, if expectation among investors is diverse, stock price tends to fluctuate more thus higher volatility.

3) Dispersion in analysts' forecasts (DISP), defined as a standard deviation of analysts' forecasts on quarterly earnings per share, standardized by absolute value of the average analysts' forecasts, issued over ninety days before the earning announcement date. If a firm has fewer than two analysts' forecasts in any quarter, it will be eliminated for the quarter. Diether et al. (2002) suggest that high dispersion in analysts' forecasts reflect high differences of opinion among analysts. So do other investors.

4) Number of days for which a company has been listed on the stock market (AGE). Newer firms can cause high uncertainty and differences of investor opinion because they have shorter operating history and less information for investors to determine its true values. AGE is negatively related to differences of investor opinion; the shorter AGE, the higher differences of investor opinion. We transform it into LN(1/AGE) to make it positively related to differences of investor opinion and reduce skewness.

5) Average daily turnover (TURN), defined as an average of the number of shares traded divided by the number of shares outstanding over forty-five-day period ending ten days prior to the earnings announcement date. Stocks with non-traded dates during the period higher than fifteen days are excluded. Harris and Raviv (1993) suggest that trading transactions occur when there are differences of opinion among investors. If they have the same view that stocks are undervalued (overvalued), no one will sell (buy) the stock. Eventually, transactions will not occur. However, investors will buy a stock when they think it is undervalued, and sell when overvalued. Given this argument, turnover reflects differences of opinion among investors regarding the stock's true value. Likewise, TURN is transformed into LN(TURN) in order to reduce its skewness.

3.2 Proxies for short-sales constraints

The Stock Exchange of Thailand allows investor to sell short only stocks which were members of SET50 index, prior to the beginning of 2011. Afterwards, the regulator relaxed the restriction so that stocks in SET100 index[1] could be sold short. Therefore, this study defines a dummy variable SET50_100 as a proxy for short-sales constraints. SET50_100 is equal to 1 if particular stocks are in the SET50 or SET100 indexes in the quarter during the earnings announcement dates, and 0 otherwise.

Although the stock in SET50 or SET100 index can be sold short by the regulation, some stocks might not have short sale transactions. Thus, we also use the actual short-sales transaction in our analysis. We use average daily short-sales turnover (SHTURN) defined as an average ratios between the number of short-sold shares and the number of share outstanding over twenty-five-day period ending ten days prior to the earnings announcement date. We use the short-sale turnover an alternative proxy for short-sales constraints to reflect the fact that if the number of short-sold shares is low, it also represents the short-sale constraints as well.

3.3 Dependent and control variables

The dependent variable is the excess return during earnings announcement period (EXRET) which is defined as buy-and-hold returns of a stock minus buy-and-hold returns of the market during three-day period centered on a quarterly earnings announcement date. Stocks with no transaction during the period are excluded.

In the robustness test we control for various market-wide and company specific variables. Market value (MV) is the market capitalization and market-to-book ratio (MB) is the market to book value of a firm at the end of the quarter before the earnings announcement date. In this paper MV and MB are transformed into LN(MV) and LN(MB) respectively to reduce their skewness. Earnings

[1] SET50 is a subset of SET100

surprises (ERNSUR) is measured by an actual quarterly earnings per share minus an average of analysts' forecast issued during ninety-day period prior to the earnings announcement date divided by the average of analysts' forecasts. Price momentum (MOM) is a buy-and-hold return of a stock minus a buy-and-hold returns of the market over two hundred and fifty trading days prior to the earnings announcement date. Finally, concentration of trading volume around earnings announcement dates (ANNVOL) is defined as an average of daily volume during three days around each of the four quarterly consecutive earnings announcement dates before the current quarter divided by an average of daily volume during two-hundred-and-fifty-day period ending ten days prior to the current earnings announcement date. Stocks with no transaction during the prior four earnings announcement periods are excluded.

4. Descriptive Statistics

We report the descriptive statistic of our sample in table 1. A number of points should be noted. The maximum number of observations is 2,790 and the minimum is 1,772 which is from the dispersion in analysts' forecasts (DISP). The reason is that most data are available only for large stocks and the variable also needs at least two different analyst forecasts to find the standard deviation. The mean of the earnings announcement period excess returns (EXRET), is 0.0010 or 0.1% which implies that, on average, stock returns slightly exceed that of the market when earnings are announced. The average of short-sale constraints dummy (SET50_100) is 0.6158 which can be implied that more than half of the sample are from the SET50 and SET100 constituents. This is also constrained by analyst forecast data which tend to cover large well-known firms and are members of the SET50 or SET100 indexes by nature. The mean for dispersion in analysts' forecasts (DISP) is 0.1589. The average number of days for which a firm has been in the stock market (AGE) is 5,230 days or more than 14 years. Market value (MV) and market-to-book ratio (MB) of the sample are moderately at 64 billion Baht and 2.3860 times respectively. The average of earnings surprises (ERNSUR) is 0.0225, which means that actual earnings tend to beat the analyst forecasts. Finally trading volumes during the earnings announcement periods are greater than regular period (ANNVOL) at 1.2408 times.

Table 2 shows correlations among variables used in the study. We found that the correlations between the earnings announcement period excess returns (EXRET) and proxies for differences of investor opinion are all negative which can be interpreted as a firm with high income volatility, high returns volatility, high dispersion in analysts' forecasts, short period being listed on the market and high average daily turnover tends to have low returns. In addition, EXRET and proxies for short-sales constraints, SET50_100 and SHTURN, are positively correlated at 0.0169 and 0.0017, respectively. A firm which can be sold short and has higher short-sales transaction, on average, has greater excess

returns around earnings announcement. Also five proxies for differences of investor opinion have positive correlations with each other, except ones between LN(1/AGE) and LN(TURN). Consistent with the literatures our proxies for differences of investor opinion are able to capture the same effects as those in other markets.

Table 1 reports descriptive statistics for variables used in the study. We use data of listed companies on the Stock Exchange of Thailand from 2 January 2005 to 30 December 2013 from SETSMART database. Variables include earnings announcement period excess returns (EXRET), short-sale constraints (SET50_100 and SHTURN), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and control variables (LN(MV), LN(MB), ERNSUR, MOM and ANNVOL). Number of observations, average, standard deviations and standard errors of each variable are reported. We also report the minimum, quartile 1, median, quartile 3, and maximum values in our sample.

	Observations	Mean	Standard Deviation	Standard Error	Min	Quartile1	Median	Quartile3	Max
EXRET	2,790	0.0010	0.0292	0.0006	-0.0956	-0.0170	-0.0005	0.0174	0.0982
SET50_100	2,790	0.6158	0.4865	0.0092	0.0000	0.0000	1.0000	1.0000	1.0000
SHTURN	2,790	1.83×10^{-5}	4.00×10^{-5}	7.58×10^{-7}	0.0000	0.0000	2.22×10^{-7}	1.75×10^{-5}	3.28×10^{-4}
INCVOL	2,600	0.0116	0.0096	0.0002	0.0003	0.0051	0.0091	0.0149	0.0599
RETVOL	2,743	0.0186	0.0069	0.0001	0.0051	0.0136	0.0172	0.0219	0.0496
DISP	1,772	0.1589	0.1793	0.0043	0.0000	0.0502	0.1017	0.2010	1.1500
AGE	2,790	5,230	3,126	59	373	2,538	5,296	7,079	14,075
LN(1/AGE)	2,790	-8.3245	0.7729	0.0146	-9.5522	-8.8649	-8.5746	-7.8391	-5.9216
TURN	2,752	0.0038	0.0051	0.0001	0.0001	0.0011	0.0022	0.0044	0.0732
LN(TURN)	2,752	-6.1349	1.0964	0.0209	-9.8392	-6.8262	-6.1004	-5.4330	-2.6146
MV	2,790	64,219	124,861	2,364	266	7,424	18,833	56,907	1,059,183
LN(MV)	2,790	9.9501	1.5097	0.0286	5.5835	8.9125	9.8434	10.9492	13.8730
MB	2,790	2.3860	2.1608	0.0409	0.1979	1.1847	1.7849	2.8279	25.3170
LN(MB)	2,790	0.6085	0.6988	0.0132	-1.6200	0.1695	0.5793	1.0395	3.2315
ERNSUR	2,790	0.0225	0.5321	0.0101	-3.0000	-0.1282	0.0061	0.1685	3.0000
MOM	2,790	0.0267	0.3336	0.0063	-1.0427	-0.1825	0.0100	0.2148	1.5899
ANNVOL	2,790	1.2408	0.5711	0.0108	0.0807	0.8665	1.1241	1.4878	3.9925

Table 2 reports the correlation matrix among variables used in the study including earnings announcement period excess returns (EXRET), short-sale constraints (SET50_100 and SHTURN), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and control variables (LN(MV), LN(MB), ERNSUR, MOM and ANNVOL). Since AGE, TURN, MV, MB are transformed into the logarithmic value to reduce skewness and we use the log-transformed values for further analyses, we do not include their original values in this table

	EXRET	SET50_100	SHTURN	INCVOL	RETVOL	DISP	LN (1/AGE)	LN (TURN)	LN (MV)	LN (MB)	ERNSUR	MOM	ANNVOL
EXRET	1	0.0169	0.0017	-0.0531	-0.0267	-0.0465	-0.0081	-0.0510	0.0179	0.0084	0.1083	0.0426	0.0054
SET50_100	0.0169	1	0.3528	-0.1913	-0.1189	-0.0019	-0.2427	0.0912	0.7265	0.2546	0.0059	0.0105	-0.1443
SHTURN	0.0017	0.3528	1	-0.0764	0.0827	0.0200	-0.1773	0.3007	0.3765	0.0805	0.0162	0.0318	-0.0536
INCVOL	-0.0531	-0.1913	-0.0764	1	0.1124	0.0791	0.1955	0.0714	-0.2234	0.0677	-0.0291	-0.0238	0.1060
RETVOL	-0.0267	-0.1189	0.0827	0.1124	1	0.0995	0.0660	0.2912	-0.1872	0.0270	0.0463	0.1488	-0.0588
DISP	-0.0465	-0.0019	0.0200	0.0791	0.0995	1	0.0148	0.1075	-0.0891	-0.1943	0.0149	-0.1319	-0.0432
LN(1/AGE)	-0.0081	-0.2427	-0.1773	0.1955	0.0660	0.0148	1	-0.0564	-0.2951	-0.0162	-0.0514	0.0040	0.0733
LN(TURN)	-0.0510	0.0912	0.3007	0.0714	0.2912	0.1075	-0.0564	1	0.0016	-0.0750	0.0451	0.1602	-0.1639
LN(MV)	0.0179	0.7265	0.3765	-0.2234	-0.1872	-0.0891	-0.2951	0.0016	1	0.3736	0.0179	0.0807	-0.1638
LN(MB)	0.0084	0.2546	0.0805	0.0677	0.0270	-0.1943	-0.0162	-0.0750	0.3736	1	-0.0522	0.2990	0.0014
ERNSUR	0.1083	0.0059	0.0162	-0.0291	0.0463	0.0149	-0.0514	0.0451	0.0179	-0.0522	1	0.0616	-0.0232
MOM	0.0426	0.0105	0.0318	-0.0238	0.1488	-0.1319	0.0040	0.1602	0.0807	0.2990	0.0616	1	0.1148
ANNVOL	0.0054	-0.1443	-0.0536	0.1060	-0.0588	-0.0432	0.0733	-0.1639	-0.1638	0.0014	-0.0232	0.1148	1

5. Methodology and Empirical Results

Berkman et al. (2009) find that a stock with high differences of investor opinion and short-sale constraints is overvalued because it reflects positive biasness from optimistic investors. However, after the firm's relevant information such as its earnings is released, differences of investor opinion decrease and optimistic investors are disappointed and sell their stocks. As a result, stock price will move down closer to its appropriate value. In other words, earnings announcements reduce positive biasness in stock price, which results in depressive stock returns. The higher differences of investor opinion and short-sales constraints, the higher positive biasness in stock price as well as the lower excess returns around earnings announcement.

We test the above prediction by regressing excess returns on different of opinion proxies and short-sales constraints on earnings announcement period excess returns

$$EXRET_{i,q} = \alpha + \beta_1 DIFOPN_{i,q} + \beta_2 SET50\_100_{i,q} + \varepsilon_{i,q} \quad (1)$$

Where $EXRET_{i,q}$ is the earnings announcement period excess returns of firm i and quarter q. $DIFOPN_{i,q}$ is the proxy for different of opinion of the corresponding quarter. EXRET is regressed on five different proxies of differences of investor opinion (DIFOPN) namely INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN) both separately and all at once. SET50_100 is a dummy variable which takes on the value of one if the stock is a member of SET50 or SET100 during the earnings announcement date, and zero otherwise. Table 3 reports results from equation 1. The coefficients are reported along with p-values.

We find that three out of five coefficients of DIFOPN are negatively and significantly related to EXRET. Consistent with Miller's hypothesis, increase in differences of investor opinion results in lower excess returns around an earnings announcement date. For example, if INCVOL increases by 1 percent, holding SET50_100 constant, EXRET will be around 0.15 percent lower. On the contrary, coefficients of RETVOL and LN(1/AGE) are not statistically significant. Moreover, two coefficients of SET50_100 are positively and significantly when using different proxies of DIFOPN. The results weakly support the argument that a stock with short-sales constraints experiences more positive biasness in price and causes lower excess returns around an earnings announcement date.

Table 3 Regression results of earnings announcement period excess returns (EXRET) on proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and short-sales constraints (SET50_100). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0019* (0.0662)	0.0011 (0.2774)	0.0023* (0.0603)	-0.0010 (0.4363)	-0.0099*** (0.0011)
INCVOL	-0.1521*** (0.0058)				
RETVOL		-0.0922 (0.1235)			
DISP			-0.0071** (0.0254)		
LN(1/AGE)				-0.0002 (0.4142)	
LN(TURN)					-0.0014*** (0.0019)
SET50_100	0.0009 (0.2390)	0.0022** (0.0273)	0.0008 (0.3125)	0.0010 (0.2082)	0.0029*** (0.0052)

The Miller (1977) hypothesis argues that the effect of short-sales constraints on excess returns around an earnings announcement date will be stronger with higher differences of investor opinion. The harder the stock to be sold short, the stronger the effect of differences of investor opinion on returns around the earnings announcement date. In this section we will investigate further on the effect of short-sales constraints together with differences of investor opinion on excess returns.

In order to test the hypothesis, we include an interaction term between short-sales constraints and differences of investor opinion $(SET50\_100_{i,q} \times DIFOPN_{i,q})$ to equation (1).

$$EXRET_{i,q} = \alpha + \beta_1 SET50\_100_{i,q} + \beta_2 DIFOPN_{i,q} + \beta_3 (SET50\_100_{i,q} \times DIFOPN_{i,q}) + \varepsilon_{i,q} \quad (2)$$

The subscriptions are the same as described above. We report the coefficients estimated from equation (2) and the p-values in the table 4. When separating the effect of shortable stocks, the coefficients of differences of investor opinion (β_2) become more negative for stocks which cannot be sold short, or stock with SET50_100 equaling zero while the coefficients of the interaction term (β_3) are positive for all proxies of differences of investor opinion. The coefficients of differences of opinion of stocks with short-sale constraints (β_2) are -0.3643, -0.3700, -0.0185, -0.0024, as opposed to -0.1521, -0.0922, -0.0071, and -0.0014 for INCVOL, RETVOL, DISP, and LN(TURN), respectively. The coefficients of the interaction term are 0.3987, 0.5246, 0.0157 and 0.0025 for INCVOL, RETVOL, DISP, and LN(TURN), respectively. INCVOL, RETVOL, and LN(TURN) are statistically significant at 1 percent and DISP at 5 percent. Similar to the results of equation (1), the coefficient β_3 in case of LN(1/AGE) is not statistically significant. One possible explanation is that the period at which the firm is listed on the market is unable to capture the different of opinion.

Overall, our results support the predictions of Miller (1977) that stocks with short-sale constraints tend to have positive bias in prices and then become depressive during the earnings announcement period. In other words, shortable stocks tend to have higher excess returns while those with the short-sale constraint tend to have lower excess returns during the earnings announcement period.

Table 4 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies. The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0048***	0.0065***	0.0041***	-0.0015	-0.0162***
	(0.0008)	(0.0038)	(0.0095)	(0.4364)	(0.0000)
SET50_100	-0.0040**	-0.0077***	-0.0017	0.0019	0.0180***
	(0.0173)	(0.0081)	(0.1931)	(0.4397)	(0.0023)
INCVOL	-0.3643***				
	(0.0000)				
SET50_100×INCVOL	0.3987***				
	(0.0005)				
RETVOL		-0.3700***			
		(0.0007)			
SET50_100×RETVOL		0.5246***			
		(0.0005)			
DISP			-0.0185***		
			(0.0038)		
SET50_100×DISP			0.0157**		
			(0.0266)		
LN(1/AGE)				-0.0002	
				(0.4227)	
SET50_100×LN(1/AGE)				0.0001	
				(0.4697)	
LN(TURN)					-0.0024**
					(0.0001)
SET50_100×LN(TURN)					0.0025**
					(0.0078)

6. Robustness Tests

6.1 Alternative proxies for short-sales constraints

The proxy for short-sales constraints used in the previous section, SET50_100, is defined in accordance with the regulation whether a stock is a member of SET50 or SET100 indexes. However, one could argue that although the stock can be sold short according to the regulation, there might be no short-sales transaction occurred. Nagel (2005) argues that institutional investors are mostly lender of the short sellers. Thus it is possible that lower proportion of institutional ownership causes fewer number of shares for short sale or it can be due to high cost of borrowing which prevent investors from selling short the stocks as they wish.

In order to examine the effect from actual short-selling transaction, we employ the market-microstructure data from the SET which provide the short-sale flag along with other information. For each transaction, we are able to identify whether it is the short-sale transaction and its volume. We then compute average daily short-sales turnover (SHTURN) to use as an alternative proxy for short-sales constraints in this section.

We employ similar regression model in order to investigate the interaction between short-sales constraints and differences of investor opinion. Nonetheless, the variable SET50_100 is replaced by SHTURN.

$$EXRET_{i,q} = \alpha + \beta_1 SHTURN_{i,q} + \beta_2 DIFOPN_{i,q} + \beta_3 (SHTURN_{i,q} \times DIFOPN_{i,q}) + \varepsilon_{i,q} \qquad (3)$$

The subscriptions are the same as described in the previous section. In table 5, we report the coefficients estimates from equation (3) along with the p-values. Our results remain materially the same to the findings in previous section. The coefficients of differences of investor opinion (β_2) become more negative compared to those from the equation (1) and the coefficients of the interaction term (β_3) are positive for proxies of differences of investor opinion, again except for the LN(1/AGE). Thus lower short-sales transaction can be implied as the short-selling constraints in our analysis. However we do not mean to imply whether the short-sale regulation in the market is effective or not.

Table 5 Regression results of earnings announcement period excess returns (EXRET) on average daily short-sales turnover (SHTURN), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between average daily short-sales turnover and differences of opinion proxies. The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0031***	0.0038**	0.0036***	-0.0044	-0.0104***
	(0.0011)	(0.0137)	(0.0002)	(0.2495)	(0.0010)
SHTURN	-24.9807	-51.299*	-28.5886*	185.5971	168.903**
	(0.1113)	(0.0991)	(0.0722)	(0.1300)	(0.0188)
INCVOL	-0.2104***				
	(0.0007)				
SHTURN×INCVOL	2,685.2607**				
	(0.0414)				
RETVOL		-0.1716**			
		(0.0236)			
SHTURN×RETVOL		2,887.6663*			
		(0.0505)			
DISP			-0.0112***		
			(0.0038)		
SHTURN×DISP			162.0861**		
			(0.0250)		
LN(1/AGE)				-0.0006	
				(0.2065)	
SHTURN×LN(1/AGE)				21.4854	
				(0.1294)	
LN(TURN)					-0.0018***
					(0.0004)
SHTURN×LN(TURN)					28.8535**
					(0.0347)

6.2 Controlling for market-wide and company specific variables

In this section, we will test whether our results from the previous section still hold when controlling for other variables which also impact the returns around earnings announcements. There are five variables as details below.

1) Market value of the firm (MV). Previous study finds the negative relationship between market value and returns in both developed and emerging markets meaning that firms with high market value, on average, will have low returns (Cakici et al. (2013)).

2) Market to book value of the stock (MB) – The study by Pontiff and Schall (1998) show that book to market ratio can be used to predict the excess returns because the ratio implies the cash flows expected to come in the future.

3) Earnings surprises (ERNSUR) – Chen et al. (2014) argue that positive earnings surprises is an unexpected exclusive information. If it is flowed into the market, it attributes to firms' returns. Additionally, Chudek et al. (2011) show that buying high positive earnings surprises stocks and selling, or shorting, a low positive earnings surprises stocks will create excess returns in two-month period after the earnings announcement date.

4) Price momentum (MOM) – The study of Jegadeesh and Titman (1993) reports that a stock with high returns in the recent past will continue to outperform a stock with low returns in the recent past over the next six to twelve months. They also argue that the stock with high returns in the recent past, or high momentum, has higher returns during earnings announcement period than the stock with low returns in the recent past, or low momentum.

5) Concentration of trading volume around earnings announcement dates (ANNVOL). Lamont and Frazzini (2007) document that earnings announcement period returns is positively related to the concentration of trading volume around earnings announcement. Moreover, if a stock has high trading volume around an earnings announcement, it will continue to have high trading volume around the earnings announcements in the future.

We incorporate these variables in our regression analysis. We regress the excess return on the differences of opinion and short sale constraints as in equation (2) and controlling for variable as described above separately.

$$EXRET_{i,q} = \alpha + \beta_1 SET50\_100_{i,q} + \beta_2 DIFOPN_{i,q} + \\ + \beta_3 (SET50\_100_{i,q} \times DIFOPN_{i,q}) + \beta_4 CTRL_{i,q} + \varepsilon_{i,q} \quad (4)$$

Where the subscription i and q are the same as the previous section. $CTRL_{i,q}$ are the control variables for company-specific information of the corresponding firm i, quarter q. The control variables include logarithmic of market value, book value, earnings surprises, price momentum, and trading volume around the earnings announcement dates. We examine the effect of each control variable as well as all of them on the regression.

We report the regression results in the table 6 to table 11, respectively.

Table 6 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies, controlling for market value (MV). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0019 (0.3520)	0.0022 (0.3336)	0.0035 (0.2756)	-0.0029 (0.3892)	-0.0168*** (0.0025)
SET50_100	-0.0048*** (0.0179)	-0.0093*** (0.0052)	-0.0019 (0.2178)	0.0012 (0.4606)	0.0178*** (0.0027)
INCVOL	-0.3611*** (0.0000)				
SET50_100×INCVOL	0.4014*** (0.0004)				
RETVOL		-0.3725*** (0.0007)			
SET50_100×RETVOL		0.5506*** (0.0003)			
DISP			-0.0185*** (0.0038)		
SET50_100×DISP			0.0158** (0.0264)		
LN(1/AGE)				-0.0002 (0.4456)	

Table 6 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies, controlling for market value (MV). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. (Continued)

	EXRET				
	(1)	(2)	(3)	(4)	(5)
SET50_100×LN(1/AGE)				0.0001	
				(0.4756)	
LN(TURN)					-0.0024***
					(0.0001)
SET50_100×LN(TURN)					0.0025***
					(0.0077)
LN(MV)	0.0003	0.0005	0.0001	0.0002	0.0001
	(0.2695)	(0.1748)	(0.4552)	(0.3445)	(0.4444)

Table 7 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies, controlling for market-to-book ratio (MB). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0047***	0.0063***	0.0040**	-0.0018	-0.0162***
	(0.0012)	(0.0050)	(0.0144)	(0.4257)	(0.0000)
SET50_100	-0.0041**	-0.0078***	-0.0018	0.0020	0.0180***
	(0.0154)	(0.0078)	(0.1897)	(0.4355)	(0.0023)
INCVOL	-0.3669***				
	(0.0000)				
SET50_100×INCVOL	0.3968***				
	(0.0005)				
RETVOL		-0.3697***			
		(0.0007)			
SET50_100×RETVOL		0.5196***			
		(0.0006)			
DISP			-0.0184***		
			(0.0040)		
SET50_100×DISP			0.0158**		
			(0.0264)		
LN(1/AGE)				-0.0003	
				(0.4150)	
SET50_100×LN(1/AGE)				0.0001	
				(0.4630)	
LN(TURN)					-0.0024***
					(0.0001)
SET50_100×LN(TURN)					0.0025***
					(0.0078)
LN(MB)	0.0004	0.0004	0.0001	0.0002	0.0001
	(0.3230)	(0.3067)	(0.4412)	(0.4046)	(0.4605)

Table 8 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies, controlling for earnings surprises (ERNSUR). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0047*** (0.0011)	0.0074*** (0.0012)	0.0038** (0.0144)	0.0006 (0.4767)	-0.0173*** (0.0000)
SET50_100	-0.0041** (0.0144)	-0.0088*** (0.0029)	-0.0016 (0.2171)	0.0012 (0.4615)	0.0184*** (0.0017)
INCVOL	-0.3603*** (0.0000)				
SET50_100×INCVOL	0.4061*** (0.0004)				
RETVOL		-0.4209*** (0.0001)			
SET50_100×RETVOL		0.5783*** (0.0001)			
DISP			-0.0175*** (0.0056)		
SET50_100×DISP			0.0140** (0.0422)		
LN(1/AGE)				4.22×10^{-5} (0.4857)	
SET50_100×LN(1/AGE)				2.47×10^{-5} (0.4935)	
LN(TURN)					-0.0026*** (0.0000)
SET50_100×LN(TURN)					0.0025*** (0.0060)
ERNSUR	0.0052*** (0.0000)	0.0062*** (0.0000)	0.0068*** (0.0000)	0.0059*** (0.0000)	0.0060*** (0.0000)

Table 9 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies, controlling for price momentum (MOM). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0047*** (0.001)	0.0069*** (0.0024)	0.0039** (0.0137)	-0.0019 (0.4202)	-0.0174*** (0.0000)
SET50_100	-0.0041** (0.0158)	-0.0077*** (0.0081)	-0.0017 (0.2066)	0.0022 (0.4290)	0.0182*** (0.0020)
INCVOL	-0.3617*** (0.0000)				
SET50_100×INCVOL	0.4001*** (0.0004)				
RETVOL		-0.3943*** (0.0004)			
SET50_100×RETVOL		0.5212*** (0.0005)			
DISP			-0.0179*** (0.0051)		
SET50_100×DISP			0.0155** (0.0288)		
LN(1/AGE)				-0.0003 (0.4100)	
SET50_100×LN(1/AGE)				0.0002 (0.4580)	
LN(TURN)					-0.0026*** (0.0000)
SET50_100×LN(TURN)					0.0025*** (0.0069)
MOM	0.0047*** (0.0031)	0.0036** (0.0156)	0.0018 (0.1977)	0.0037** (0.0125)	0.0035** (0.0172)

Table 10 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN)), and interaction between short-sales constraints and differences of opinion proxies, controlling for concentration of trading volume around earnings announcement dates (ANNVOL). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0045**	0.0061**	0.0028	-0.0024	-0.0162***
	(0.0129)	(0.0173)	(0.1348)	(0.4040)	(0.0001)
SET50_100	-0.0040***	-0.0076***	-0.0016	0.0023	0.0180***
	(0.0188)	(0.0091)	(0.2186)	(0.4288)	(0.0023)
INCVOL	-0.3654***				
	(0.0000)				
SET50_100×INCVOL	0.3985***				
	(0.0005)				
RETVOL		-0.3670***			
		(0.0008)			
SET50_100×RETVOL		0.5225***			
		(0.0005)			
DISP			-0.0181***		
			(0.0045)		
SET50_100×DISP			0.0154**		
			(0.0296)		
LN(1/AGE)				-0.0003	
				(0.4118)	
SET50_100×LN(1/AGE)				0.0001	
				(0.4608)	
LN(TURN)					-0.0024***
					(0.0001)
SET50_100×LN(TURN)					0.0025***
					(0.0080)
ANNVOL	0.0003	0.0003	0.0010	0.0004	4.13×10^{-5}
	(0.4009)	(0.3844)	(0.2351)	(0.3332)	(0.4833)

Table 11 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN), and interaction between short-sales constraints and differences of opinion proxies, controlling for market value (MV), market-to-book ratio (MB), earnings surprises (ERNSUR), price momentum (MOM) and concentration of trading volume around earnings announcement dates (ANNVOL). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

	EXRET				
	(1)	(2)	(3)	(4)	(5)
Intercept	0.0026 (0.3148)	0.0047 (0.2046)	0.0014 (0.4091)	-0.0010 (0.4610)	-0.0174*** (0.0023)
SET50_100	-0.0046** (0.0215)	-0.0097*** (0.0039)	-0.0015 (0.2747)	0.0014 (0.4559)	0.0189*** (0.0016)
INCVOL	-0.3558*** (0.0000)				
SET50_100×INCVOL	0.4092*** (0.0003)				
RETVOL		-0.4375*** (0.0001)			
SET50_100×RETVOL		0.5873*** (0.0001)			
DISP			-0.0165*** (0.0088)		
SET50_100×DISP			0.0134** (0.0494)		
LN(1/AGE)				2.16×10^{-5} (0.4928)	
SET50_100×LN(1/AGE)				0.0001 (0.4818)	
LN(TURN)					-0.0028*** (0.0000)
SET50_100×LN(TURN)					0.0026*** (0.0055)

Table 11 Regression results of earnings announcement period excess returns (EXRET) on short-sales constraints (SET50_100), proxies for differences of opinion (INCVOL, RETVOL, DISP, LN(1/AGE) and LN(TURN), and interaction between short-sales constraints and differences of opinion proxies, controlling for market value (MV), market-to-book ratio (MB), earnings surprises (ERNSUR), price momentum (MOM) and concentration of trading volume around earnings announcement dates (ANNVOL). The p-values are reported in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. (Continued)

	EXRET				
	(1)	(2)	(3)	(4)	(5)
LN(MV)	0.0002	0.0003	4.93×10^{-5}	0.0001	-0.0001
	(0.3584)	(0.2964)	(0.4694)	(0.4257)	(0.4271)
LN(MB)	-0.0001	0.0001	0.0002	-0.0001	-0.0001
	(0.4476)	(0.4455)	(0.4303)	(0.4611)	(0.4401)
ERNSUR	0.0050***	0.0060***	0.0068***	0.0058***	0.0059***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
MOM	0.0042**	0.0027*	0.0011	0.0031***	0.0031**
	(0.0101)	(0.0620)	(0.3105)	(0.0387)	(0.0380)
ANNVOL	0.0001	0.0002	0.0013	0.0003	-0.0002
	(0.4502)	(0.4120)	(0.1791)	(0.3661)	(0.4318)

The results of equation (4), using various control variables, show that the coefficients of the interaction terms between short-sales constraints and differences of investor opinion, or β_3, remain positive for all five proxies of differences of investor opinion, which is consistent to the results of equation (2) shown in table 4.

Similar to the results of equation (2), the results of equation (4) show that the coefficients of the interaction terms, or β_3, are statistically significant at 5 percent in case of INCVOL, RETVOL, and LN(TURN), and the one in case of DISP is statistically significant at 10 percent, while that in case of LN(1/AGE) is not statistically significant even at 10 percent. The results in the previous section are robust even when controlling for market value (MV), market-to-book ratio (MB), earnings surprises (ERNSUR), price momentum (MOM) and concentration of trading volume around earnings announcement dates (ANNVOL). Overall, the results in table 6 to table 11 provide further support for the Miller (1977) hypothesis.

7. CONCLUSION

The Miller (1977) hypothesis states that stocks with differences of investor opinion and short-sales constraints are overvalued. There are many studies trying to generate evidences on the Miller (1977) hypothesis. One of the interesting studies is Berkman et al. (2009) who examine the excess returns around the earnings announcement date conditional on differences of investor opinion and short-sales constraints. In their study, proportion of institutional ownership in a company is used as a proxy for short-sales constraints. However, Baik et al. (2010) suggest that the proportion of institutional ownership can be a proxy for institutional investors' informational advantages as well. This paper, therefore, studies data from the Stock Exchange of Thailand (SET). In Thai market, according to the regulation, only stocks in SET50 or SET100 indexes can be sold short, which give us a clearer picture of short-sales constraints.

Following Berkman et al. (2009), this paper focuses on the effects of differences of investor opinion and short-sales constraints on excess returns around earnings announcement dates. The results show that stocks with higher differences of investor opinion have lower excess returns around earnings announcement dates. Besides, the depressive returns are even worse in the case that stocks cannot be sold short, or can be sold short but have very few short-sales transaction in practice. After controlling for other factors, including market value, market-to-book ratio, earnings surprises, price momentum and concentration of trading volume around earnings announcement dates, the results are still robust. Overall, the result provides further supports for the Miller (1977) hypothesis.

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