



**A Study on the Stock Price Performance
Subsequent to Directors' Dealings
in Hong Kong**

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Conducted By
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1. Background of study

- 1.1. In the 2008 Hong Kong Exchanges and Clearing Limited's (HKEx) consultation paper on proposed changes to the listing rules, a proposal is made in respect of extending the "black out" period. Under the new proposal, directors are prohibited from dealing in shares of their listed companies during the period between the listed company's period end date and the date the company releases the relevant results announcement. Currently, a listed company has four months from the year-end and three months from the period end in which to publish year-end results and half-year results respectively. Assuming that the listed company makes full use of the period being permitted to publish the results, the maximum "black out" period would be seven months.
- 1.2. The rationale behind the proposal is that unpublished price sensitive information in respect of a listed issuer continues to accrue after the period end. The current "black out" period of one month for both the year-end and half-year results announcement may fail to ensure that the insiders do not trade based on the "relevant" information.
- 1.3. Based on public consultation and comments received after the consultation period, the proposal is revised in February 2009 such that the black out period for year-end results announcement is extended to 60 days, while the black out period for half-year or interim results announcement remains at 30 days.
- 1.4. This study conducts an empirical investigation of the share price performance subsequent to directors' dealing in shares of their companies. If directors' dealings are based on "relevant" information, we should observe abnormal share price performance subsequent to the dealings.

2. Focus of analysis

- 2.1. This study seeks to answer three related questions:
 - (a) Do directors deal in shares of their companies more often before the results announcement than after?
 - (b) Do directors outperform the market when dealing in shares of their companies preceding the results announcement?
 - (c) Do directors outperform the market when dealing in shares of their companies not preceding the results announcement?

3. Previous Studies

3.1. The following is a summary of related studies on insider trading activities in Hong Kong:

Authors and article title	Data source and sample period	Findings
Wong, Cheung and Wu, 2000, "Insider trading in the Hong Kong stock market," <i>Asia-Pacific Financial Markets</i>	- Stock Exchange of Hong Kong (Director/Chief Executive Notifications Weekly Summary) for dealings data between Sep 1991 and June 1993	- Abnormal profits for insider trading in small firms - No abnormal profits for insider trading in medium and large firms
Cheng, Firth, Leung and Rui, 2006, "The effects of insider trading on liquidity" <i>Pacific-Basin Finance Journal</i>	- Primark for dealings data between May 1996 to April 2000	- A widening of bid-ask spread and a decline of depth (at ask and bid) on insider trading days
Cheuk, Fan and So, 2006, "Insider trading in Hong Kong: Some stylized facts," <i>Pacific-Basin Finance Journal</i>	- Primark for dealings data between January 1993 to Dec 1998	- Abnormal profits from both insider buying and selling transactions
Cheng and Leung, 2008, "Is there information content from insider trading activities preceding earnings and dividend announcements in Hong Kong?" <i>Accounting and Finance</i>	- Primark for dealings data between 1993 to April 2000; - Hong Kong Exchanges (Securities Daily Summary and Director's Chief Executives' Notification Report) for dealings data between May 2000 to 2003	- Significant net-insider-buying activities before the announcement of good news ("Earnings-Dividend Increase") and significant net-insider-selling activities before bad news ("Earnings-Dividend Decrease") - a relationship between insider trading activity and the abnormal return of earnings announcement
Firth, Leung and Rui, 2009, "Insider Trading in Hong Kong: Tests of Stock Returns and Trading Frequency" HKIMR working paper	- Inside Trade Asia for dealings data from 1993 to 1999.	- The cumulative abnormal returns from a long purchase and short sale investment strategy over 360 days after the insider trade average 1.9 percent, while purchase transactions averaging negative 6.4percent and sale transactions averaging 17.6 percent.

3.2. As seen, previous studies use data based on earlier years, with the most recent period dating back to 2003. In this study, we investigate the share price performance subsequent to directors' dealings using a more updated period from 2003 to 2008.

4. Sample construction

- 4.1. We obtain the following data for all companies listed on the Main Board of HKEx between 2003 and 2008:
 - (a) Daily stock returns and year-end market capitalization from Datastream;
 - (b) Disclosure of Interests (DI) filed by directors, retrieved from the HKEx website on Shareholding Disclosures;
 - (c) Dates of results announcements and fiscal year end dates from Bloomberg.
- 4.2. We also obtain daily Hang Seng Index (market) returns from Datastream.
- 4.3. From the DI Notice files, we select those dealings with the following reason codes:
 - 121(L) Becoming interested in shares of the listed corporation; this includes all acquisitions whether by purchase or gift, or by rights/bonus issue or taking a security interest in shares;
 - 122(L) Ceasing to have an interest in shares of the listed corporation;The notation (L) means that the director has a long position, and 121(L) indicates a director's purchase while 122(L) indicates a director's sale.
- 4.4. If there are both purchases and sales for the same company on the same day, the dealings on that day will be excluded from the analysis. If there are multiple purchase transactions or multiple sale transactions on one day, we combine all transactions and treat that the company has one dealing observation (either purchase or sale) on that day.
- 4.5. The following dealings are excluded from the sample:
 - dealings in companies without matching information on fiscal year end dates in the corresponding year ;
 - dealings in companies without daily stock return data available from Datastream;
 - dealings in companies with 4 results announcements per year (i.e. quarterly financial reporting).
- 4.6. For each dealing observation, we compare the date of dealing with dates of results announcements and determine whether the dealing occurs before the results announcement or after. We then compare the date of result announcement pertaining to the dealing with fiscal year end dates, in order to determine whether the announcement is for year-end results or half-year results.
- 4.7. We classify directors' dealings into two types – those that occur before results announcements and those that occur after announcements. We will see whether the directors deal in securities of their companies before results announcements more often than after.

5. Methodology

- 5.1. The objective of our analysis is to determine whether directors' dealings contain information about the subsequent price performance. We partition the final sample of dealing observations into days of directors' purchases versus days of directors' sales. If directors' dealings are information-motivated, we should observe positive abnormal returns subsequent to directors' purchases and negative abnormal returns subsequent to directors' sales.
- 5.2. The analysis is based on the event study methodology. We identify the date of director's dealing or the date of earnings announcement, treat it as an event day, and calculate either the market-adjusted return or risk-adjusted return for a period following the event. The market-adjusted return is to control for the market movement, while the risk-adjusted return will control also for the relative risk of the company.

Dealings preceding results announcements

- 5.3. We first discuss the methodology for analyzing directors' dealings occurring before results announcements. The date of results announcement is denoted Day 0 and the date of dealing is denoted Day -t.
- 5.4. For each day in the pre-announcement period (Day -t to Day 0), we calculate the daily stock return of the company ($R_{i,t}$). We also calculate the daily market return ($R_{m,t}$), based on Hang Seng Index. We then calculate daily abnormal stock return, based on either the market-adjusted return or risk-adjusted return.
- 5.5. The market-adjusted return is calculated as ($R_{i,t} - R_{m,t}$). The risk-adjusted return is calculated based on beta adjustment. A market model is estimated using all daily stock returns for the company during the corresponding year:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad \text{Equation (1)}$$

where α_i is the estimated intercept and β_i is the estimated beta. The risk-adjusted return is set equal to the residual term ($\varepsilon_{i,t}$).

- 5.6. We calculate cumulative abnormal stock returns for the companies during the pre-announcement period by cumulating daily abnormal returns (either market-adjusted returns or risk-adjusted returns) from Day -t to Day 0.
- 5.7. If the director's dealing contains relevant information and if the information is incorporated into the stock price before the results announcement, we will observe a positive cumulative abnormal return subsequent to the director's purchase, and a negative cumulative abnormal return subsequent to the director's sale. The director who purchases will outperform the market when the subsequent abnormal return is positive, and the director who sells will outperform the market when the subsequent abnormal return is negative.
- 5.8. Since the relevant information might not be incorporated into stock prices before

the results announcement, we also examine the stock price performance after the results come out. As the information should be quickly incorporated into the stock prices after the announcement, we employ a short post-earnings announcement period for investigation, from Day 1 to Day 14.

- 5.9. We repeat the same methodology as described above in calculating cumulative abnormal returns for the companies after results announcements. If the director's dealing contains information about earnings, there will be a positive cumulative abnormal return for the director's purchase and a negative cumulative abnormal return for the director's sale in the post-earnings announcement period (Day 1 to Day 14).
- 5.10. We classify the dealings according to the timing of dealings (number of months) before results announcements. Under the original proposal submitted by HKEx, the black out period could be as long as 4 months for the year-end results announcement and 3 months for the half-year results announcement. For those dealings before year-end results announcements, we partition them into three sub-groups according to the number of months before the announcement: (i) between 1 to 2 months (30-60 days), (ii) between 2 to 3 months (60-90 days), and (iii) between 3 to 4 months (90-120 days). For those dealings before half-year results announcements, we partition them into two sub-groups according to the number of months before the announcement: (i) between 1 to 2 months (30-60 days), and (ii) between 2 to 3 months (60-90 days).
- 5.11. Since the current black out period is one month for both year-end and half-year results announcements, we are not supposed to observe dealings occurring within that one month period. However, our final sample does include some dealings occurring within one month of the announcement. We are unable to determine whether the irregularity is due to errors in DI notices recorded in the HKEx website, errors in dates of results announcements, or some other reasons. But since the number of observations is not large (about 4% of total sample) and that we find no abnormal stock returns for these dealings, we do not have a separate report of the results for these dealings.

Dealings not preceding results announcements

- 5.12. We also analyze directors' dealings that do not precede results announcements. We will examine the share price performance, starting from the date of director's dealing, for the next 30 days (1 month), 60 days (2 months), 90 days (3 months), and 120 days (4 months).
- 5.13. We adopt a similar methodology as in analyzing directors' dealings preceding results announcements. We estimate daily abnormal stock returns, either the daily market-adjusted returns or daily risk-adjusted return, in the period subsequent to the directors' dealings. We then calculate cumulative abnormal stock returns in the 30-day, 60-day, 90-day and 120-day holding periods afterwards.

Firm size classification

- 5.14. Some of the analysis will be stratified by the firm size. All firms in the final sample are classified into 3 firm size groups according to the market capitalization at the end of the year:
- (a) small firm (less than HK\$1 billion);
 - (b) medium firm (HK\$1 billion ~ HK\$10 billion);
 - (c) large firm (larger than HK\$ 10 billion).

6. Major Results

- 6.1. The table below reports the number of days in which directors deal in securities of their companies before and after results announcements, stratified by the calendar year and firm size. Altogether, there are 4746 days with directors' dealings preceding results announcements, and 11500 days with directors' dealings not preceding announcements. Therefore, approximately 30% of directors' dealings are before results announcements.
- 6.2. Directors are more likely to purchase additional shares of their companies, rather than to sell shares, regardless of whether the dealings are before or after results announcements. During the sample period, approximately 75% of directors' dealings are purchases, and only 25% are sales.

Number of days of dealings									
Dealings before results announcements									
Year	Small firm		Medium firm		Large firm		TOTAL		Purchases + Sales
	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	
2003	172	47	39	47	6	5	217	99	316
2004	153	56	155	87	15	27	323	170	493
2005	285	36	362	57	21	63	668	156	824
2006	302	55	202	53	76	57	580	165	745
2007	321	170	358	150	120	89	799	409	1208
2008	319	23	519	42	198	59	1036	124	1160
TOTAL							3623	1123	4746
Dealings after results announcements									
Year	Small firm		Medium firm		Large firm		TOTAL		Purchases + Sales
	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	
2003	330	174	142	196	26	31	498	401	899
2004	364	149	394	211	114	71	872	431	1303
2005	393	115	559	125	208	95	1160	335	1495
2006	701	111	409	104	173	159	1283	374	1657
2007	658	128	719	361	398	281	1775	770	2545
2008	617	71	1713	105	903	192	3233	368	3601
TOTAL							8821	2679	11500

- 6.3. The rest of this section reports the major results on the share price performance subsequent to directors' dealings. For each type of dealing observations, we report the median value (instead of the mean) of cumulative market-adjusted

returns, as the median is not affected by outliers. Those estimates with a statistical significance of 0.1% will be marked with asterisk (*). A complete summary of results is provided in the Appendix, which contains also the cumulative risk-adjusted returns. In general, results for cumulative market-adjusted returns are similar to those for cumulative risk-adjusted returns, except in a few occasions.

Dealings before results announcements

- 6.4. Figures 1A and 1B contain results for directors' dealings conducted before results announcements. Purchases (year-end) and sales (year-end) refer to the dealings conducted before year-end results announcements, while purchases (interim) and sales (interim) refer to the dealings conducted before half-year results announcements. Figure 1A reports the pre-announcement returns, which are the cumulative market-adjusted returns calculated from the date of dealings to the date of results announcement. Figure 1B reports the post-announcement returns, which are the cumulative market-adjusted returns in the 14-day holding period following the results announcement.
- 6.5. Based on pre-announcement returns, there is no positive (negative) abnormal price movement for the companies subsequent to directors' purchases (sales). Instead, there is significant negative abnormal price movement subsequent to directors' purchases. This means that the directors who purchase underperform the market.
- 6.6. Based on post-announcement returns (in the 14-day holding period), there remains no positive abnormal price movement for the companies in which the directors purchase additional shares. However, there are statistically significant negative abnormal returns for the companies in which the directors sell shares (1.93% for sales before year-end results announcements and 1.85% for sales before half-year results announcements). This means that directors who sell shares outperform the market after results come out.

Figure 1A
Market-adjusted returns subsequent to directors' dealings conducted before earnings announcement
(Pre-announcement return)

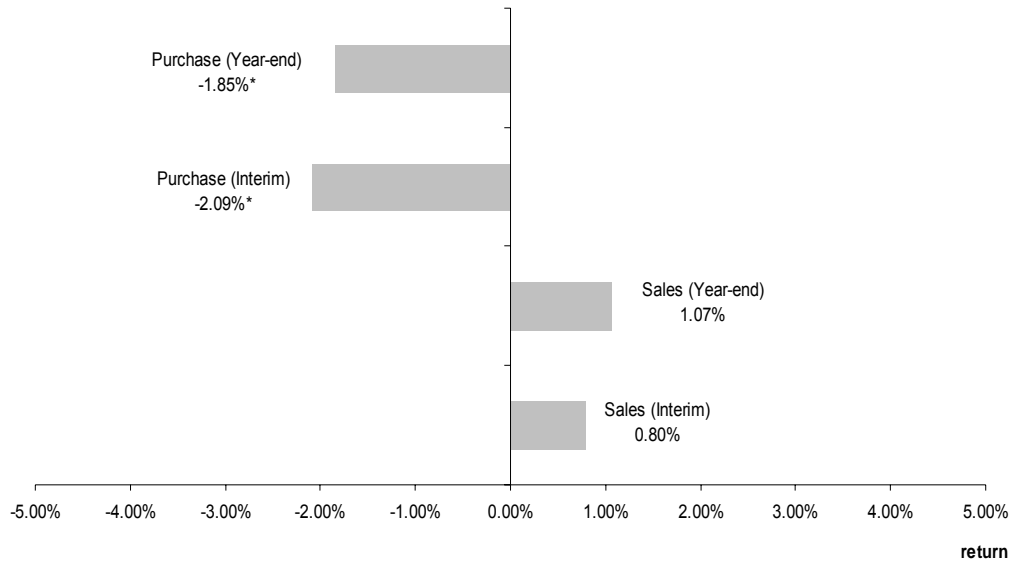
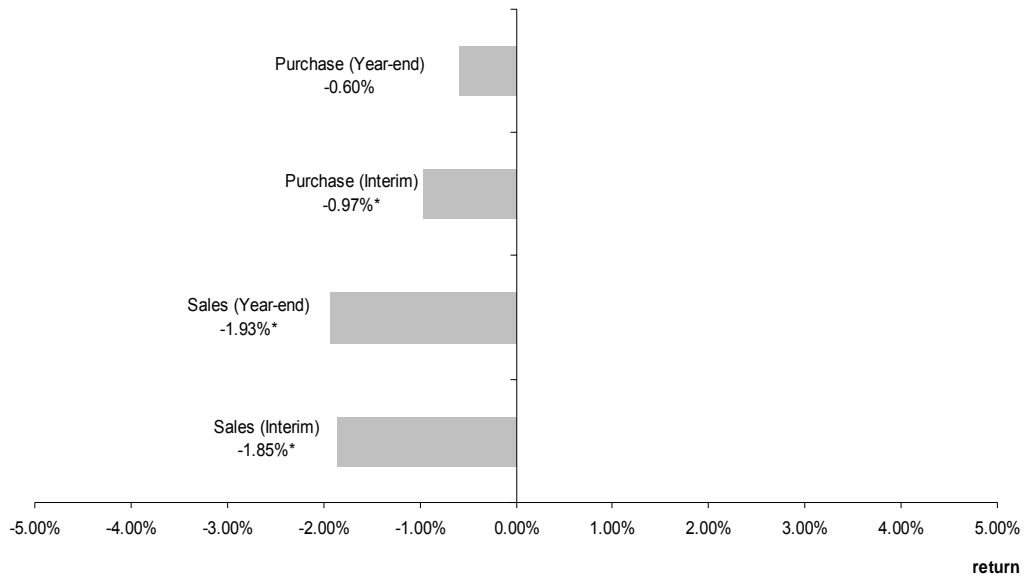
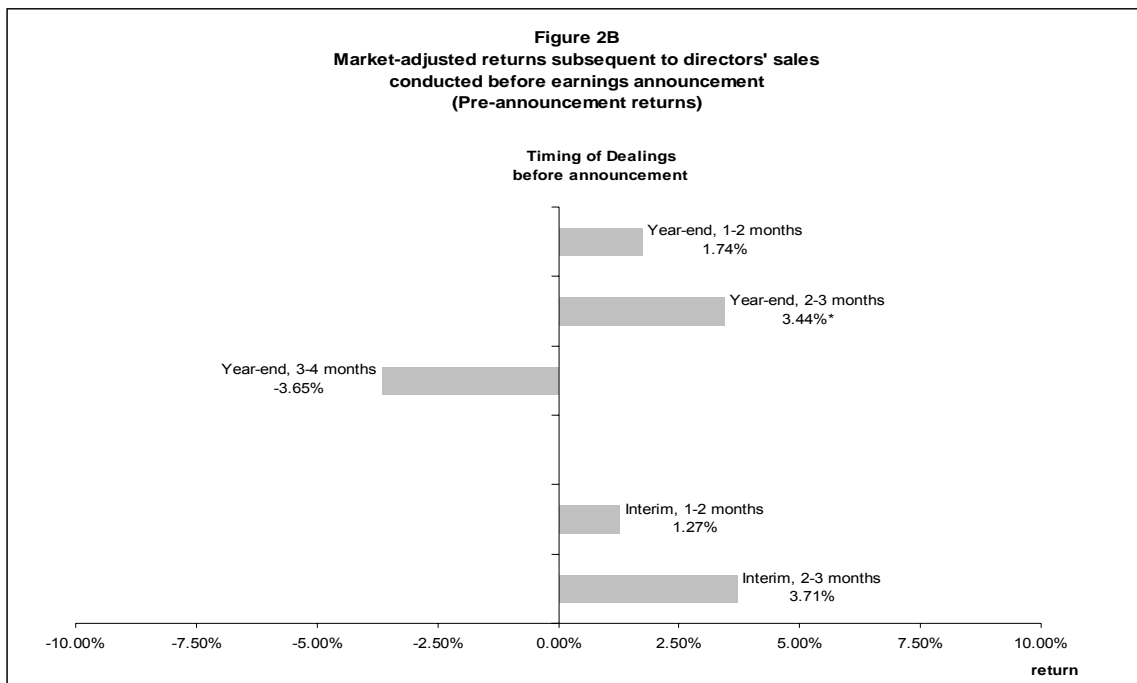
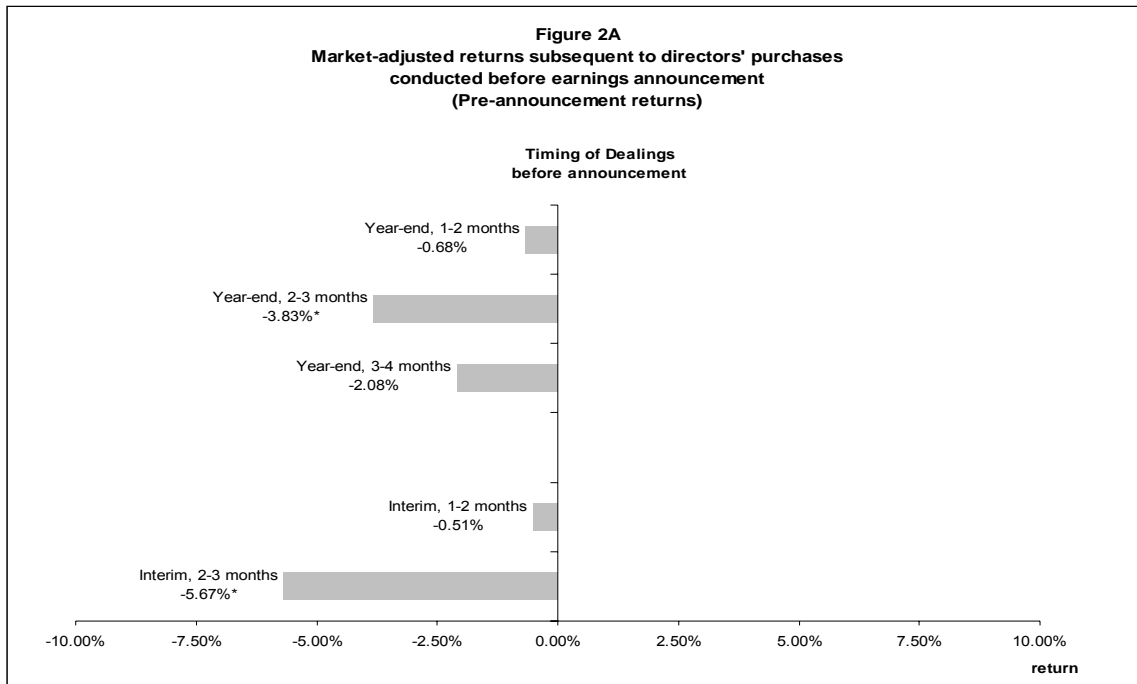


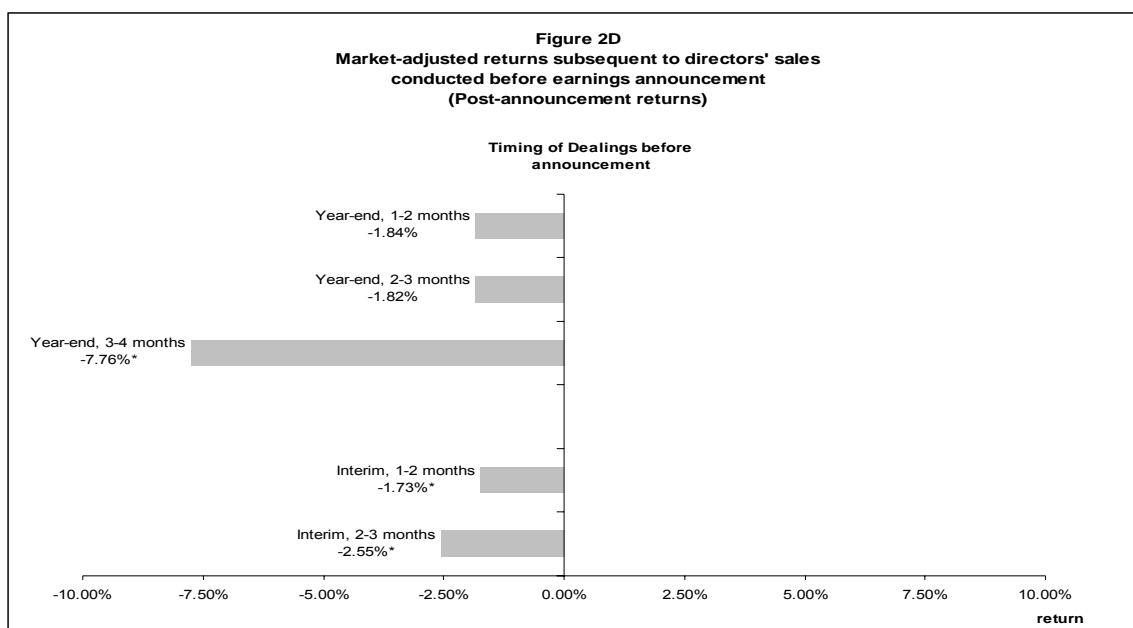
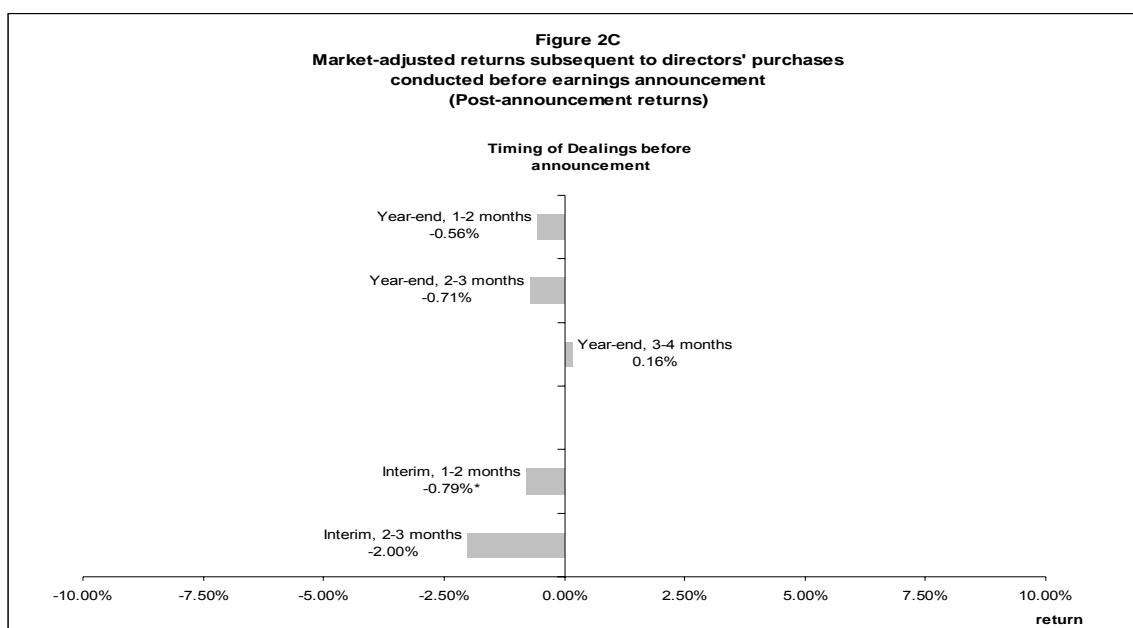
Figure 1B
Market-adjusted returns subsequent to directors' dealings conducted before earnings announcement
(Post-announcement return)



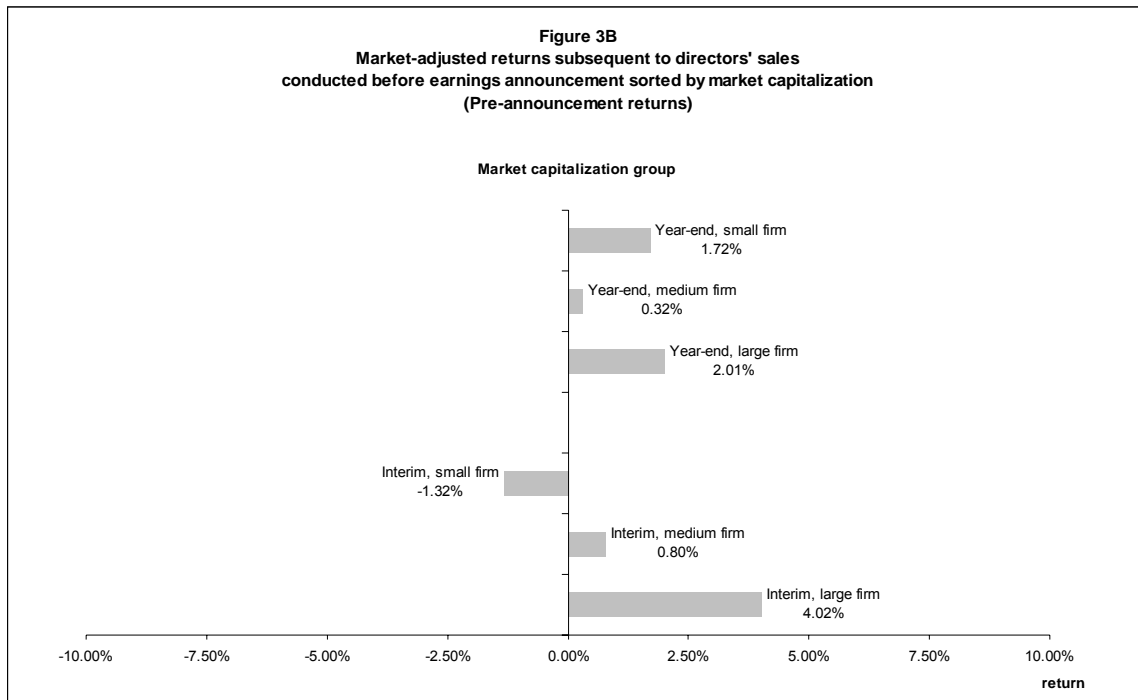
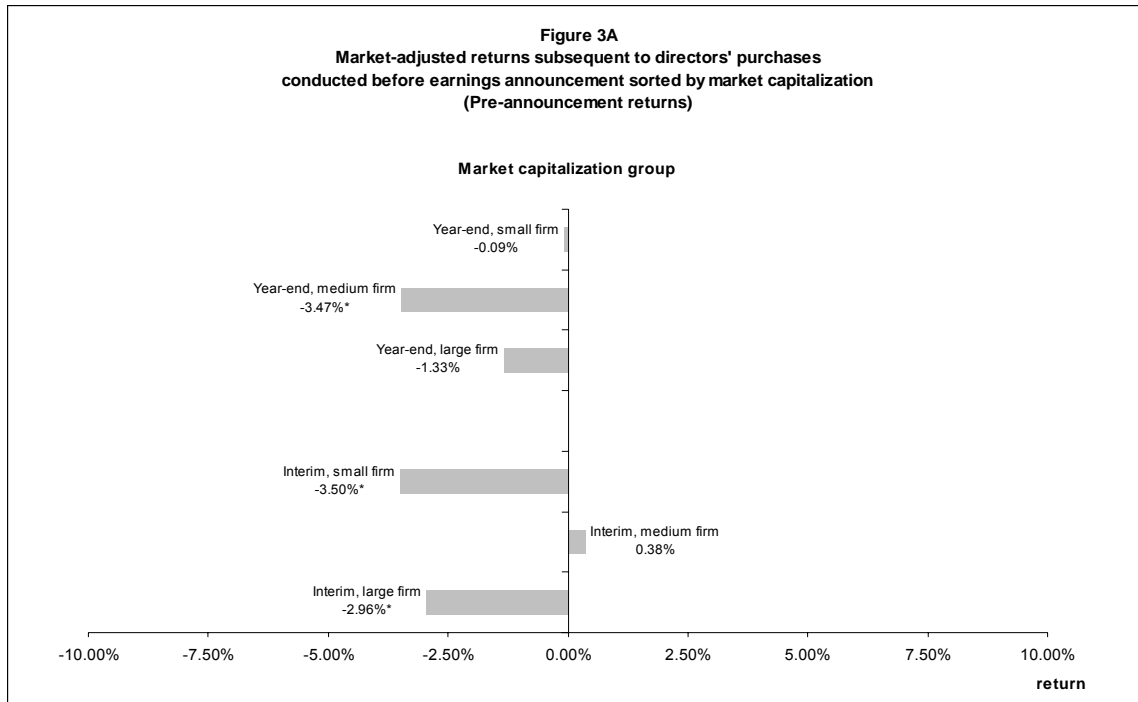
- 6.7. Figures 2A and 2B report pre-announcement abnormal returns for dealings conducted before results announcements, stratified by the timing of dealings (number of months) before results announcements.
- 6.8. Based on pre-announcement abnormal returns, regardless of timing of dealings, there is no significant evidence that directors are able to outperform the market from their purchases or sales.



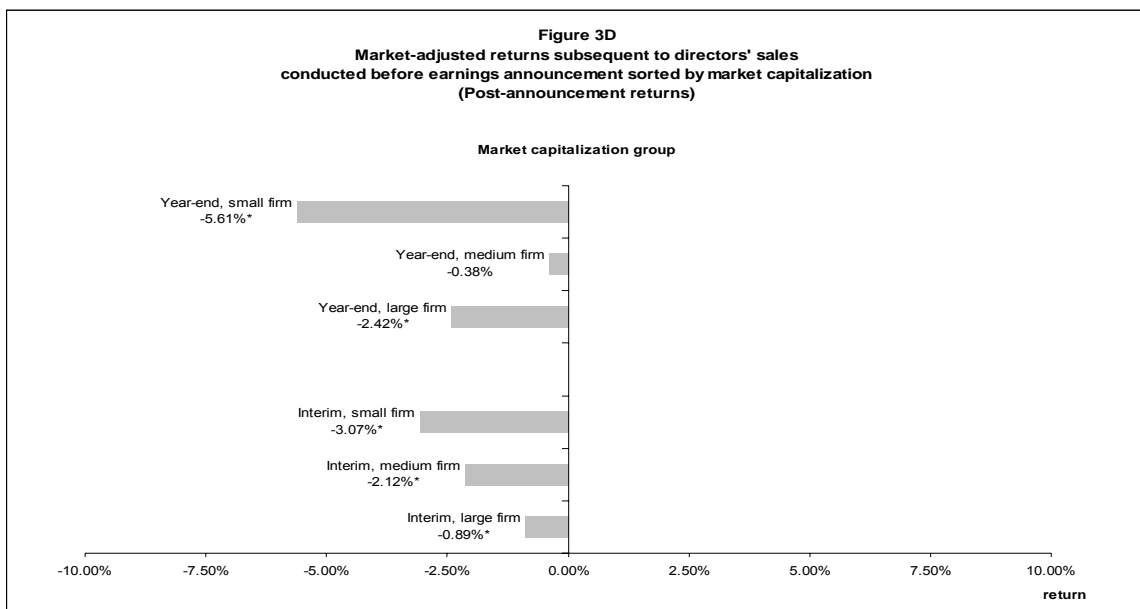
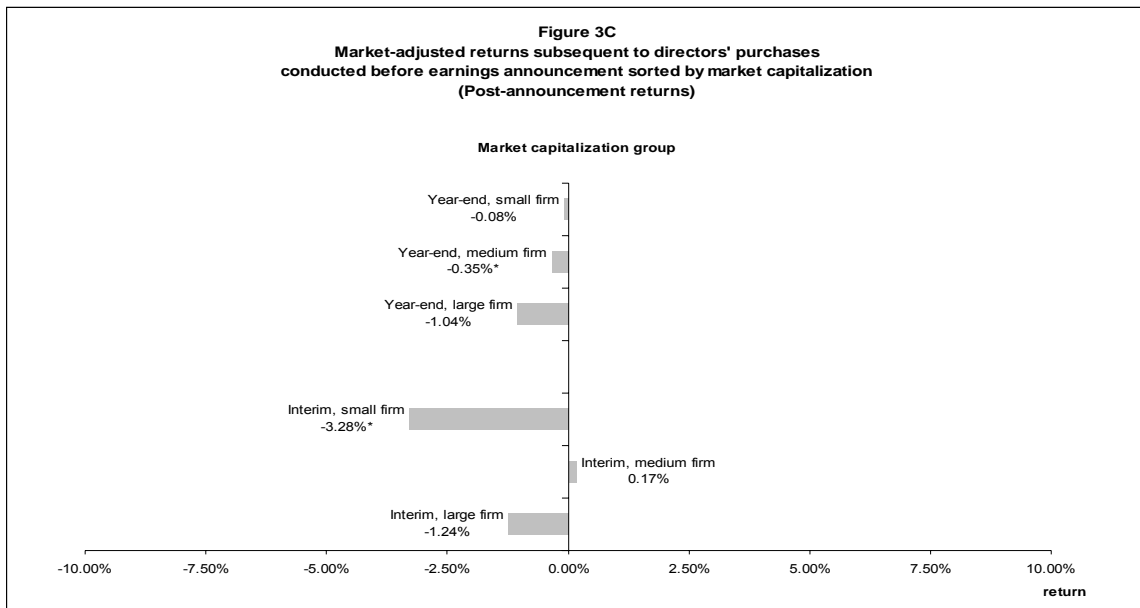
- 6.9. Figures 2C and 2D report post-announcement abnormal returns for dealings conducted before results announcements, stratified by timing of dealings. Again, the post-announcement period refers to the 14-day holding period after the earnings result comes out.
- 6.10. Based on post-announcement abnormal returns, regardless of timing of dealings, directors do not outperform the market from their purchases. However, directors who sell shares will outperform the market. During the sample period, the directors outperform the market in the 14-day holding period when they sell shares within 3~4 months before year-end results announcements (7.76%) and within 2~3 months before half-year results announcements (2.55%).



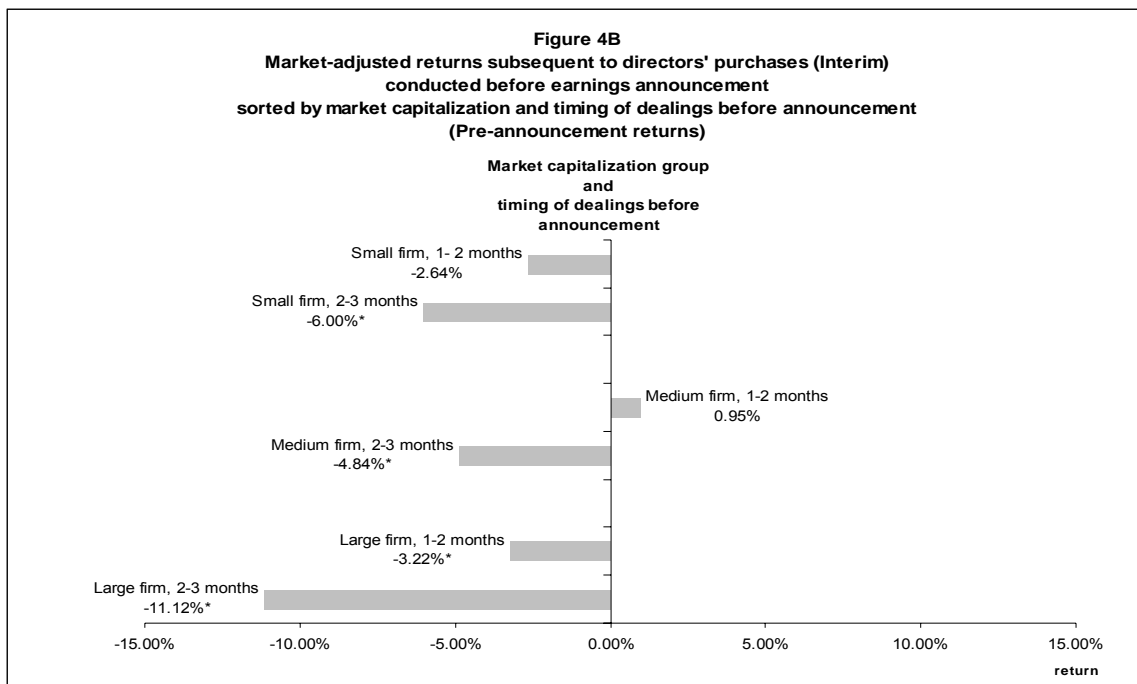
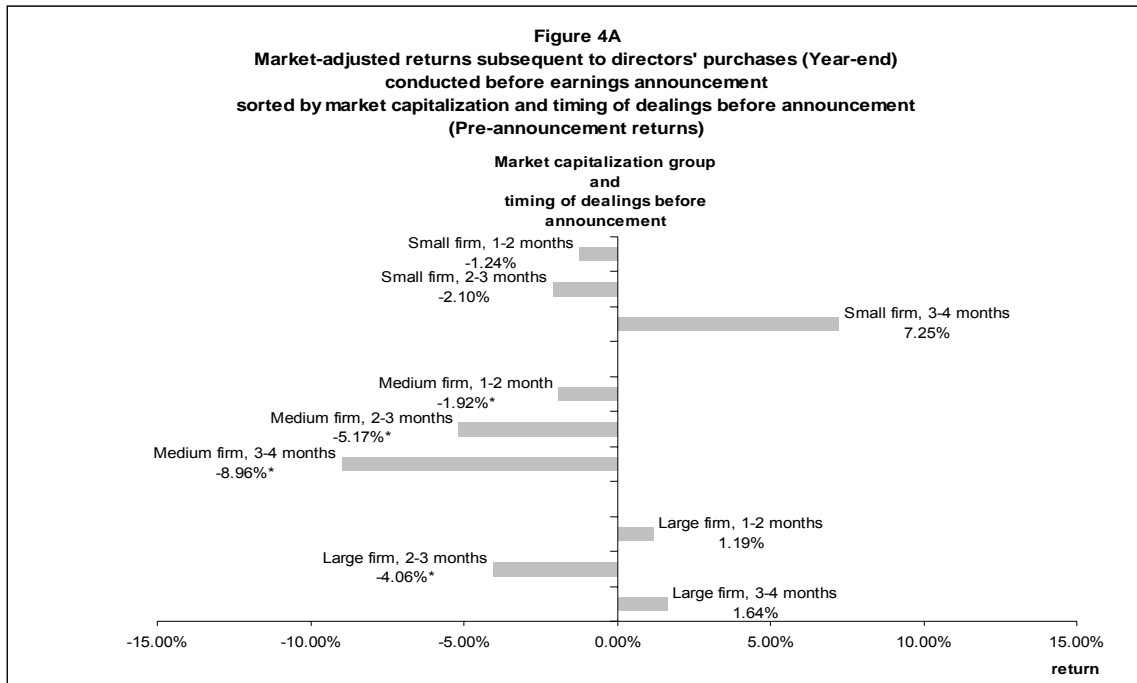
- 6.11. Figures 3A and 3B report pre-announcement abnormal returns for dealings preceding results announcements, stratified by the firm size.
- 6.12. Based on pre-announcement abnormal returns, there is no significant evidence that directors outperform the market from purchases or sales, regardless of the firm size.



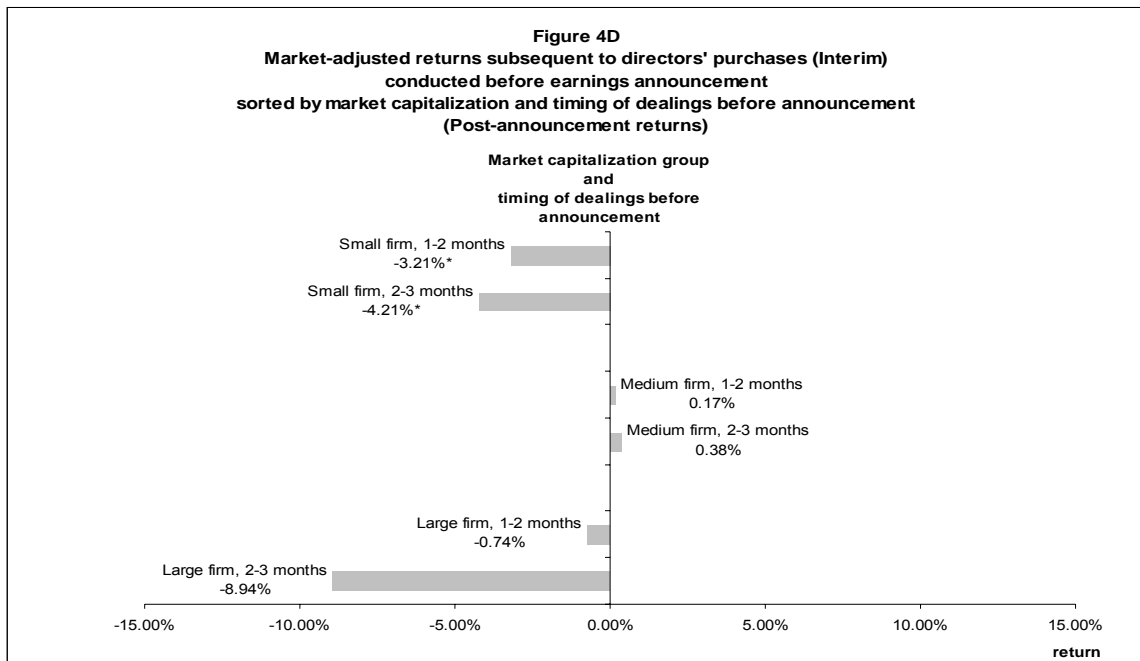
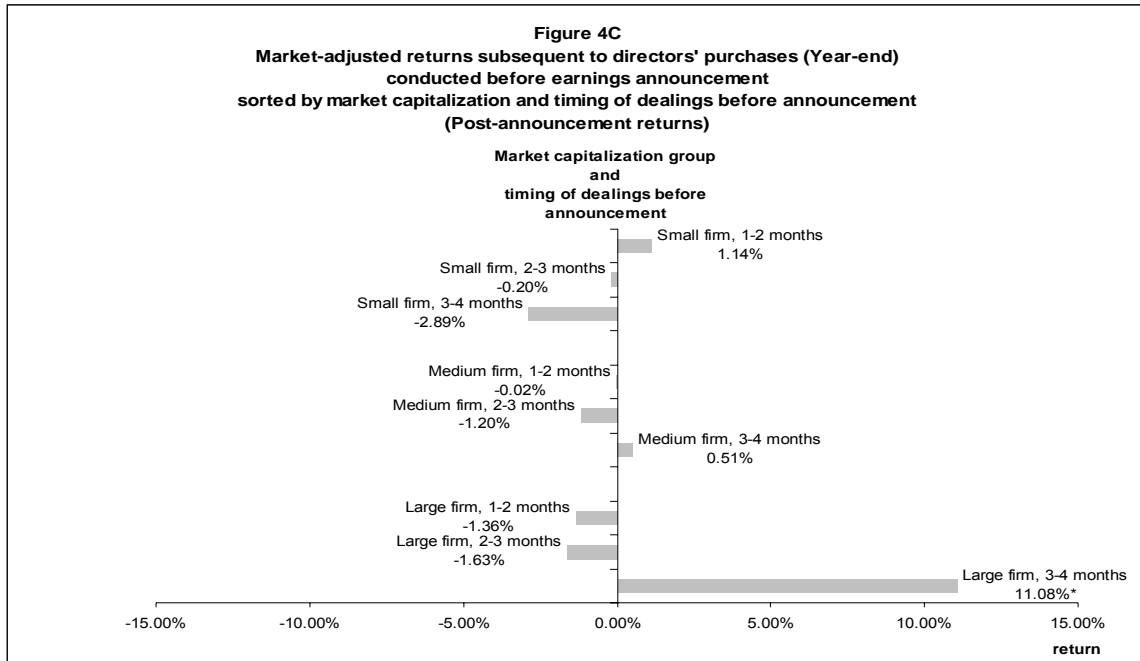
- 6.13. Figures 3C and 3D report post-announcement abnormal returns for dealings preceding results announcements, stratified by the firm size. Again, the post-announcement period refers to the 14-day period after the earnings result comes out.
- 6.14. Based on post-announcement abnormal returns, there is no consistent evidence that directors are able to profit from their purchases, regardless of the firm size. However, directors of some firms will outperform the market when selling shares of their companies. During the sample period, directors of small firms outperform the market in that 14-day holding period when they sell shares before year-end results announcements (5.61%) as well as before half-year results announcements (3.07%).



- 6.15. Figures 4A and 4B report pre-announcement abnormal returns for directors' purchases that precede results announcements, stratified by firm size and timing of dealings before the results announcement.
- 6.16. Based on pre-announcement abnormal returns, there appears to be an economically large return for purchases in small firms occurring within 3~4 months before year-end results announcements (7.25%). However, the return estimate is not statistically significant.

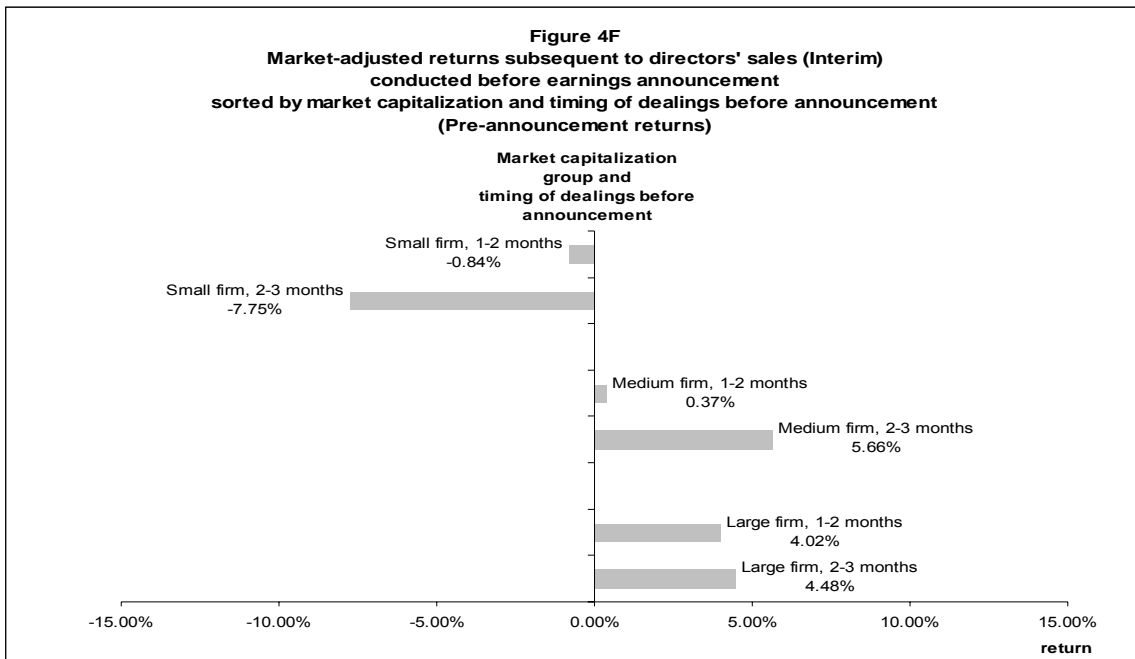
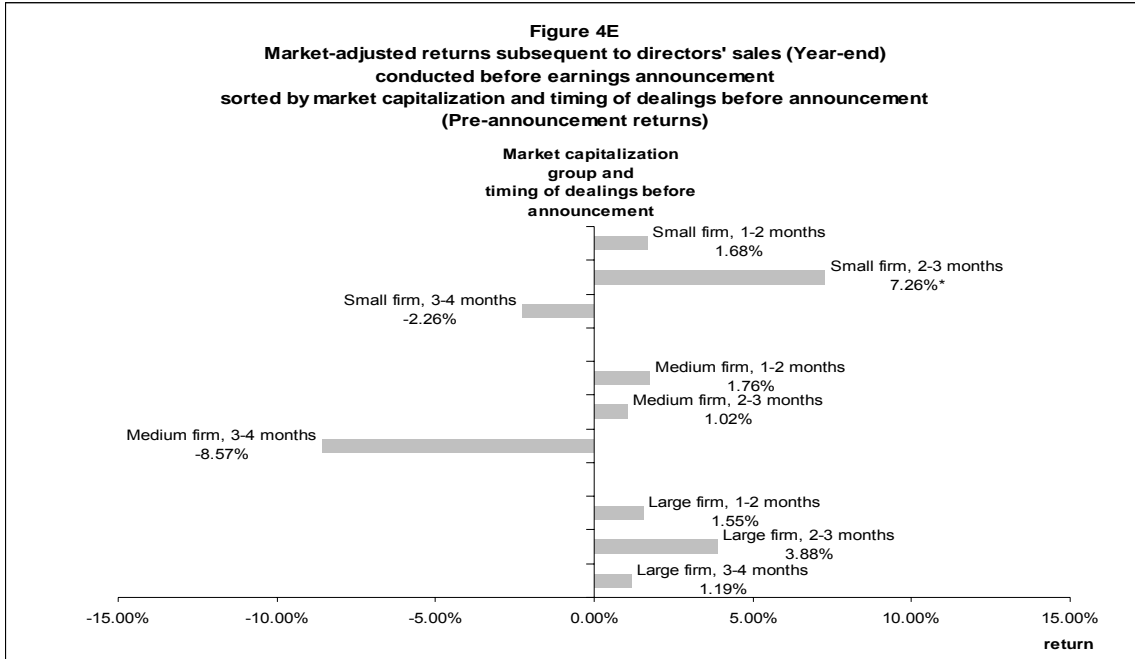


- 6.17. Figures 4C and 4D report post-announcement abnormal returns for directors' purchases that precede results announcements, stratified by the firm size and timing of dealings before the announcement.
- 6.18. Based on post-announcement abnormal returns, there appears to be an economically large return for purchases in large firms occurring within 3~4 months before year-end results announcements (11.08%). However, as shown in Table 4-1 (Panel B), there are only 25 observations and therefore the result might not be reliable.

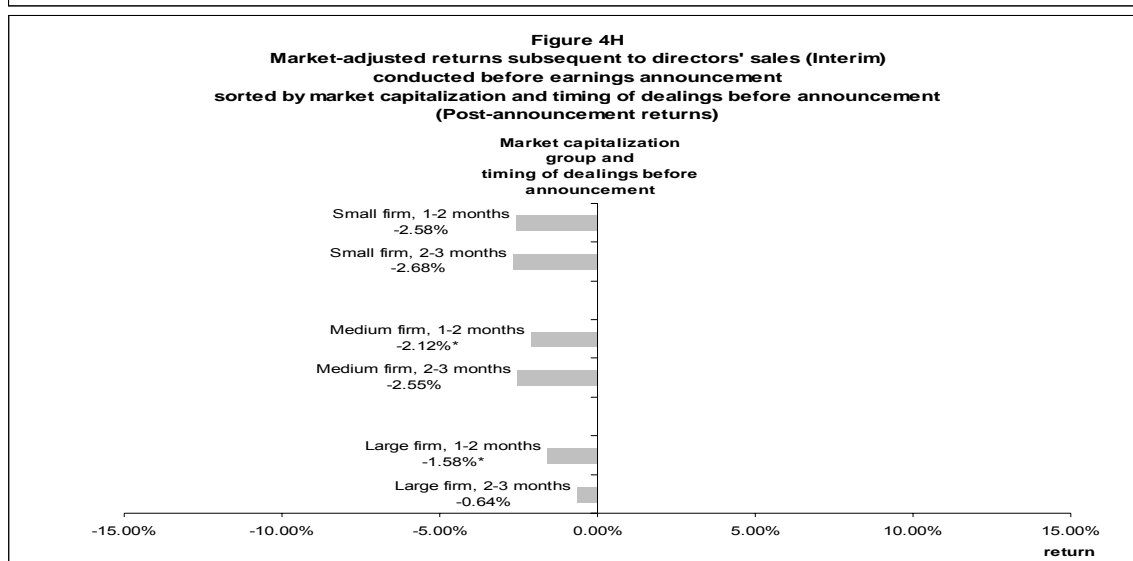
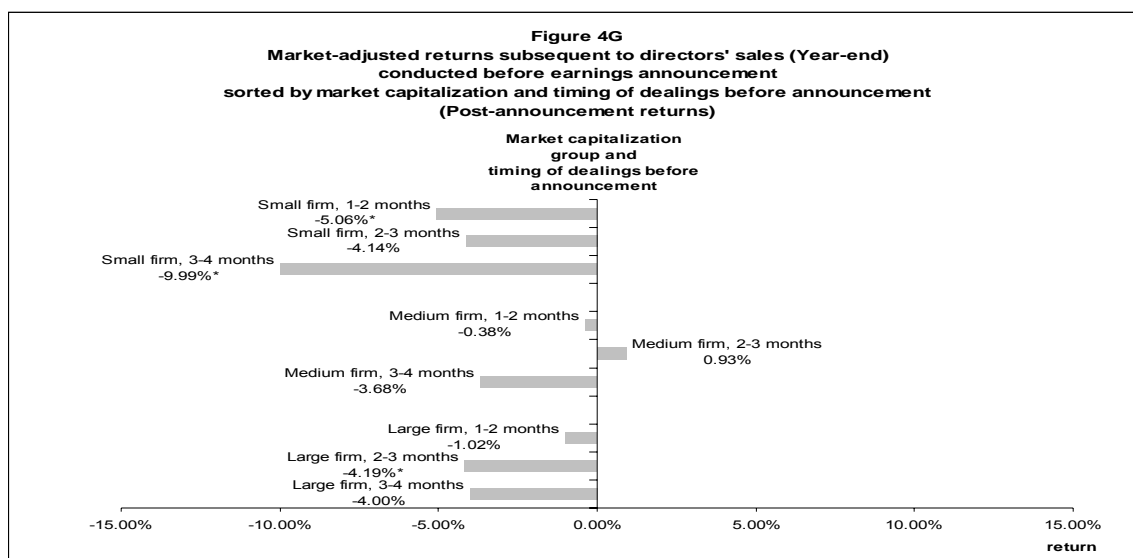


6.19. Figures 4E and 4F report pre-announcement abnormal returns for directors' sales that precede results announcements, stratified by firm size and timing of dealings before the announcement.

6.20. It appears that directors outperform the market when (i) selling shares of medium size firms within 3~4 months before year-end results announcements (8.57%), and (ii) selling shares of small firms within 2~3 months before half-year results announcements (7.75%). However, both abnormal return estimates are not statistically significant.

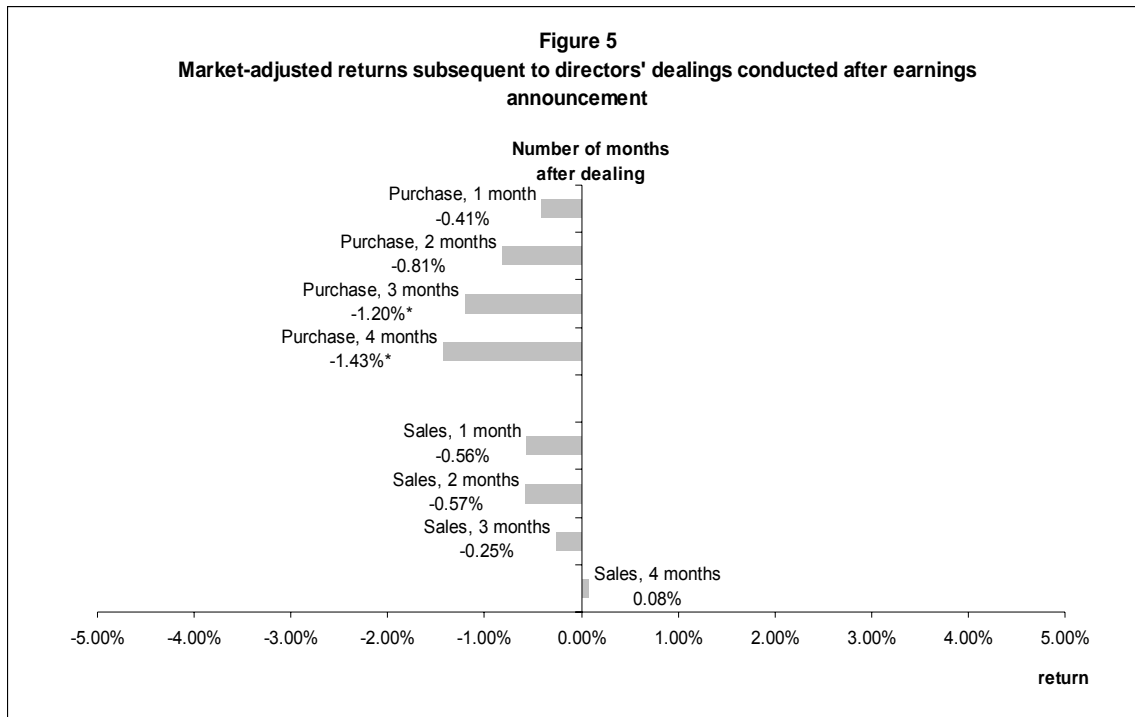


- 6.21. Figures 4G and 4H report post-announcement abnormal returns for directors' sales that precede results announcements, stratified by the firm size and timing of dealings before the announcement.
- 6.22. Based on post-announcement abnormal returns, there are statistically and economically significant returns for some directors in selling shares of their companies. During the sample period, directors of small firms outperform the market when selling shares, with outperformance of 5.06%, 4.14% and 9.99% for sales occurring within 1~2 months, 2~3 months, and 3~4 months before year-end results announcements, and two of the three abnormal return estimates are statistically significant.
- 6.23. While abnormal returns in the post-announcement period are significantly negative for directors' sales in large firms, they are easily offset by the positive abnormal returns in the pre-announcement period (Figures 4E and 4F).

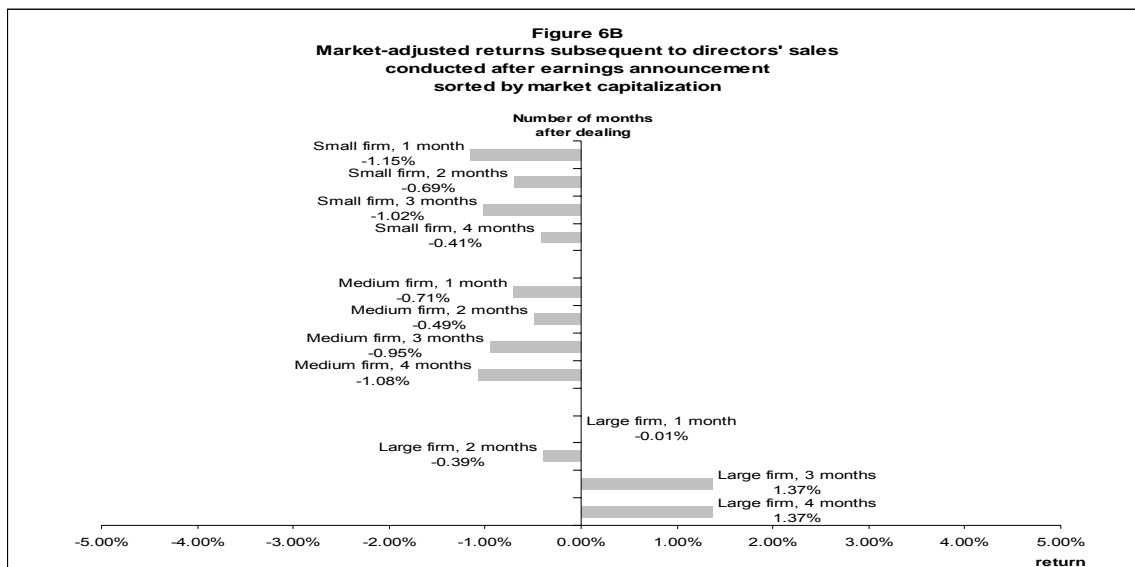
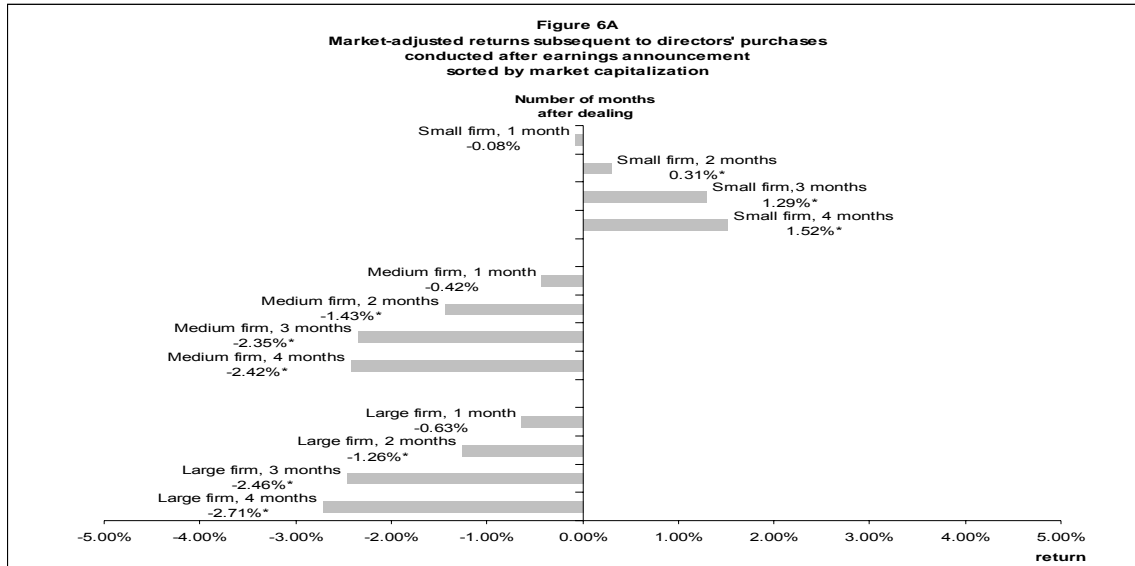


Dealings after results announcements

- 6.24. We now turn to the analysis of dealings that do not precede results announcements. In other words, the dealings occur after the previous results announcement, and well in advance of the next announcement (more than 4 months ahead of year-end results announcement and more than 3 months ahead of half-year results announcement).
- 6.25. Figure 5 reports the abnormal stock price performance subsequent to directors' dealings that do not precede results announcements, including cumulative market-adjusted returns in the 30-day, 60-day, 90-day and 120-day holding periods.
- 6.26. There is no significant evidence that directors outperform the market from their purchases or sales, regardless of the length of the holding period. In fact, the cumulative market-adjusted returns to purchases are negative, suggesting that directors underperform the market when purchasing additional shares of their companies.



- 6.27. Figures 6A and 6B report the abnormal stock price performance subsequent to directors' dealings that do not precede results announcements, stratified by the firm size.
- 6.28. While there are statistically significant abnormal returns to directors' purchases for small firms (1.29% for a 3-month holding period and 1.52% for a 4-month period), they are small in terms of economic significance.



6.29. The cumulative abnormal returns to directors' sales in small firms also appear to be insignificant. However, we find that the market-adjusted return estimates, as reported in Figures 6A and 6B, are generally lower than the risk-adjusted return estimates for small firms (Table 6 of the Appendix). One reason is that small firms generally have beta estimates higher than one (higher risk relative to the market). Since the 2003-08 period is during an upward market trend (positive market returns), the risk-adjusted return as calculated according to Equation (1) will be lower than the market-adjusted return.

6.30. Table 6 of the Appendix shows that on a risk-adjusted basis, the cumulative abnormal returns are -2.51%, -3.59%, -4.03%, -5.09% for holding periods of 1 month, 2 months, 3 months, and 4 months, and all return estimates are statistically significant. Therefore, once we take into account of the risk, it is deemed that directors of small firms outperform the market even when their sales do not precede results announcements.

7. Conclusion

- 7.1. This study examines the stock price performance subsequent to directors' dealings in Hong Kong in the 2003-2008 period. We find that directors do not deal in securities of their companies more often before results announcements than after. During the sample period, only 30% of directors' dealings are before results announcements.
- 7.2. Directors are more likely to purchase their company shares rather than to sell. During the sample period, approximately 75% of directors' dealings are purchases, and only 25% are sales.
- 7.3. We find that directors' purchases are not information-motivated; there is no positive abnormal price movement subsequent to directors' purchases. On the other hand, directors' sales contain relevant information. On average, there is a negative abnormal return of around 2% in the post-announcement period (a 14-day period after the earnings results come out) for the company in which the directors sell shares preceding the announcement. This implies that directors will outperform the market by 2% in the post-announcement period when they sell their company shares prior to the announcement.
- 7.4. The abnormal price performance subsequent to the directors' sales comes mostly from small firms. There are negative abnormal returns of around 3% - 5% in the post-announcement period for the small firms in which the directors sell shares before the results announcement. The abnormal price performance is observed not only for sales that take place closer to the results announcement. In fact, we find negative abnormal returns for sales occurring within 1~2 months, 2~3 months, as well as 3~4 months before the results announcement.
- 7.5. There is also abnormal price performance subsequent to the directors' sales that do not precede the results announcement, with the results again stronger for small firms. However, the evidence is not as strong as those for the directors' sales that precede the results announcement.
- 7.6. Overall, our evidence is consistent with previous studies that directors' dealings contain relevant information. However, our additional evidence shows that (i) the abnormal price performance is observed mostly for small firms and for directors' sales (rather than director's purchases); (ii) the abnormal price performance is observed even for sales occurring within 3~4 months before the results announcement and also for sales not preceding the results announcement.
This raises the question on whether by only extending the black out period, this will be effective in disallowing any abuse of insider information, especially for small companies.

APPENDIX

Table 1						
Panel A: Abnormal returns subsequent to directors' dealings conducted before the earnings announcement, with returns calculated from the date of directors' dealings to the date of earnings announcement.						
	Type of announcement	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
			Mean	Median	Mean	Median
Purchases	Year-end	2034	-1.21%	-1.85%*	0.97%	0.52%
	Half-year	1642	-1.41%	-2.09%*	-0.77%	-0.89%
Sales	Year-end	668	3.34%*	1.07%	0.37%	0.25%
	Half-year	451	0.41%	0.80%	-3.08%	-1.21%
Panel B: Abnormal returns in the 14-day period subsequent to the earnings announcement when directors deal in company shares before the earnings announcement.						
	Type of announcement	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
			Mean	Median	Mean	Median
Purchases	Year-end	2034	0.02%	-0.60%	1.23%*	0.50%*
	Half-year	1642	0.18%	-0.97%*	0.25%	-1.05%*
Sales	Year-end	667	-1.69%*	-1.93%*	-1.94%*	-3.16%*
	Half-year	450	-2.95%*	-1.85%*	-3.44%*	-3.12%*

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 2							
Panel A Abnormal returns subsequent to directors' dealings conducted before the earnings announcement, stratified by timing of dealings. Returns are calculated from the date of directors' dealings to the date of earnings announcement,							
	Type of announcement	Timing of dealings (# months before announcement)	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Purchases	Year-end	1~2	945	-1.62%	-0.68%	-0.38%	0.59%
		2~3	750	-2.38%	-3.83%*	0.64%	-0.23%
		3~4	317	2.88%	-2.08%	5.97%	1.99%
Purchases	Half-year	1~2	1062	-0.06%	-0.51%	-0.03%	-0.39%
		2~3	477	-4.20%	-5.67%*	-2.22%	-1.51%*
Sales	Year-end	1~2	283	2.72%	1.74%	0.83%	0.35%
		2~3	262	5.76%*	3.44%*	0.90%	1.18%
		3~4	91	-0.42%	-3.65%	-2.14%	1.32%
Sales	Half-year	1~2	283	0.91%	1.27%	-3.08%	-1.40%
		2~3	127	0.18%	3.71%	-3.64%	-0.92%
Panel B Abnormal returns in the 14-day period subsequent to the earnings announcement when directors deal in company shares before the earnings announcement, stratified by timing of dealings.							
	Type of announcement	Timing of dealings (# months before announcement)	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Purchases	Year-end	1~2	945	0.10%	-0.56%	0.87%	0.24%
		2~3	750	-0.58%	-0.71%	1.12%	0.77%
		3~4	317	1.18%	0.16%	2.64%	1.55%*
Purchases	Half-year	1~2	1062	0.07%	-0.79%*	0.00%	-0.96%*
		2~3	477	0.71%	-2.00%	1.12%	-1.30%
Sales	Year-end	1~2	283	-2.16%	-1.84%*	-2.50%*	-3.53%*
		2~3	262	0.21%	-1.82%	-0.23%	-1.39%
		3~4	91	-6.50%*	-7.76%*	-6.05%*	-4.58%*
Sales	Half-year	1~2	283	-2.65%*	-1.73%*	-3.44%*	-2.13%*
		2~3	127	-3.90%*	-2.55%*	-4.28%*	-3.57%*

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 3							
Panel A Abnormal returns subsequent to directors' dealings conducted before the earnings announcement, stratified by firm size. Returns are calculated from the date of directors' dealings to the date of earnings announcement.							
	Type of announcement	Firm size	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Purchases	Year-end	Small	794	2.84%	-0.09%	3.81%*	0.85%
		Medium	892	-4.72%*	-3.47%*	-1.49%	-0.12%
		Large	316	-2.57%	-1.33%	0.13%	0.76%
Purchases	Half-year	Small	752	-0.74%	-3.50%*	-2.37%	-2.03%*
		Medium	743	-0.97%	0.38%	1.56%	1.03%
		Large	120	-7.90%*	-2.96%*	-5.93%*	-4.51%*
Sales	Year-end	Small	253	6.80%*	1.72%	-1.11%	-2.58%
		Medium	211	-1.42%	0.32%	-0.40%	2.54%
		Large	203	3.95%	2.01%	3.02%	2.60%
Sales	Half-year	Small	127	-4.26%	-1.32%	-11.62%*	-4.24%
		Medium	225	2.71%	0.80%	0.81%	-1.2%
		Large	97	0.92%	4.02%	-1.07%	-0.58%
Panel B Abnormal returns in the 14-day period subsequent to the earnings announcement when directors deal in company shares before the earnings announcement, stratified by firm size.							
	Type of announcement	Firm size	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Purchases	Year-end	Small	794	1.30%	-0.08%	2.19%*	1.16%*
		Medium	892	-0.19%	-0.35%*	1.38%*	0.37%
		Large	316	-2.44%*	-1.04%	-1.21%	-0.65%
Purchases	Half-year	Small	752	-2.19%*	-3.28%*	-2.72%*	-3.15%*
		Medium	743	2.69%*	0.17%	3.15%*	0.41%
		Large	120	-0.35%	-1.24%	0.62%	-0.4%
Sales	Year-end	Small	253	-4.93%*	-5.61%*	-6.49%*	-6.46%*
		Medium	211	2.14%	-0.38%	3.04%*	1.27%
		Large	203	-1.65%	-2.42%*	-1.42%	-3.52%*
Sales	Half-year	Small	127	-3.25%	-3.07%*	-4.37%*	-4.39%*
		Medium	225	-3.14%*	-2.12%*	-3.29%*	-2.15%*
		Large	97	-2.22%	-0.89%*	-2.70%*	-1.72%

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 4-1							
Panel A Abnormal returns subsequent to directors' purchases conducted before the earnings announcement, stratified by firm size and timing of dealings. Returns are calculated from the date of directors' purchases to the date of earnings announcement.							
	Firm size	Timing of purchases (# months before earnings announcement)	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Year-end	Small	1~2	361	-0.53%	-1.24%	-0.54%	-1.03%
	Small	2~3	267	1.42%	-2.10%	2.89%	1.13%
	Small	3~4	153	13.77%*	7.25%	16.13%*	6.02%*
	Medium	1~2	401	-3.43%*	-1.92%*	-1.19%	0.51%
	Medium	2~3	345	-4.83%*	-5.17%*	-0.58%	-0.53%
	Medium	3~4	139	-8.24%*	-8.96%*	-4.54%	-6.07%
	Large	1~2	162	-0.55%	1.19%	1.20%	3.68%
	Large	2~3	127	-5.28%*	-4.06%*	-1.64%	-0.82%
	Large	3~4	25	-1.94%	1.64%	2.23%	-0.15%
Half-year	Small	1~2	466	0.27%	-2.64%	-1.71%	-1.28%
	Small	2~3	229	-2.14%	-6.00%*	-3.55%	-4.31%*
	Medium	1~2	485	0.86%	0.95%	2.46%*	1.17%
	Medium	2~3	220	-4.94%*	-4.84%*	-0.20%	0.61%
	Large	1~2	91	-6.01%*	-3.22%*	-5.05%	-4.92%*
	Large	2~3	21	-18.99%	-11.12%*	-11.9%	-3.34%

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 4-1							
Panel B Abnormal returns in the 14-day period subsequent to the earnings announcement when directors purchase company shares before the earnings announcement, stratified by firm size and timing of dealings.							
	Firm size	Timing of purchases (# months before earnings announcement)	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Year-end	Small	1~2	361	2.56%*	1.14%	3.04%*	2.42%*
	Small	2~3	266	0.91%	-0.20%	2.28%	1.15%
	Small	3~4	153	-0.96%	-2.89%	0.14%	0.57%
	Medium	1~2	401	-0.88%	-1.20%	0.23%	-0.36%
	Medium	2~3	345	-0.51%	-0.02%	1.47%	1.94%
	Medium	3~4	139	2.62%	0.51%	4.62%*	2.73%
	Large	1~2	162	-2.73%	-1.36%	-1.93%	-2.40%
	Large	2~3	127	-3.85%	-1.63%	-1.92%	-0.65%
	Large	3~4	25	6.26%	11.08%*	6.96%*	10.63%*
Half-year	Small	1~2	466	-1.96%*	-3.21%*	-2.74%*	-3.15%*
	Small	2~3	229	-3.10%*	-4.21%*	-3.07%*	-5.13%*
	Medium	1~2	484	2.23%*	0.17%	2.60%*	0.51%
	Medium	2~3	220	4.71%*	0.38%	5.28%*	1.00%
	Large	1~2	91	-0.77%	-0.74%	0.07%	-0.40%
	Large	2~3	21	0.09%	-8.94%	2.13%	-4.87%

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 4-2

Panel A Abnormal returns subsequent to directors' sales conducted before the earnings announcement, stratified by firm size and timing of dealings. Returns are calculated from the date of directors' sales to the date of earnings announcement.

	Firm size	Timing of sales (# months before earnings announcement)	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Year-end	Small	1~2	102	1.53%	1.68%	-3.15%	-3.46%
	Small	2~3	91	12.66%*	7.26%*	0.29%	-2.62%
	Small	3~4	47	9.44%	-2.26%	1.04%	-1.53%
	Medium	1~2	79	3.06%	1.76%	3.46%	4.64%
	Medium	2~3	92	-1.03%	1.02%	-0.74%	1.60%
	Medium	3~4	31	-14.71%	-8.57%	-9.63%	-5.62%
	Large	1~2	102	3.66%	1.55%	2.81%	2.27%
	Large	2~3	79	5.74%	3.88%	3.52%	4.31%
	Large	3~4	13	-1.94%	1.19%	4.24%	8.73%
Half-year	Small	1~2	81	-0.90%	-0.84%	-10.03%	-3.59%
	Small	2~3	25	-14.84%	-7.75%	-24.10%	-7.49%
	Medium	1~2	133	1.54%	0.37%	0.09%	-1.24%
	Medium	2~3	77	5.30%	5.66%	2.17%	-0.64%
	Large	1~2	69	1.83%	4.02%	-0.94%	-0.66%
	Large	2~3	24	-1.95%	4.48%	-1.87%	-0.33%

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 4-2

Panel B Abnormal returns in the 14-day period subsequent to the earnings announcement when directors sell company shares before the earnings announcement, stratified by firm size and timing of dealings.

	Firm size	Timing of sales (# months before earnings announcement)	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Year-end	Small	1~2	102	-5.47%*	-5.06%*	-7.11%*	-6.82%*
	Small	2~3	91	-2.68%	-4.14%	-4.74%*	-6.36%*
	Small	3~4	47	-9.07%*	-9.99%*	-9.91%*	-7.03%*
	Medium	1~2	79	1.54%	-0.38%	2.12%	0.82%
	Medium	2~3	92	4.45%	0.93%	5.05%*	1.97%*
	Medium	3~4	31	-3.73%	-3.68%	-1.49%	-2.66%
	Large	1~2	102	-1.71%	-1.02%	-1.48%	-2.59%
	Large	2~3	79	-1.4%	-4.19%*	-1.19%	-4.76%*
	Large	3~4	13	-3.83%	-4.00%	-2.95%	-3.86%
Half-year	Small	1~2	81	-2.04%	-2.58%	-3.82%	-4.39%
	Small	2~3	25	-4.67%	-2.69%	-6.20%*	-3.57%*
	Medium	1~2	133	-3.00%*	-2.12%*	-3.27%*	-2.10%*
	Medium	2~3	77	-4.51%*	-2.55%*	-4.62%*	-3.26%*
	Large	1~2	69	-2.68%	-1.58%*	-3.34%*	-3.12%*
	Large	2~3	24	-1.67%	-0.64%	-1.71%	0.43%

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 5						
Abnormal returns in the 1- to 4-month holding periods subsequent to directors' dealings not preceding earnings announcements.						
	Returns subsequent to dealings	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
			Mean	Median	Mean	Median
Purchases	1-month	8874	0.49%	-0.41%	0.87%*	0.02%
	2-month	8874	0.11%	-0.81%	0.90%*	-0.01%
	3-month	8874	-0.33%	-1.20%*	0.74%	-0.07%
	4-month	8874	-0.47%	-1.43%*	0.87%	0.38%
Sales	1-month	2680	0.27%	-0.56%	-1.07%*	-1.43%*
	2-month	2680	0.03%	-0.57%	-2.36%*	-2.30%*
	3-month	2680	-0.60%	-0.25%	-3.71%*	-2.89%*
	4-month	2680	-0.72%	0.08%	-4.09%*	-3.01%*

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)

Table 6							
Abnormal returns in the 1- to 4-month holding periods subsequent to directors' purchases not preceding earnings announcements, stratified by firm size							
	Firm size	Returns subsequent to purchases	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Purchases	Small	1-month	3036	1.81%*	-0.08%	0.48%	-0.93%
	Small	2-month	3036	3.37%*	0.31%*	0.73%	-0.63%
	Small	3-month	3036	4.49%*	1.29%*	0.56%	-0.7%
	Small	4-month	3036	5.21%*	1.52%*	0.27%	-0.19%
	Medium	1-month	3929	0.15%	-0.42%	1.16%*	0.57%*
	Medium	2-month	3929	-1.26%*	-1.43%*	0.94%	0.36%
	Medium	3-month	3929	-2.67%*	-2.35%*	0.60%	0.01%
	Medium	4-month	3929	-3.12%*	-2.42%*	1.12%	0.73%
	Large	1-month	1817	-0.77%	-0.63%	1.07%	0.36%
	Large	2-month	1817	-2.18%*	-1.26%*	1.17%	0.67%*
	Large	3-month	1817	-3.13%*	-2.46%*	1.40%	0.68%
	Large	4-month	1817	-3.87%*	-2.71%*	1.42%	0.80%
Abnormal returns in the 1- to 4-month holding periods subsequent to directors' sales not preceding earnings announcements, stratified by firm size							
	Firm size	Returns subsequent to sales	# of obs	Cumulative market-adjusted returns		Cumulative risk-adjusted returns	
				Mean	Median	Mean	Median
Sales	Small	1-month	746	0.70%	-1.15%	-1.16%	-2.51%*
	Small	2-month	746	1.37%	-0.69%	-2.17%	-3.59%*
	Small	3-month	746	0.99%	-1.02%	-3.96%*	-4.03%*
	Small	4-month	746	1.60%	-0.41%	-4.23%	-5.09%*
	Medium	1-month	1098	-0.24%	-0.71%	-1.58%*	-2.04%*
	Medium	2-month	1098	-0.49%	-0.49%	-2.76%*	-2.10%*
	Medium	3-month	1098	-1.76%	-0.95%	-4.38%*	-3.92%*
	Medium	4-month	1098	-2.78%*	-1.08%	-5.11%*	-3.32%*
	Large	1-month	828	0.60%	-0.01%	-0.28%	-0.50%
	Large	2-month	828	-0.45%	-0.39%	-2.01%*	-1.57%*
	Large	3-month	828	-0.46%	1.37%	-2.57%*	-1.07%*
	Large	4-month	828	0.06%	1.37%	-2.50%*	-0.89%*

*denotes statistical significance at 0.1% (mean returns based on t-test and median returns based on non-parametric signed-rank test)