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Abstract

Armed with superior information and investment expertise, institutional investors often demonstrate the herding effect on individual investors in their stock trading in emerging markets. This paper aims to (1) investigate the impact of institutional net buys/sells on returns in the Taiwan stock index futures market and examine the price impact asymmetry between net buys and net sells; (2) explore the price impact asymmetry between foreign and domestic institutions. A dummy variables model is introduced to distinguish between individual institutional net buys/sells and simultaneous net buys/sells for all institutions and lagged variables are introduced to address these two different issues in the literature; (3) examine the returns for the strategy of individual investors taking a long position on trading day following large institutional net buys. The results show that (1) the impacts of large net buys/sells on contemporaneous returns are more significant than those of small net buys/sells; (2) large net buys of institutional investors seem to reveal bullish message and have more significant impacts on subsequent returns than net sells and small net buys, an asymmetric impact on subsequent returns exists between large net buys and large net sells, which also holds between large net buys and small net buys; (3) net buys of foreign institutional investors have larger impacts on subsequent returns than those of the domestic institutional investors, price impact asymmetry of net buys exists between foreign and domestic institutions and foreign institutions seem to perform the best; (4) institutional large net buys, especially those of foreign institutions, provide valuable information for enhancing the performance of individual investors.

Keywords: net buys/sells, institutional investors, price impact asymmetry.
JEL Classification: G00, G23.

Introduction

There are three major groups of professional institutional investors in the Taiwan securities market: foreign investors, security investment trust companies, and security dealers. Due to economies of scale, and armed with rich capital, investment expertise, experience and skills, these professional institutional investors are often viewed as informed traders who are good at information collection and interpretation and enjoy higher payoffs. The investment strategies of these institutional investors are always thought of as influencing market prices. The net buying and selling information of these institutional investors always receives great attention from the public media and individual investors. The net buys/sells of foreign institutional investors are often regarded as a balloon indicator for a bullish or bearish market in Taiwan. To get higher payoffs, individual investors often take advantage of information on the net buys/sells of institutional investors and follow their investment strategies.

Numerous studies (e.g., Nofsinger and Sias 1999; Wermers, 1999; Cai, Kaul, and Zheng, 2000; Sias, Starks, and Titman, 2001, 2006; Griffin, Harris, and Topaloglu, 2003; Bennett, Sias, and Starks, 2003) have found evidence of a positive relationship between institutional transactions and contemporaneous stock prices. Some studies documented that

institutional trades have a larger permanent price impact (Chan and Lakonishok, 1993; Chan and Lakonishok, 1995; Bozcuk and Lasfer; 2005; Sias et al., 2006). The information hypothesis, one explanation for these effects, posits that institutional investors, due to economies of scale, may be better informed than individual investors. If institutional trading conveys private information to the market, then their trading will affect prices. Consistent with the information hypothesis, a number of studies (Bartov et al., 2000; Dennis and Weston, 2000; O'Neill and Swisher, 2003) find evidence that institutions are better informed traders. Additionally, some studies report that the buy trades of informed traders are likely to convey more information than the sell trades, and suggest that large trades will have more price effect than small trades. That is, the impacts of buy and sell trades are asymmetric, and so are the impacts of large and small trades (Keim and Madhavan, 1996; Chan and Lakonishok, 1993; and Bozcuk and Lasfer, 2005).

Another issue addressed in the literature is the information asymmetry between foreign and domestic institutional investors. The question of who has the information advantage is controversial. Some studies suggest that foreign investors may have an information advantage because they have superior investment experience and expertise (see, for example, Froot and Ramadorai, 2001; Hamao and Mei, 2001; Seasholes, 2004; Grinblaat and Keloharju, 2000; Froot, O'Connel, and Seasholes, 2001; and Karolyi, 2002). Several other studies, however,

demonstrate that domestic investors have an advantage because the information does not have to travel across physical, linguistic, or cultural boundaries (see, Brennan and Cao, 1997; Shukla and van Inwegen, 1995; Chiao and Lin 2004; Choe, Kho, and Stulz, 2005; Hau, 2001; Dvořák, 2005; and Parwada et al., 2007).

Although several studies address these issues with respect to the Taiwan stock market, few works focus on the futures market and no study explores the relationship between net buys and sells for institutional investors and returns on the stock index futures because of the limitations of source data. Many studies suggest that price discovery in stock index futures markets is more significant than in stock spot markets, including Kawaller et al. (1987), Stoll and Whaley (1990), Chan (1992), Abhyanker (1995), Shyy et al. (1996), and Min and Najand (1999), Booth et al. (1999). These results imply that new information transits into the futures markets first and then proceeds to the spot markets. However, some studies find evidence of a bi-direction causal relation between stock index futures prices and stock spot prices (Chatrath et al., 2002; and Min and Najand, 1999). These results suggest that regardless of whether a feedback mechanism between a stock index futures market and spot market exists, we can plausibly predict a significant relationship, as suggested in stock markets, between institutional transactions and stock index futures prices or returns.

This paper explores these issues for the stock index futures market in Taiwan and simultaneously addresses two different streams in the literature. In detail, the purposes of this paper are: (1) to examine whether institutional net buys/sells actually reveal bullish or bearish messages, and explore the price asymmetry responses of net buys and sells. We also explore the market price response to different sizes of net buys/sells; (2) investigate the price impact asymmetry between foreign and domestic institutions. Additionally, this paper explores the value of the information in institutional net buys/sells for individual investors. First, we examine the impacts of the three types of institutional net buys/sells on the contemporaneous and subsequent stock index futures returns, by examining the significance of returns on (after) the institutional net buys/sell date. Next, we investigate the effect of different sizes of net buys and sells. Finally, we examine whether significant positive returns exist for the strategy of taking a long position in the Taiwan stock index futures contracts on the day after the signals of institutional large net buys appear, to explore whether the large net buys information can improve the investment performance of individual investors.

We construct a dummy variables model with two designs. First, we split these institutions into three categories to distinguish between the transactions of specific institutions and simultaneous net buys/sells for all of the institutions. This design enables us to deeply explore the price impact of different institutional net buys/sells compositions and investigate the price asymmetry impact for net buys and sells. Additionally, the model can accurately investigate the price impact asymmetry between foreign and domestic institutional investors, since various combinations of institutional net buys/sells can be identified. Since the respective (simultaneous) net buys/sells reflect the heterogeneity (homogeneity) of information or economic analysis among the three institutional investors, the approach we construct can accurately explore the differing price impacts among institutional investors. Another design element introduces lagged variables into the model to conveniently examine the price changes or returns for various holding periods and explore the permanent price impact.

The main results of this study indicate: (1) no evidence of a significant relationship between contemporaneous returns and single institutional net buys/sells for the three types of investors, regardless of the magnitudes of the trades. However, this paper suggests a significant relationship between contemporaneous returns and various types of large simultaneous net buys/sells from the three institutional investors, with the exception of net buys for both foreigners and trust investment companies. The impacts of large net buying and selling on contemporaneous returns are, in general, more significant than small net buys/sells. (2) In terms of the relationship between subsequent returns and net buys/sells, a significant price increase seems to exist after net buys by foreign institutional investors only. Foreign institutions are likely to have a stronger impact than domestic institutions; a price impact asymmetry exists between foreign and domestic institutional investors. (3) Two types of large net buys seem to convey a bullish message: the net buys for foreigners only and simultaneous net buys for all three institutions. The returns for the strategy of taking a long position on the day after a signal of large net buys for these two buys are significantly positive. (4) We find some evidence of a significant relationship between negative subsequent returns and the large net sells from foreigners only, but no evidence for other types of net sells. In other words, except for foreigners, we find no evidence indicating that large institutional net

sells reveal a bearish message. (5) The price impact of institutional net buys is stronger than that of net sells. Asymmetric effects between net buys and net sells, in general, seem to exist for subsequent returns.

The rest of this paper is organized as follows. Section 1 describes data sources and methodology. Section 2 reports empirical results. The final section concludes this paper.

1. Data and methodology

The sample period covers 2002 to 2008 (June). The daily settlement (open) price of stock index futures and net buys/sells of institutional investors on nearby stock index futures contracts are retrieved from the Taiwan futures exchange (TAIFEX)[1]. The daily returns on stock index futures are calculated as $(\ln p_t - \ln p_{t-1}) \times 100$, where p_t is the settlement (open) price of stock index futures on day t. The i-day holding period returns on stock index futures are calculated as $(\ln p_t - \ln p_{t-i}) \times 100$.

1.1. The impacts of institutional investors' net buys/sells on the contemporaneous returns of stock index futures. This study constructs a dummy variable method to investigate the significant relationship between daily returns of stock index futures and various types of net buys/sells from the three major groups of institutional investors. The regression model of this study is presented as follows:

$$R_t = \beta_1 dnb_t + \beta_2 fnb_t + \beta_3 tnb_t + \beta_4 dfnb_t + \beta_5 dtnb_t + \beta_6 ftnb_t + \beta_7 threenb_t + \beta_8 zeronb_t + dow_t + \varepsilon_t, \tag{1}$$

where $R_t = (\ln p_t - \ln p_{t-1}) \times 100$, p_t denotes the settlement price of stock index futures contract on day t.

dnb_t: The dummy variable of net buys for dealers only, taking a value of one if the dealers type is a unique net buyer and zero otherwise.

fnb_t: The dummy variable of net buys for foreign institutional investors only, taking a value of one if the foreigners type is a unique net buyer and zero otherwise.

tnb_t: The dummy variable of net buys for investment trust companies only, taking a value of one if investment trust companies type is a unique net buyer and zero otherwise.

$dfnb_t$: The dummy variable of net buys for both dealers and foreign institutional investors simultaneously, taking a value of one if there are two categories of institutional investors: dealers and foreign institutions are both net buyers and zero otherwise.

$dtnb_t$: The dummy variable of net buys for both dealers and investment trust companies simultaneously, taking a value of one if there are two categories of institutional investors: dealers and investment trust companies are both net buyers and zero otherwise.

$ftnb_t$: The dummy variable of net buys for both foreign institutional investors and investment trust companies simultaneously, taking a value of one if there are two categories of institutional inves-

tors: foreigners and investment trust companies are both net buyers and zero otherwise.

$threenb_t$: The dummy variable of net buys for all three institutional investors simultaneously, taking a value of one if these three categories of institutional investors are all net buyers and zero otherwise.

$zeronb_t$: This dummy variable defines that none of these three categories of institutions is a net buyer, taking a value of one if these three categories of institutional investors are all net sellers and zero otherwise.

dow_t denotes the returns on Dow Jones Industrial averaged index. The coefficients of these variables measure the expected returns for the specific net buys. From these definitions, we see that the eight dummy variables of Eq. (1) distinguish the net buys for an institutional investor only, for two institutional investors simultaneously, and for three institutional investors simultaneously. This design is useful for examining the impacts of various types of net buys mixed by these three groups of institutional investors on stock index futures returns. We exclude an intercept in Eq. (1) to deal with the collinearity among these variables. The Newey-West method (Newey & West, 1987) is used for correcting autocorrelation and heteroskedasticity.

1.2. Investigating the impacts of institutional net buys/sells on the subsequent returns of stock index futures. This study attempts to explore the significant returns after net buys/sells of three institutional investor types and investigate the price impact and price impact asymmetry of net buys and sells. If institutional net buys (sells) have impact on returns and reveal bullish (bearish) message, a significant relation between price ups

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[1] The data for daily net buys/sells for the three institutional investors are not complied from the tick-by-tick transactions data bases from Taiwan futures exchange (TAIFEX). So these data are unique.

(downs) and institutional net buys (sells) seems to exist. Similarly, the period returns are significantly positive (negative) after the net buys (sells) of the institutional investors.

Another issue this study addresses is price impact asymmetry between foreign and domestic institutions. In this paper, we split the institutional investors into three categories: foreign investors, security investment trust companies, and security dealers. In addition, our model distinguished between net buys/sells of specific types of institutional investors and simultaneous net buys/sells of institutions and introduced lagged variables. Since the respective (simultaneous) net buys/sells maybe reflect the heterogeneity (homogeneity) in

economic analysis, focusing on the respective net buys/sells seems to be helpful for investigating the different impact between foreign and domestic institutions. If an information asymmetry relationship exists between foreign and two domestic institutions, price impact of net buys/sells between foreign and domestic institutions is significantly different.

The approach we construct can simultaneously explore these two different issues in the literature. The regression models developed to explore these issues are discussed as follows:

First, after introducing lagged variables into Eq. (1), we have the following regression equations:

$$_{t-i}R_t = \beta_1 dnb_{t-i} + \beta_2 fnb_{t-i} + \beta_3 tnb_{t-i} + \beta_4 dfnb_{t-i} + \beta_5 dtnb_{t-i} + \beta_6 ftnb_{t-i} + \beta_7 threenb_i + \beta_8 zeronb_i + dow_t + \varepsilon_t, \tag{2}$$

where $_{t-i}R_t = (\ln p_t - \ln p_{t-i}) \times 100$, denotes the i-day holding period returns, we let $i = 1, 2, 3,\ldots,7, 14, 21, 30$, in Eq. (2). This study uses Eq. (2) to examine the holding period returns, after the respec-

tive (simultaneous) net buys/sells of the three groups of institutional investors. Additionally, we can rewrite Eq. (2) as the following equation to implement differential tests:

$$_{t-i}R_t = c + \beta_1 dnb_{t-i} + \beta_2 tnb_{t-i} + \beta_3 dfnb_{t-i} + \beta_4 dtnb_{t-i} + \beta_5 ftnb_{t-i} + \beta_6 threenb_i + \beta_7 zeronb_i + dow_t + \varepsilon_t. \tag{3}$$

In Eq. (3), the intercept measures the mean holding period returns after the net buy for the foreign institutional investors only. The coefficients for these variables measure the difference between the expected return after the net buys/sells for foreign institutional investors only and the other net buys/sells styles. We define $i = 1, 2, 3,\ldots, 7, 14, 21, 30$. Eq. (3) is mainly used to examine whether there exists significant difference between the returns after net buys of foreign institutional investors and domestic institutional investors.

1.3. Exploring the market responses to different sizes of institutional net buys/sells. This paper takes the magnitude of institutional net buys/sells into account and investigates differing impacts of large and small net buys/sells. Each variable of net buys/sells in Eq. (1) is split into two variables, giving differing net buys/sell intensities, from the ratio of the net buys/sells to the trading volume for the three primary institution types. We use the following two regressions to perform the test.

$$_{t-i}R_t = \beta_1 d_{lnb,t-i} + \beta_2 d_{snb,t-i} + \beta_3 f_{lnb,t-i} + \beta_4 f_{snb,t-i} + \beta_5 t_{lnb,t-i} +$$
$$\beta_6 t_{snb,t-i} + \beta_7 df_{lnb,t-i} + \beta_8 df_{snb,t-i} + \beta_9 dt_{lnb,t-i} + \beta_{10} dt_{snb,t-i} + \tag{4}$$
$$\beta_{11} ft_{lnb,t-i} + \beta_{12} ft_{snb,t-i} + \beta_{13} three_{lnb,t-i} + \beta_{14} three_{snb,t-i} +$$
$$\beta_{15} zero_{lbn,t-i} + \beta_{16} zero_{snb,t-i} + dow_t + \varepsilon_t,$$

$$_{t-i}R_t = \beta_1 d_{lns,t-i} + \beta_2 d_{sns,t-i} + \beta_3 f_{lns,t-i} + \beta_4 f_{sns,t-i} + \beta_5 t_{lns,t-i} +$$
$$\beta_6 t_{sns,t-i} + \beta_7 df_{lns,t-i} + \beta_8 df_{sns,t-i} + \beta_9 dt_{lns,t-i} + \beta_{10} dt_{sns,t-i} + \tag{5}$$
$$\beta_{11} ft_{lns,t-i} + \beta_{12} ft_{sns,t-i} + \beta_{13} three_{lns,t-i} + \beta_{14} three_{sns,t-i} +$$
$$\beta_{15} zero_{lns,t-i} + \beta_{16} zero_{sns,t-i} + dow_t + \varepsilon_t,$$

Eq. (4) is used to test the market response to different sizes of net buys, and Eq. (5) is for net sells. $_{t-i}R_t = (\ln p_t - \ln p_{t-i}) \times 100$, $d_{lnb,t-i}\left(d_{lns,t-i}\right)$,

and $d_{snb,t-i}\left(d_{sns,t-i}\right)$ are dummy variables of the large and small net buys (sells) for dealers, respectively, and the rest can be done in the same way.

1.4. Investigating the returns from following the investment pace of institutional investors.

This study presents the methodology to investigate the significant returns for the strategies of taking long positions on the day after the signal of large net buys of institutional investors. If significantly positive returns exist for these strategies, it seems that the net buys information of institutional investors can be used to make profits. The regression model this study developed can also compare the value of net buy information from different categories of institutional investors and explore which one is worthy of being followed by individual investors. For this purpose, we introduce lagged variables into Eq. (1), and then transfer it into the following regression equation:

$$
\begin{aligned}
_{t-i+1}R_t = {} & \beta_1 d_{\ln b,t-i} + \beta_2 d_{snb,t-i} + \beta_3 f_{\ln b,t-i} + \beta_4 f_{snb,t-i} + \beta_5 t_{\ln b,t-i} + \beta_6 t_{snb,t-i} \\
& + \beta_7 df_{\ln b,t-i} + \beta_8 df_{snb,t-i} + \beta_9 dt_{\ln b,t-i} + \beta_{10} dt_{snb,t-i} + \beta_{11} ft_{\ln b,t-i} + \beta_{12} ft_{snb,t-i} + \\
& \beta_{13} three_{\ln b,t-i} + \beta_{14} three_{snb,t-i} + \beta_{15} zero_{\ln b,t-i} + \beta_{16} zero_{snb,t-i} + dow_t + \varepsilon_t,
\end{aligned}
\tag{6}
$$

where $_{t-i+1}R_t = (\ln p_t - \ln p_{t-i+1}) \times 100$ denotes the returns for the strategy of taking a long position on the day (i.e., period $t-i+1$) after the signal of large net buys of institutional investors, $i = 2, 3,\ldots,$ 31, and p is the open price of stock index futures. Eq. (6) is used to investigate the significant returns for the strategy of following the various net buys/sells of institutional investors. The Newey-West method is used for correcting autocorrelation and heteroskedasticity of Eq. (6).

2. Empirical results

2.1. The impacts of institutional net buys/sells on the contemporaneous returns of stock index futures.
Table 1 presents the results of regression analysis of the impacts of net buys/sells for the three types of institutional investors on contemporaneous returns of stock index futures. From Table 1, the computed t-statistics of coefficients β_3 and β_4 are -2.961 and 3.362, respectively, suggesting evidence for significantly negative (positive) expected daily returns with the net sells (buys) for both dealers and foreigners simultaneously[1]. The computed t-statistics of coefficients β_2 and β_5 are -3.110 and 4.529, respectively, suggesting evidence for significantly negative (positive) expected daily returns with the simultaneous net sells (buys) for both dealers and trust companies[2]. Table 1 also shows evidence of significantly positive (negative) expected daily returns with simultaneous net buys (sells) for all three institutional investors. The computed t-statistics of coefficients β_7 and β_8 are 4.315 and -3.819, respectively. The expected returns with any net buys (sells) for single institutional investors only are not significantly positive (negative), indicating that the net buys/sells of any single institutional investors fail to significantly influence price changes or returns in the same period. However, the simultaneous net buys/sells of institutions, with the exception of simultaneous net buys for both foreigners and investment trust companies, have a significant influence on price changes. Performing this test for the impact of net buys/sells intensity on returns suggests a significant effect of large net buys/sells; however, the results do not hold for small net buys/sells. The impacts of most types of large net buys/sells on contemporaneous returns are more significant than those of small net buys/sells. (See the first two arrays of Table 3 and Table 4).

2.2. The impacts of institutional net buys/sells on subsequent stock index futures returns.
Table 2 shows the test results for a significant relationship between subsequent holding period returns on stock futures and institutional net buys/sells behavior. The empirical results find evidence of a significant relationship between subsequent returns and the net buys of foreign institutional investors. That is, the evidence exists for significantly positive expected returns after the date when foreign institution is a unique net buyer (see the third column in Table 2). Surprisingly, the regression results indicate that the holding period returns after the net buys of foreign institutional investors are significantly higher than those after the net buys for the others (see the last two columns in Table 2). In terms of the relationship between subsequent returns and the simultaneous net buys/sells for the three types of institutional investors, the empirical results show much evidence of significantly positive returns after the simultaneous net buys of all three institutional investors. However, there is no evidence of significantly negative returns after net sells for all three institutional investors (see the estimated coefficients $\hat{\beta}_7$ and $\hat{\beta}_8$ in Table 2).

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[1] The returns with net buys for investment trust companies only are equivalent to those with the net sells for both dealers and foreigners simultaneously.
[2] The returns with net buys for foreign institutions only are equivalent to those with the simultaneous net sells for both dealers and trust companies.

Table 1. Test results for significant returns with the net buys/sells of institutional investors

This table lists the results for the effects of institutional net buys/sells on the contemporaneous returns of stock index futures. There are eight types of net buys/sells from three primary groups of institutional investors. The regression is presented as follows:

$$R_t = \beta_1 dnb_t + \beta_2 fnb_t + \beta_3 tnb_t + \beta_4 dfnb_t + \beta_5 dtnb_t + \beta_6 ftnb_t +$$
$$\beta_7 threenb_t + \beta_8 zeronb_t + dow_t + \varepsilon_t$$

	$\hat{\beta}_1$	$\hat{\beta}_2$	$\hat{\beta}_3$	$\hat{\beta}_4$	$\hat{\beta}_5$	$\hat{\beta}_6$	$\hat{\beta}_7$	$\hat{\beta}_8$
Estimates	-0.031	-0.310	-0.351	0.240	0.410	-0.081	0.538	-0.443
t-value	-0.319	-3.110***	-2.961***	3.362***	4.529***	-0.725	4.315***	-3.819***

Notes: There are eight dummy variables in the above equation, namely, fall into place, the returns with net buys for dealers only, net buys for foreign institutional investors only, net buys for investment trust companies only, net buys for both dealers and foreign institutional investors simultaneously, net buys for both dealers and investment trust companies simultaneously, net buys for both foreign institutions and investment trust companies simultaneously, net buys for all three institutional investors simultaneously and net buys for none of the three institutional investors. They take value of one for that returns with given net buys situation, zero otherwise. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

To summarize, there exists no evidence of significantly negative returns on the stock index after the net sells of some or all of the institutional investors, it seems that the impacts of institutional net buys and net sells on subsequent returns are asymmetric. In addition, the impact of net buys by foreign and domestic institutions differs significantly.

Table 2. Test results for significant relationship between subsequent holding period returns and institutional net buys/sells

This table reports the results for significant holding period returns on the post periods of net buys/sells of three types of institutional investors, and shows significant difference between foreigners and the other domestic institutional investors. The regression estimated is presented as follows:

$$_{t-i}R_t = \beta_1 dnb_{t-i} + \beta_2 fnb_{t-i} + \beta_3 tnb_{t-i} + \beta_4 dfnb_{t-i} + \beta_5 dtnb_{t-i} + \beta_6 ftnb_{t-i} + \beta_7 threenb_{t-i} +$$
$$\beta_8 zeronb_{t-i} + dow_t + \varepsilon_t$$

$$_{t-i}R_t = c + \beta_1 dnb_{t-i} + \beta_2 tnb_{t-i} + \beta_3 dfnb_{t-i} + \beta_4 dtnb_{t-i} + \beta_5 ftnb_{t-i} + \beta_6 threenb_{t-i} + \beta_7 zeronb_{t-i}$$
$$+ dow_t + \varepsilon_t$$

HP	$\hat{\beta}_1$	$\hat{\beta}_2$	$\hat{\beta}_3$	$\hat{\beta}_4$	$\hat{\beta}_5$	$\hat{\beta}_6$	$\hat{\beta}_7$	$\hat{\beta}_8$	Δ(d,f)	Δ(t,f)
1	-0.0720 (-0.909)	0.2035 (2.280)**	-0.0557 (-0.417)	-0.0091 (-0.075)	-0.0582 (-0.584)	0.0193 (0.203)	0.0900 (0.947)	-0.0383 (-0.334)	-0.2755 (-2.048)**	-0.2592 (-1.660)*
2	-0.0650 (-0.548)	0.2954 (2.349)**	-0.1227 (-0.639)	-0.0238 (-0.167)	-0.1538 (-1.025)	0.1053 (0.759)	0.1954 (1.488)	-0.0891 (-0.492)	-0.3604 (-2.174)**	-0.4180 (-1.979)**
3	-0.0755 (-0.450)	0.3519 (2.285)**	-0.2526 (-1.122)	-0.0791 (-0.422)	-0.1205 (-0.635)	0.1349 (0.778)	0.2828 (1.615)	-0.0606 (-0.294)	-0.4274 (-2.001)**	-0.6045 (-2.424)**
4	-0.1594 (-0.739)	0.4000 (2.192)**	-0.4781 (-1.828)*	0.0179 (0.077)	-0.1695 (-0.818)	0.1077 (0.561)	0.4009 (2.024)**	0.0792 (0.332)	-0.5593 (-2.110)**	-0.8780 (-2.981)**
5	-0.2140 (-0.860)	0.4037 (1.879)*	-0.4724 (-1.622)	0.1606 (0.639)	-0.1229 (-0.548)	0.0478 (0.206)	0.5173 (2.387)**	-0.0641 (-0.233)	-0.6178 (-2.098)**	-0.8761 (-2.683)***
6	-0.2268 (-0.809)	0.2830 (1.139)	-0.2635 (-0.845)	0.1922 (0.657)	-0.1725 (-0.718)	0.0824 (0.333)	0.6078 (2.406)**	-0.0100 (-0.324)	-0.5098 (-1.569)	-0.5464 (-1.521)
7	-0.2387 (-0.752)	0.4954 (1.925)*	-0.6380 (-1.921)*	0.1904 (0.595)	-0.2174 (-0.841)	0.1617 (0.597)	0.5299 (1.863)*	0.0007 (0.002)	-0.7341 (-2.088)**	-1.1334 (-2.983)***
14	-0.0417 (-0.109)	0.5541 (1.485)	-0.5734 (-1.208)	0.1353 (0.295)	-0.2621 (-0.697)	0.2355 (0.615)	0.7794 (1.892)*	-0.1421 (-0.330)	-0.5958 (-1.395)	-1.1275 (-2.168)**
21	-0.1637 (-0.349)	0,7774 (1.765)*	-0.6418 (-1.155)	0.0622 (0.114)	-0.3285 (-0.07)	0.1280 (0.270)	0.8287 (1.724)*	-0.0353 (-0.072)	-0.9410 (-1.904)*	-1.4191 (-2.467)**
30	0.0316 (0.0590)	0.7745 (1.396)	-0.6766 (-1.094)	0.2368 (0.370)	-0.2989 (-0.620)	-1.037 (-0.183)	0.5704 (1.043)	0.0384 (0.279)	-0.7429 (-1.242)	-1.4510 (-2.090)**

Notes: In this table, the first column denotes the period after the net buys/sells for the three institutional investors. The eight estimated beta coefficients present the estimated results for the fist regression equation above. The last two columns report the estimated coefficients of β_1, β_2 for the second regression equation, that is, show the difference returns between the net buys for the foreigners and the other two institutions. t-statistics are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Test results for responses to different sizes of the institutional net buys

This table reports the results for significant holding period returns after large and small net buys of the three types of institutional investors. The regression estimated is presented as follows:

$$_{t-i}R_t = \beta_1 d_{lnb,t-i} + \beta_2 d_{snb,t-i} + \beta_3 f_{lnb,t-i} + \beta_4 f_{snb,t-i} + \beta_5 t_{lnb,t-i} + \beta_6 t_{snb,t-i} + \beta_7 df \beta_8 df_{snb,t-i} + \beta_9 dt_{lnb,t-i} +$$
$$\beta_{10} dt_{snb,t-i} + \beta_{11} ft_{lnb,t-i} + \beta_{12} ft_{snb,t-i} + \beta_{13} three_{lnb,t-i} + \beta_{14} three_{snb,t-i} + \beta_{15} zero_{lnb,t-i} + \beta_{16} zero_{snb,t-i} + dow_t + \varepsilon_t$$

HP	$\hat\beta_1$	$\hat\beta_2$	$\hat\beta_3$	$\hat\beta_4$	$\hat\beta_5$	$\hat\beta_6$	$\hat\beta_7$	$\hat\beta_8$	$\hat\beta_9$	$\hat\beta_{10}$	$\hat\beta_{11}$	$\hat\beta_{12}$	$\hat\beta_{13}$	$\hat\beta_{14}$	$\hat\beta_{15}$	$\hat\beta_{16}$
0	-0.060 (-0.437)	-0.0049 (-0.033)	-0.3036 (-2.361)**	-0.3165 (-2.056)**	-0.2661 (-1.577)	-0.4387 (-3.06)***	0.4381 (4.820)***	0.04613 (0.442)	0.7482 (6.525)***	0.0711 (0.560)	-0.2499 (-1.454)	0.0895 (0.658)	0.6246 (3.479)***	-0.1257 (-0.765)	-0.7910 (-5.42)***	-0.1027 (-0.631)
1	-0.1253 (-1.014)	-0.0190 (-0.178)	0.1511 (1.129)	0.2558 (2.013)**	0.0855 (0.477)	-0.1945 (-0.894)	0.1056 (0.557)	-0.1228 (-0.917)	-0.1846 (-1.612)	0.0687 (0.439)	-0.0736 (-0.630)	0.1122 (0.752)	0.1943 (1.396)	-0.0133 (-0.104)	-0.1461 (-0.893)	0.0677 (0.404)
2	-0.2612 (-1.386)	0.1311 (0.965)	0.3485 (2.103)**	0.2427 (1.217)	0.0845 (0.311)	-0.3263 (-1.191)	0.2068 (0.995)	-0.2524 (-1.343)	-0.3708 (-2.019)**	0.0634 (0.293)	0.2154 (1.183)	-0.0048 (-0.022)	0.3674 (2.159)**	0.0252 (0.132)	-0.1843 (-0.701)	0.0047 (0.020)
3	-0.2390 (-0.959)	0.0878 (0.416)	0.3951 (2.074)**	0.3091 (1.392)	-0.1709 (-0.544)	-0.3329 (-1.031)	0.2261 (0.832)	-0.3816 (-1.598)	-0.3570 (-1.545)	0.1162 (0.417)	0.0624 (0.277)	0.2078 (0.864)	0.4392 (2.117)**	0.1282 (0.478)	-0.2232 (-0.718)	0.0998 (0.410)
4	-0.3447 (-1.090)	0.0257 (0.103)	0.5805 (2.557)**	0.2206 (0.946)	-0.2674 (-0.762)	-0.6856 (-1.867)*	0.4728 (1.448)	-0.4316 (-1.502)	-0.3547 (-1.433)	0.0144 (0.048)	0.1311 (0.559)	0.0837 (0.303)	0.4811 (1.842)*	0.3207 (1.128)	-0.0937 (-0.265)	0.2520 (0.928)
5	0.3727 (1.030)	-0.0554 (-0.196)	0.6729 (2.627)***	0.1358 (0.476)	-0.1613 (-0.409)	-0.7789 (-2.018)**	0.6227 (1.791)*	0.2954 (0.949)	0.2579 (0.965)	0.0096 (0.030)	0.0676 (0.240)	0.0271 (0.081)	0.4173 (1.441)	0.6147 (2.108)**	-0.3253 (-0.793)	0.1970 (0.617)
6	-0.5261 (-1.345)	0.0723 (0.228)	0.6170 (2.106)**	-0.0489 (-0.150)	0.1963 (0.452)	-0.7161 (-1.842)*	0.6935 (1.738)*	-0.3037 (-0.855)	-0.2899 (-1.013)	-0.0557 (-0.163)	-0.1341 (-0.472)	0.0304 (0.088)	0.5705 (1.676)*	0.6448 (1.927)*	-0.2825 (-0.625)	0.2813 (0.224)
7	-0.4406 (-0.974)	-0.0372 (-0.107)	0.7476 (2.387)**	0.2445 (0.766)	-0.1442 (-0.346)	-1.1250 (-2.657)**	0.6610 (1.562)	-0.2751 (-0.675)	0.3355 (1.187)	-0.1005 (-0.264)	0.3681 (1.243)	-0.0447 (-0.117)	0.4670 (1.179)	0.5924 (1.655)*	0.0497 (0.113)	-0.0463 (-0.125)
14	0.2225 (0.465)	0.1397 (0.301)	1.1157 (2.511)**	-0.0022 (-0.005)	-0.7555 (-1.259)	-0.3937 (-0.577)	0.2255 (0.386)	0.0459 (0.078)	-0.2505 (-0.526)	-0.2719 (-0.586)	0.2413 (0.580)	0.2302 (0.438)	1.1584 (2.341)**	0.4043 (0.722)	0.1266 (0.215)	-0.4088 (-0.716)
21	-0.5855 (-0.980)	0.2582 (0.453)	1.2457 (2.487)**	0.3130 (0.539)	-1.1100 (-1.460)	-0.1809 (-0.256)	0.5229 (0.751)	-0.3940 (-0.579)	0.3600 (0.797)	-0.2965 (-0.502)	0.2988 (0.583)	-0.0426 (-0.063)	1.0897 (2.135)**	0,5702 (0.818)	0.0563 (0.085)	-0.1260 (-0.207)
30	0.1002 (0.164)	0.1637 (0.228)	1.1613 (1.717)*	0.3901 (0.545)	-0.6525 (-0.730)	-0.6996 (-0.943)	1.1821 (1.436)	-0.6993 (-0.936)	-0.0788 (-0.143)	-0.5178 (-0.836)	0.1782 (0.298)	-0.3852 (-0.482)	0.7226 (1.150)	0.4201 (0.546)	0.0371 (0.057)	0.0380 (0.058)

Notes: In this table, the first column denotes the period after the net buys/sells for the three institutional investors. The sixteen estimated beta coefficients present the estimated results for the above regression equation. t-statistics are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4. Test results for responses to different sizes of institutional net sells

This table reports the results for significant holding period returns after large and small net sells of the three types of institutional investors. The regression estimated is presented as follows:

$$_{t-i}R_t = \beta_1 d_{lns,t-i} + \beta_2 d_{sns,t-i} + \beta_3 f_{lns,t-i} + \beta_4 f_{sns,t-i} + \beta_5 t_{lns,t-i} + \beta_6 t_{sns,t-i} + \beta_7 df_{lns,t-i} + \beta_8 df_{sns,t-i} + \beta_9 dt_{lns,t-i} + \beta_{10} dt_{sns,t-i}$$

$$+ \beta_{11} ft_{lns,t-i} + \beta_{12} ft_{sns,t-i} + \beta_{13} three_{lns,t-i} + \beta_{14} three_{sns,t-i} + \beta_{15} zero_{lns,t-i} + \beta_{16} zero_{sns,t-i} + dow_t + \varepsilon_t$$

HP	$\hat{\beta}_1$	$\hat{\beta}_2$	$\hat{\beta}_3$	$\hat{\beta}_4$	$\hat{\beta}_5$	$\hat{\beta}_6$	$\hat{\beta}_7$	$\hat{\beta}_8$	$\hat{\beta}_9$	$\hat{\beta}_{10}$	$\hat{\beta}_{11}$	$\hat{\beta}_{12}$	$\hat{\beta}_{13}$	$\hat{\beta}_{14}$	$\hat{\beta}_{15}$	$\hat{\beta}_{16}$
0	0.3330 (2.226)**	0.1715 (1.193)	0.4487 (3.74)***	0.3707 (2.785)***	0.3836 (4.371)***	0.1081 (0.992)	-0.6851 (-3.443)***	-0.0225 (-0.141)	-0.6041 (-4.469)***	-0.0186 (-0.134)	-0.2742 (-2.232)**	0.2154 (1.423)	-0.7890 (-5.400)***	-0.1028 (-0.633)	0.6231 (3.470)***	-0.1268 (-0.772)
1	-0.0087 (-0.069)	0.0473 (0.313)	-0.2134 (-1.349)	0.0972 (0.833)	0.0796 (0.517)	-0.0953 (-0.554)	-0.0768 (-0.433)	-0.0349 (-0.152)	0.1631 (1.290)	0.2447 (0.2443)	-0.1584 (-1.279)	0.1005 (1.075)	-0.1458 (-0.892)	0.0678 (0.405)	0.1942 (1.395)	-0.0132 (-0.102)
2	0.1336 (0.725)	0.0776 (0.353)	-0.3595 (-1.806)*	0.0897 (0.487)	-0.0866 (-0.440)	0.0365 (0.189)	-0.1016 (-0.428)	-0.1428 (-0.475)	0.2992 (1.726)*	0.2917 (1.600)	-0.1687 (-0.996)	0.2094 (1.277)	-0.1852 (-0.704)	0.0043 (0.018)	0.3683 (2.164)**	0.0250 (0.130)
3	0.2046 (0.946)	0.0660 (0.252)	-0.4436 (-1.618)	0.2034 (0.936)	-0.2218 (-0.823)	0.0588 (0.245)	-0.1998 (-0.729)	-0.3042 (-0.883)	0.2648 (1.300)	0.4396 (2.024)**	-0.1156 (-0.584)	0.3229 (1.416)	-0.2235 (-0.719)	0.0994 (0.408)	0.4396 (2.118)**	0.1283 (0479)
4	0.0953 (0.376)	0.1208 (0.432)	-0.6455 (-2.230)**	0.3079 (1.333)	-0.0765 (-0.230)	0.1087 (0.380)	-0.3611 (-1.078)	-0.5928 (-1.585)	0.2734 (1.249)	0.5276 (1.983)**	-0.1154 (-0.438)	0.1323 (0.473)	-0.0956 (-0.269)	0.2500 (0.921)	0.4827 (1.845)*	0.3208 (1.128)
5	0.1122 (0.380)	-0.1680 (-0.054)	-0.7063 (-2.342)**	0.4601 (1.772)*	-0.0294 (-0.091)	0.3456 (0.992)	-0.3534 (-1.009)	-0.5895 (-1.431)	0.3882 (1.471)	0.4192 (1.435)	-0.1053 (-0.370)	-0.0375 (-0.118)	-0.3260 (-0.795)	0.1952 (0.611)	0.4183 (1.444)	0.6148 (2.108)**
6	0.2831 (0.963)	-0.1181 (-0.346)	-0.5605 (-1.802)*	0.2158 (0.692)	0.2182 (0.613)	0.1667 (0.399)	-0.2922 (-0.768)	-0.2349 (-0.553)	0.4121 (1.320)	0.1530 (0.468)	-0.0340 (-0.106)	-0.0089 (-0.024)	-0.2828 (-0.625)	0.0802 (0.221)	0.5706 (1.677)*	0.6445 (1.925)*
7	0.3631 (1.089)	-0.0396 (-0.111)	-0.3711 (-1.370)	0.2362 (0.752)	0.1494 (0.362)	0.2302 (0.533)	-0.4633 (-1.201)	-0.8098 (-1.816)*	0.7202 (2.255)**	0.2687 (0.792)	-0.1015 (-0.273)	-0.0461 (-0.119)	0.0493 (0.112)	-0.0473 (-0.128)	0.4669 (1.178)	0.5924 (1.654)*
14	0.6048 (1.126)	-0.1335 (0.296)	-0.4554 (-0.863)	-0.0679 (-0.156)	0.2064 (0.431)	0.0661 (0.097)	-0.3033 (-0.490)	-0.8386 (-1.391)	0.8378 (1.845)	0.2682 (0.556)	-0.2878 (-0.681)	0.3652 (0.836)	0.1267 (0.216)	-0.4283 (-0.715)	1.1585 (2.341)**	0.4042 (0.721)
21	0.1622 (0.276)	0.0927 (0.158)	-0.5722 (-1.033)	-0.0874 (-0.170)	-0.0793 (-0.137)	0.1988 (0.253)	-0.7324 (-1.134)	-0.554 (-0.731)	1.0295 (1.993)**	0.5220 (0.888)	-0.6387 (-1.281)	0.5437 (0.911)	0.0566 (0.086)	-0.1252 (-0.205)	1.0903 (2.136)**	0.5700 (0.819)
30	-0.1022 (-0.142)	-0.1071 (-0.158)	-0.4451 (-0.725)	-0.1579 (-0.275)	0.1372 (0.202)	0.3330 (0.374)	-1.1053 (-1.654)*	-0.2579 (-0.286)	0.9069 (1.491)	0.6402 (0.855)	-0.4255 (-0.751)	0.7405 (1.103)	0.0378 (0.059)	0.0412 (0.062)	0.7213 (1.147)	0.4201 (0.547)

Notes: In this table, the first column denotes the period after the net buys/sells for the three institutional investors. The sixteen estimated beta coefficients present the estimated results for the above regression equation. t-statistics are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

2.3. Market responses to the intensity of institutional net buys/sells. We previously show some evidence of the impacts of institutional net buys on stock index futures returns, but no significant evidence for most types of institutional net sells. This paper takes the magnitude of institutional net buys/sells into account and investigates differing impacts of large and small net buys/sells. Each variable of net buys/sells in Eq. (1) is split into two variables, giving differing net buys/sell intensities, from the ratio of the net buys/sells to the trading volume for the three primary institution types.

Table 3 shows the test results for significant returns on the date and post periods of net buys. We suggest a significant impact from net buys on returns for two types of large net buys – net buys of foreigners and the simultaneous net buys of all institutional investors. Compared to Table 2, Table 3 shows a more significant impact of three types of large net buys on returns. Two out of these three types of large net buys, including those of foreigners and simultaneous net buys for all three primary institutions, have a stronger impact than small net buys. On the other hand, we find no evidence of a significant impact of net buys for dealers and trust companies; the subsequent price impacts of net buys between foreigners and the other two institutional investors are likely to be asymmetric.

Table 4 reports the test results for market response to different sizes of net sells for the three institutional investors. Although we find a few significant impacts of the large net sells of foreigners on returns, the relationship between returns and institutional net buys is generally more significant for net sells. It seems that an asymmetric price impact exists between net buys and net sells.

If significantly positive (negative) subsequent returns exist after the net buys (sells) for the three types of institutional investors, the information of net buys (sells) seems to reveal bullish (bearish) messages and be useful for individual investors in enhancing

their investment performance. Our results indicate that the information in some types of net buys, especially large net buys, from the three institutional investors is a bullish indicator for the Taiwan stock futures market. Next, this study will examine the returns for the strategy of following the investment pace of institutional investors. We will explore whether these large net buys/sells contain information that improves the investment performance of individual or general investors.

2.4. The returns from following the investment pace of institutional investors. From the regression results, it seems that individual investors would benefit if they take advantage of the information of a large net buy for institutional investors. Table 5 shows the regression results from investigating significant returns for the strategy of following the investment pace of institutional investors. That is, this table lists the regression results from examining significant returns for the strategy of taking a long position on the day after the signal of large net buys of institutional investors. Table 5 also presents the results of different large net buys/sells situations, including a single institutional net buy/sell only, and two or three simultaneous institutional net buys/sells.

Table 5 shows evidences of significantly positive returns from taking a long position day after the large net buys of foreign institutional investors. The expected returns for this strategy are significantly higher than those of following the other two types of institutional investors during most holding periods. Next, Table 5 also indicates that the expected returns for following the simultaneous large net buys of all three institutional investors is significantly positive for most holding periods. Thus, the regression results suggest that the information from these types of large net buys is valuable for enhancing the performance of individual investors. The strategy of following the large net buys of foreigners is more profitable than that of following those of two types of domestic institutional investors.

Table 5. Test results for the significant returns from following the investment pace of institutional investors

This table reports results for the significant holding period returns from taking a long position on the day after the signal of large net buys of the institutional investors. In addition, this table also shows the different returns between the strategies of following the foreigners and the other institutional investors. The regression models estimated are presented as follows, respectively:

$$_{t-i+1}R_t = \beta_1 d_{lnb,t-i} + \beta_2 d_{snb,t-i} + \beta_3 f_{lnb,t-i} + \beta_4 f_{snb,t-i} + \beta_5 t_{lnb,t-i} + \beta_6 t_{snb,t-i}$$
$$+ \beta_7 df_{lnb,t-i} + \beta_8 df_{snb,t-i} + \beta_9 dt_{lnb,t-i} + \beta_{10} dt_{snb,t-i} + \beta_{11} ft_{lnb,t-i} + \beta_{12} ft_{snb,t-i}$$
$$+ \beta_{13} three_{lnb,t-i} + \beta_{14} three_{snb,t-i} + \beta_{15} zero_{lnb,t-i} + \beta_{16} zero_{snb,t-i} + dow_t + \varepsilon_t$$

The above equation examines the significance of returns for the strategy of following the various net buys/sells from the three institutional investors. We substitute intercept term for variable of large net buys for foreigners and further investigate the different period returns between the strategies of following the respective net buys for foreigners and the other institutional investors. The first column denotes the holding period after the net buys for the three institutional investors. The eight estimated beta coefficients (from column 2 to column 9) show the results of equation and the last two columns report the results of differential test between foreigners and two domestic institutions. *t*-statistics are in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% levels, respectively.

HP	$\hat{\beta}_1$	$\hat{\beta}_3$	$\hat{\beta}_5$	$\hat{\beta}_7$	$\hat{\beta}_9$	$\hat{\beta}_{11}$	$\hat{\beta}_{13}$	$\hat{\beta}_{15}$	Δ(d, f)	Δ(t, f)
1	-0.2331	0.2549	-0.0723	0.0947	-0.2174	-0.0910	0.1284	0.0675	-0.4880	-0.3272
	(-1.979)**	(2.129)**	(-0.467)	(0.614)	(-1.767)*	(-0.888)	(1.228)	(0.407)	(-2.713)***	(-1.693)*
2	-0.1942	0.3803	-0.1277	0.1662	-0.3408	0.1760	0.4460	-0.1590	-0.5746	-0.5081
	(-1.153)	(2.341)**	(-0.577)	(0.866)	(-1.650)*	(1.044)	(2.776)***	(-0.696)	(-2.528)**	(-1.857)*
3	-0.3510	0.4560	-0.3806	0.3428	-0.2626	0.0593	0.4916	-0.1526	-0.8070	-0.8366
	(-1.423)	(2.438)**	(-1.202)	(1.370)	(-1.235)	(0.295)	(2.441)**	(-0.491)	(-2.770)***	(-2.289)**
4	-0.4276	0.7781	-0.3041	0.4283	-0.3071	-0.0908	0.5527	-0.0417	-0.8445	-1.0821
	(-1.354)	(3.399)***	(-0.858)	(1.449)	(-1.272)	(-0.363)	(2.310)**	(-0.012)	(-2.527)**	(-2.617)***
5	-0.3498	0.6403	-0.2488	0.5798	-0.2178	0.0518	0.3947	-0.1703	-0.9901	-0.8890
	(-0.989)	(2.377)**	(-0.656)	(1.740)*	(-0.883)	(0.183)	(1.436)	(-0.409)	(-2.405)**	(-1.926)*
6	-0.5187	0.6802	0.1584	0.6145	0.2362	0.1741	0.6095	-0.1743	-1.1990	-0.8386
	(-1.326)	(2.268)**	(0.390)	(1.653)*	(0.8687)	(0.6377)	(1.862)*	(-0.368)	(-2.574)**	(-.1.685)*
7	-0.5160	0.8770	-0.3416	0.5885	-0.3187	0.2414	0.4481	0.0417	-1.3931	-1.2186
	(-1.130)	(2.786)***	(-0.835)	(1.369)	(-1.102)	(0.766)	(1.196)	(0.009)	(-2.728)***	(-2.418)**
14	-0.3099	1.2326	-0.8674	0.2462	-0.2603	0.2399	1.2017	0.2765	-1.5426	-2.1000
	(-0.642)	(2.761)***	(-1.358)	(0.403)	(-0.531)	(0.555)	(2.60)***	(0.458)	(-2.735)***	(-2.836)***
21	-0.6794	1.3331	-1.2692	0.5165	-0.3266	0.3054	1.1695	0.1324	-2.0125	-2.6023
	(-1.135)	(2.563)**	(-1.774)*	(0.731)	(-0.723)	(0.599)	(2.299)**	(0.200)	(-2.939)***	(-3.14)***
30	-0.2771	1.3133	-0.9447	1.1244	0.0649	0.1162	0.7358	0.0001	-1.5903	-2.2579
	(-0.434)	(1.967)**	(-1.107)	(1.348)	(0.116)	(0.193)	(1.168)	(0.001)	(-1.933)*	(-2.266)**

Conclusion

Although many studies examine the relationship between returns and net buys/sells for institutional investors in the Taiwan stock market, only a few studies investigate this relationship for the stock futures market owing to the lack of source data. We use a unique data source to investigate this issue and provide valuable results. This study develops the dummy variables regression, in which we distinguish between net buys and sells of specific types of institutional investors and simultaneous net buys/sells; we introduce a lagged variable to simultaneously address two different issues in the literature: (1) the impact of institutional trades and the price asymmetry responses between institutional buy trades and sell trades; and (2) the price impact asymmetry between foreign and domestic institutional investors. This approach has the advantage of deeply analyzing the impact for various combinations of institutional net buys/sells and accurately measuring the difference in the impact of foreign and domestic institutional investors. In this paper, we also examine whether the information of large net buys by institutions is useful in enhancing investment performance of individual investors.

The main results of this paper are summarized as follows: (1) we find no evidence of a significant relationship between contemporaneous returns and the net buys/sells of single type of institutional investors, no matter the magnitude of the transactions.

However, this paper suggests a significant relationship between contemporaneous returns and most types of large simultaneous net buys/sells of the three types of institutional investors. Additionally, we find no evidence of a significant relationship between contemporaneous returns and small simultaneous net buys/sells. (2) In terms of the impact of institutional net buys/sells on subsequent returns, this paper finds evidence of significantly positive holding period returns after the some types of large net buys/sells, including the net buys/sells of foreigners, simultaneous net buys for both foreigners and dealers, and simultaneous net buys of all three institutions. (3) We suggest that the impacts of the net buys/sells of foreigners are stronger than those for the two domestic institutions. In general, the results indicate that the impact of large net buys on subsequent returns is more significant than large net sells and small net buys. (4) We find evidence of significantly positive holding period returns for the strategy of taking a long position on the day after two types of large net buys: net buys of foreigners and the simultaneous net buys of all three institutions. These results indicate that these types of large net buys provide useful information for individual investors. Additionally, the investment strategy that follows the net buys of foreigners is more profitable than one following the net buys of the other two types of institutional investors.

Together, these results indicate (1) an asymmetric impact on subsequent returns between large net

buys and large net sells, which also holds between large net buys and small net buys; (2) the asymmetric impact of net buys on subsequent returns between foreign and domestic institutional investors; (3) the impact of large net buys/sells on contemporaneous returns is more significant than that of small net buys/sells; (4) trading information of large net buys, especially of foreign institutional investors, can enhance the investment performance of individual investors.

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