Do Domestic Investors Have an Information Advantage? Evidence from Indonesia

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Abstract

Using transaction data from the Jakarta Stock Exchange, I find three pieces of evidence which indicate that domestic investors have an information advantage over foreign investors. First, foreign investors tend to buy during the two and a half hours prior to large negative intra-day returns. Second, foreigners sell the during 5 days prior to large positive daily returns. Finally, the permanent impact of foreign sales is smaller than that of domestic sales. Over time, intra-day prices at which foreign investors trade were worse during 1999-01 than during 1995-96; foreign selling prior to positive returns was most intense during the crisis of 1997-98 but disappeared during the 1999-01 period.

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1 Introduction

Despite the tremendous increase in international capital flows during the 1990s, home bias is still a prevailing feature of equity portfolios (Ahearne et al. 2001). One possible explanation for home bias is that foreigners face higher information costs than domestic investors (see Lewis 1999). However, the hypothesis that domestic investors possess superior information has always been controversial. One reason for this controversy is that foreign investors tend to have a significant amount of investment experience and expertise, and are thus in a better position to evaluate firms' prospects. On the other hand, foreign investors could be at a disadvantage because information about companies has to travel physical as well as cultural distances. In addition, outside of the U.S., rules against insider trading are poorly enforced (Bhattacharya and Daouk 1999). The empirical evidence on this issue is mixed. While Choe, Kho and Stulz (2001) using Korean data, and Hau (2001) using German data find that foreigners are at a disadvantage, Seasholes (2000) using Taiwanese data, Grinblatt and Keloharju (2000) using Finnish data and Froot and Ramadorai(2001) using a cross section of 25 countries make a convincing case that foreigners do better than local investors. Furthermore, Kang and Stulz (1997) using Japanese data find no difference in the performance of domestic and foreign investors.

There are at least two reasons why the question of information asymmetries in international equity markets is important. First, when domestic investors have better information, foreign investors may be reluctant to invest in local securities. This generates home bias which implies insufficient risk sharing and excessive volatility in consumption and results in welfare losses. Information asymmetries lead to fewer capital flows which in turn lead to an inefficient allocation of world savings. In particular, they leave developing countries with low levels of capital. Second, the fear that local equity investors are better informed leads foreigners to invest in debt rather than equity. This makes international equity flows far smaller then debt flows. Debt does not provide as much risk sharing as equity does. Furthermore, the Asian financial crisis and now the crisis in Argentina underline the disadvantages of debt. Efforts to replace debt finance with equity are underway (see, for example, Rogoff 1999). In order to facilitate the shift from debt to equity it is important to understand the nature of the asymmetries that exist in these markets.

How can one find out who has the information advantage? There is a surprising variety of approaches used in the literature. Virtually every study tries to infer information asymmetries using a different method. The specific method employed usually depends on the type and detail of data

used, and more importantly, on the underlying theoretical model. In an early study, Brennan and Cao (1997) make inferences from the the correlation between aggregate flows and returns. Grinblatt and Keloharju (2000) look at whether foreigners are better than domestic investors at buying future winners and selling future losers. Hau (2001) compares trade-to-trade profits of foreign and domestic traders. Froot and Ramadorai(2001) investigate whether cross border flows predict closed end country funds' discounts. Seasholes (2000) looks at whether foreigners buy or sell prior to positive or negative earnings surprises. Choe, Kho and Stulz (2001) use a variety of approaches including a comparison of the prices at which domestic and foreign investors trade, patterns of net buying prior to large returns and the price impact of foreign and domestic trades.

This paper investigates information asymmetries in Indonesia. It uses transaction data from the Jakarta Stock Exchange (JSX). The most critical aspect of the data is that every transaction record contains information on whether the buyer or seller was a domestic or foreign investor. To my knowledge this data has never been explored in the context of information asymmetries. [1]

My research strategy combines methods which were used in previous studies of information asymmetries. I chose to do this because the multitude of approaches used previously makes it difficult to asses whether different findings should be attributed to different methods or to differences in information asymmetries across countries. Combining different methods in one study using one data set can uncover whether different methods are responsible for different results. Currently, I focus on papers by Choe, Kho and Stulz (2001)(CKS hereafter) and Seasholes (2000). I chose these papers for three reasons. First, both my paper and CKS use transaction data. Since transaction data which distinguish between trades by foreign and domestic investors are rare, investigating whether CKS's results for Korea hold in a different country, Indonesia, will provide additional and useful evidence. Second, CKS and Seasholes arrive at contradictory conclusions. While CKS find that domestic investors have an information advantage, Seasholes finds the opposite. Finally, both CKS and Seasholes consider East Asian emerging markets.

The data in this paper span nearly 7 years from January 1995 through September 2001. This is the longest sample period than in any previous study of this type. I carry out the analysis for different sub-periods and investigate whether information asymmetries change over time. In summary, this paper contributes to the debate on information asymmetries between foreign and domestic investors

[1] I found only two academic studies that used data from the JSX. Bonser-Neal, Linnan and Neal (1999) use pre 1995 data to estimate transaction costs. Comerton-Forde (1999) looks at the impact of opening procedures on market efficiency on the Australian and Jakarta Stock Exchanges.

in three ways: it uses a previously unexplored dataset; it combines several different methodologies; and it looks at how information asymmetries change over time.

The remainder of the paper is organized as follows. I begin with a brief description of the data. I then compare the intra-day prices at which domestic and foreign investors trade. Next, I look at whether foreign or domestic investors can anticipate large returns and good or bad news announcements. Finally, I compare the price impact of domestic and foreign trades. The last section concludes.

2 Data Description

Indonesia has two stock exchanges: JSX and Surabaya Stock Exchange. They are about equal in market capitalization, but JSX accounts for over 90% of combined trading volume. The JSX consists of several trading boards. The regular board, which accounts for 98% of all trades is an order-driven system operating as a continuous auction. Since 1995 trading takes place through an automated system. Brokers enter their orders which are then matched by the computer according to price and time priorities. There is also a negotiated board where prices are agreed upon by two brokers, and a crossing board where a trade is done by one broker who has two orders to buy and sell at the same price and quantity. Before September 1997, Indonesia had a 49% limit on foreign ownership and a foreign board where stocks that reached this limit were traded among foreigners. I consider only regular board transactions in this paper.

My data consists of records for each transaction on the JSX from January 1995 until the end of September 2001. Each record contains the date, stock code, transaction price and volume of shares. Most importantly, each transaction record indicates whether the customer represented by the selling and buying brokers is a domestic or foreign investor. In addition, since April 1996, each transaction record contains the buy and sell order number. Since order numbers are assigned sequentially, it is possible to identify whether the trade was buy or sell initiated. Finally, from January 1999, each transaction has a time stamp with the hour, minute and second of when the trade was executed.

Table 1 shows a few descriptive statistics of the data. The number of firms traded on the JSX has steadily increased from 235 in 1995 to nearly 300 in 2001. Also, the number of firms that were traded every day jumped from 5 in 1995 to 33 in 2001. No single firm was traded every day throughout the entire sample period. The number of trades has increased every year since 1995 and reached a total of well over 20 million by the end of September 2001. Approximately a quarter of these trades

involved foreigners on one or both sides of the transaction. Trading volume expressed in dollar value traded shows tremendous fluctuations. Part of these fluctuations can be attributed to the movement in the exchange rate. 1998 stands out as a particularly low volume year. A striking feature of the data is that the foreign share in the trading volume has steadily declined from 58% in 1995 to a mere 7% in 2001. Net foreign inflows are small compared to foreign trading volume and also show considerable fluctuations. For example, in 1997 foreigners took $430 million out of Indonesia - over two thirds of the net inflow over the past two years. Market capitalization also shows signs of the Asian financial crisis with a drop of more than 84% in dollar market value from the end of 1996 to the end of 1998.

Throughout this paper I compare my results to those of CKS who use Korean data, and with those of Seasholes who uses Taiwanese data. Therefore, a brief comparison of the Indonesian market with these markets is in order. The JSX is the smallest of the three with market capitalization of about $26 billion at the end of the year 2000 compared to $247 billion in Taiwan and $148 billion in Korea. Foreign ownership is somewhat greater in Indonesia than in Korea. Choe, Kho and Stulz (1999) report that about 6% of Korean stocks were owned by foreigners in 1997. The JSX factbook reports that foreign ownership in that year was 25%.

A comparison along another dimension may be important. CKS use time period from December 1996 to November 1998. For most of this two year period, Korea was in a severe financial crisis during which the Korean stock market plunged 75% in dollar terms. It is possible that their results are affected by the special circumstances surrounding this crisis. My dataset covers both pre and post crises period. Another important comparison is that CKS have data to differentiate between institutional and individual investors. My data distinguishes only between foreing and domestic investors. Unfortunately, at this point I have no information as to how much of the domestic trading is by institutions vs. individuals. The facts that mutual funds are not widely spread in Indonesia and that there are over 200 active brokers suggest that a large portion of the domestic trading is by individuals.

3 Do foreigners trade at worse prices?

This section investigates whether there are any systematic differences in intra-day prices at which foreign and domestic investors trade. I first replicate CKS's analysis and compare average sell and buy prices of domestic and foreign investors. Next, I analyze relative intra-day prices using a number

of regressions.

3.1 Comparing average buy and sell prices

I select only days when both domestic and foreign investors trade the same stock. Next, I calculate the trade weighted average of the price at which domestic investors bought the stock. I do the same for foreign investors. I take the difference between these two averages and normalize it by the trade weighted average price at which the stock was traded during that day. Scaling the difference in prices by the average price ensures that the differences are comparable across stocks and time. In summary, I consider the following expression:

$$bdif_{i,t} = \frac{B^D_{i,t} - B^F_{i,t}}{A_{i,t}}$$

where $B^D_{i,t}$ is the trade weighted average purchase price of stock i on day t paid by domestic investors; $B^F_{i,t}$ is defined analogously for foreign investors; and $A_{i,t}$ is the trade weighted average price of a stock i on a day t. The differences in prices at which investors *sell* a stock are calculated analogously. The scaled differences are first averaged across stocks for each day and then across days. Standard errors are calculated using the variation in daily averages. This is done because the price differences for different stocks on the same day are unlikely to be independent. The assumption that average daily differences are independent is more reasonable. This independence is necessary for t-statistics to be valid. Equally weighted averages are shown in table 2. The t-statistics test whether average difference in prices paid by domestic and foreign investors are different from zero. The first two columns show that the difference is significantly negative for purchases and significantly positive for sales. This means that foreigners buy at significantly higher and sell at significantly lower prices than domestic investors. Foreigners systematically trade at worse prices than domestic investors, suggesting that domestic investors may have an information advantage. These results are strikingly similar to those found in CKS. They find that foreign money managers pay 0.14% more than domestic individual investors. This is identical to my result for all foreigners compared to domestic investors.[2] The differences in sell prices appear somewhat higher in Indonesia than in Korea. I find that foreigners sell at prices that are 0.24% lower than the prices at which domestic investors sell; CKS find the corresponding difference to be 0.16%. Interestingly, consistent with CKS's result, I find that foreigners trade at worse prices when they sell than when they buy.

I repeat the above analysis for the three sub-periods as shown in table 2. In each sub-period the

[2] The t-statistics are also remarkably close.

qualitative differences in prices paid by foreign and domestic investors are the same as in the full sample. [3] Also, the asymmetry between sales and purchases is consistent over time, although the most dramatic difference is during the crisis period of 1997-1998. There is an indication that the prices at which foreigners trade have worsened since 1995 and 1996. Table 2 shows that foreigners buy at progressively higher prices than domestic investors. In 1995/1996 the cost of round trip in a stock was about 0.16% higher for a foreign investor than for a domestic investor. Between 1997 and 2001 this difference almost tripled to 0.47%. As CKS point out, the economic significance of this difference depends on the amount of trading an investor does. If an investor holds a stock for one year, the difference in performance between domestic and foreign investors will be only 0.47%. However, if an investor buys and sells his portfolio 10 times a year, the return of a foreign investor will be 4.7% lower than that of a domestic investor.

One concern is that the differences in intra-day price paid by foreigners and domestic investors are driven by differences in trade sizes. In Indonesia, an average domestic trade is about 35% smaller than an average trade by a foreign investor. Large purchases/sales must offer premium/discounts to compensate other traders for the provision of liquidity. This concern is addressed in the last six columns of table 2 where the differences in prices are calculated separately for three different trade sizes. Every day all trades are split into three groups according to the traded value. Small, medium and large trades are indicated by 1, 2 and 3 respectively. I find that the differences are the same across different trade sizes except for large purchase trades in 1995-1996 where the difference is statistically insignificant.

To check the robustness of the above results, I weigh the differences for each stock and day by the daily trade value rather than weighing the differences equally. Table 3 shows results using trade weighed averages. I find that for the whole sample, results are statistically significant and qualitatively the same as in the equally weighted procedure, although the differences between foreign and domestic prices are somewhat smaller. [4] Across sub-periods it appears that between 1995 and 1998 foreigners no longer buy at significantly higher prices, but they still sell at lower prices. In the most recent sub-sample, foreigners both buy and sell at worse prices for all trades as well as across different trade sizes. In summary, there is strong evidence that foreign investors trade at worse intra-day prices than domestic investors.

[3] Though not reported, the differences are statistically significant for every year in the sample.

[4] That the differences decrease is similar to the result of CKS. They found that using the trade weighted procedure, the differences for all trades are no longer significant, though they are significant for some trade sizes.

3.2 Regression analysis of intra-day prices

In an effort to control for confounding influences I estimate a number of regressions which try to explain relative intra-day prices of each trade. As explanatory variables I use dummies for foreign buyer and foreign seller, trade size, firm size, and identities of brokers involved. Unlike in the previous sub-section, here I separate transactions into sales and purchases. A transaction is classified as a purchase(sale) if the buy order arrived after(before) the sell order. The relative intra-day price of each trade is the trade price divided by the average price at which the stock traded during the day. The foreign buyer/seller dummy is equal to 1 if the buyer/seller is a foreigner. As a measure of trade size I use the number of shares in the trade divided by shares outstanding. The logarithm of market capitalization is used as a measure of firm size. I also control for identities of brokers on both sides of the trade. There are approximately 200 brokers in the data set. Controlling for broker identities on both sides of the transaction means adding approximately 400 dummies on the right hand side. The entire sample involves over 20 million observations. This poses serious computational problems and difficulty in interpreting standard errors. In order to limit the number of observations, I estimate the regression for the three sub-samples only. In addition, rather than using all stocks, I randomly select 100 stocks to be used in calculations. I estimate the regressions using several sets of 100 randomly chosen stocks and find that the results are not sensitive to different sets.

Table 4 shows the results. Before turning to the coefficients on foreign investor dummies I discuss other regression coefficients. As expected, the intercept for purchases is greater than 1 while the intercept for sales is less than 1. The difference in these intercepts shows that the spread at the JSX is positive and ranges, depending on specification and time period, from 1 to 6 percent. The trade size coefficients have negative signs for purchases. This is contrary to the expectation that a higher price should be paid for large purchases. Similarly, trade size in some instances has a positive coefficient in the sales equation. One reason for the unexpected sign on trade size could be that the unit of observation here is a transaction as opposed to a completed order. Because it may take several transactions to execute some orders, the size of a transaction may be unrelated to order size. Firm size has a negative effect on purchase price and a positive effect on sales price. Thus, large firms trade at better prices than small firms. The dummies for broker identities on the sell and buy side are jointly significant in all specifications and all sub-samples.

If foreigners trade at worse intra-day prices even after controlling for trade and firm characteristics, the coefficients on the foreign buyer(seller) dummy should be positive(negative). Table 4 shows that the results are mixed. The coefficient on the foreign *seller* dummy is negative except for sales

during 1996. This means that foreigners tend to sell at lower prices than domestic investors even after controlling for trade and firm characteristics as well as broker identities. The magnitude of the coefficient implies that foreigners sell at prices that are up to 0.3% lower than prices at which domestic investors sell. Interestingly, the coefficients on foreign sell dummy are always greater in absolute value for purchases than they are for sales. This means that foreigners sell at lower prices when they do *not* initiate the trade.

The sign on foreign buyer dummy coefficient varies across time periods and specifications. For purchases, it is negative during the earliest two sub-samples but it turns positive during the most recent one. This means that during the 1996-98 period foreign initiated buys traded at lower prices than domestic initiated buys. In the most recent sub-sample the pattern is reversed. For sales, the foreign buyer dummy coefficients are mostly positive. This again shows that foreigners trade at worse prices when they are are not initiators of the trade. Overall, the regression results show that even after conditioning on trade size, firm size and identities of brokers involved in the trade, foreigners still sell at prices that are lower than those of domestic investors. Foreigners seem to buy at higher prices in trades initiated by the seller but not in trades initiated by the buyer.

To further explore the robustness of the above results I estimate regressions stock by stock instead of pooling data for different stocks. I choose the specification in which I control for trade size and broker identities. Estimating intra-day price equations stock by stock implicitly controls for time invariant firm characteristics. I select all stocks with at least 500 trades so that each equation has at least 100 degrees of freedom. Table 5 summarizes the results. It shows the number of stocks for which the foreign buyer and foreign seller dummies are significantly positive or negative. The results confirm that foreigners tend to *sell* at lower prices than domestic investors. For example, looking at purchases during the most recent sub-sample, 91 of 262 stocks have a significantly negative coefficient on the foreign seller dummy. The coefficient is significantly positive for only 24 stocks. For sales the score is less striking: 75 stocks have a significantly negative coefficient on the foreign seller dummy versus 46 significantly positive coefficients. This confirms that when foreigners initiate a sale they do not perform as poorly as when they simply take the other side of the transaction. The results also show that foreigners tend to *buy* at higher prices than domestic investors, although the number of stocks with a positive coefficient on the foreign buyer dummy is not much (and not always) greater than the number of stocks with a negative coefficient. Overall, the stock by stock estimation shows that for the majority of stocks, foreign buyer and seller dummies are statistically insignificant. However, there are more stocks in which foreign investors trade at worse prices than those in which

they trade at better prices relative to domestic investors. There is substantial heterogeneity across stocks and in the future it may be fruitful to investigate this heterogeneity systematically.

4 Are foreigners better able to anticipate events?

Why is it that during a day foreigners trade at worse prices? It is unlikely that foreign trades are poorly executed because all orders in the automated trading system are executed at the best possible prices that are available at the moment. It is impossible for foreigners to simultaneously trade at different prices than domestic investors. Therefore, the difference in average intra-day prices must come from timing within a day. If foreigners buy at higher prices, it must be that either they buy after price increases or before price declines. Similarly, the fact that they sell at lower prices means that they either sell after prices fall or before prices increase. If foreigners buy after price increases and sell after price declines they are not necessarily at an information disadvantage, but rather that they pursue a positive feedback strategy. One may argue that domestic investors anticipate large returns and trade to profit from them only if foreign investors tend to sell prior to positive returns and buy prior to negative returns. Only in that case one may conclude that foreigners are at an information disadvantage. Therefore, in order to identify whether foreigners are simply momentum traders or whether they have an information disadvantage, it is crucial to investigate the timing of foreign net buys within the day. With that goal in mind I conduct an intra-day event study of net foreign buys around large returns. To investigate the timing of net foreign purchases over longer horizons I also conduct an event study using daily data.

4.1 Intra-day study

The intra-day study uses only the most recent subsample because the time stamp for each trade is available only since January 1999. I divide trading hours of each day into 20 intervals, each 15 minutes long. [5] Foreign net buys for each stock and each interval are calculated as number of shares bought minus shares sold divided by shares outstanding. Under this definition, foreign net buy is equal to domestic net sell. If a stock is not traded during a particular interval, the observation is treated as missing. If a stock is not traded by foreigners but is traded by domestic investors, foreign net buy is equal to zero. As events I select intervals when individual stock returns exceed 5% in absolute value. I calculate returns in interval t as $log(\frac{P_t}{P_{t-1}})$ where P_t is the last price at which

[5] On Friday there are only 48 intervals as trading is two hours shorter than on Monday through Thursday.

the stock was traded in interval t. The event window is 10 intervals, i.e. two and half hours long. Windows that overlap a previous window for the same stock are dropped. Windows are allowed to cross day boundaries. Scaled net buys are averaged first across stocks for each calendar day and then across days. The first two panels in figure 1 show the results. The first panel shows that foreigners are buying *after* large positive returns. During the two and a half hours they buy around 0.02 percent of shares outstanding. The second panel shows that foreign investors are significant buyers *before* large negative returns. During the two and a half hours prior to large negative return foreign investors buy about 0.04 percent of shares outstanding. These results show that foreign investors trade at worse intra-day prices partly because of poor market timing at very short horizons, which is consistent with foreigners having an information disadvantage, and partly because foreigners are momentum traders.

Even a cursory look at the two panels in figure 1 shows that during intervals with large positive returns, foreigners are significant net buyers, while they are net sellers during intervals with negative returns. This raises a concern that perhaps large returns are not related to a revealed information but rather, are due to price pressure from foreign buying and selling. As Seasholes (2000) argues, the relationship between returns and flows is endogenous. This possibility does not invalidate the preceding analysis, but makes it more difficult to detect informed behavior. If large returns are not related to information, there is no reason why domestic or foreign investors would buy or sell prior to these returns. A better way to detect informed behavior is to identify large returns which are due to information revelation and not price pressure. Seasholes tries to isolate information events by looking at the effects of earnings announcements. The timing of the announcements should not be be related to foreign flows. If domestic investors have inside information or are able to predict the news, they should buy prior to good news and sell prior to bad news.

I collect data on news wires from the major Asian real time news provider, AFX News. The data covers the period from April 1, 1999 through September 2001. Each day there are between 20 and 30 news stories that match the keyword Jakarta. Each story is posted at London time, and I convert this to Jakarta time. I identified 3846 stories specific to 184 companies listed on JSX. I keep only company specific news and omit all political, macroeconomic and other stories. News posted during an interval with returns greater than 5% are classified as good news. Bad news are classified analogously. There are 491 good and 397 bad news announcements. [6] As only information events

[6] The 5% threshold is very conservative for detecting "important" news. Seasholes identifies good and bad news by comparing the actual earnings with their forecasts as provided by I/B/E/S. The price reaction of daily returns to

are considered this method should add power to my tests . The cost is that news data span a shorter time period and fewer stocks resulting in lower number of observations.

The last two panels in figure 1 show the results. Foreigners again appear to buy after good news had been announced, although the result lost some statistical significance. Similarly, foreigners are still buying during the two and a half hours prior to bad news announcement with t-statistic of 1.77. While the lower number of observations rendered the estimates much less precise they are qualitatively the same as when all large positive and negative returns were used. This indicates that domestic investors have short term information advantage. In particular, the fact that domestic investors are selling to foreigners prior to negative news announcements suggests that insider trading takes place.

4.2 Inter-day study

The subject of this subsection is to investigate whether domestic investors can predict large returns at longer than intra-day horizons. With daily data I am no longer restricted to the most recent sub-sample (for which I have time stamp) and can investigate patterns in different sub-periods. Returns are classified as "large" when abnormal returns exceed 5% in absolute value. The abnormal returns are residuals in a regression on a constant and the return on the JSX composite index. If raw returns are used the results are unchanged. Again for each stock I look at daily net foreign shares bought divided by shares outstanding. Treatment of days when a stock was not traded is the same as in the intra-day study. Again, I proceed in two steps: first, I look at the behavior around all large positive and negative returns; and second, I consider only large positive or negative returns which coincide with news announcements.

Figure 2 shows foreign net buys for the period five days prior and five days after large positive returns. If domestic investors can anticipate the positive returns better than foreigners, foreign net buys should be negative prior to the positive return. The first panel presents the results for the full sample. The graph shows that for three days prior to the positive return, foreign investors are significant net sellers. The average net foreign buy over five days preceding a large positive return is significantly negative. This means that domestic investors are buying stocks during the five days prior to a large positive return, perhaps because they posses valuable information which is revealed

good news is only about 2% and to bad news about -3% (see table 4 in Seasholes(2000)). I use all news rather than earnings news. If only earnings news are used, the number of good news drops to 102 and the number of bad news to 78. The results using earnings news are very similar to those using all news.

later on. On the day of the positive return, foreigners are significant net buyers. After the event, net foreign buys are statistically insignificant.

Turning to the results for the three sub-samples, it appears that the ability of domestic investors to profit from future large positive returns has recently disappeared. In the earliest sub-sample, foreigners are significant net sellers during the four days prior to positive returns. Foreigners did the worst during the 1997-1998 time period when they were net sellers on all five days prior to positive events. During this time period, domestic investors took full advantage of their superior ability to predict positive returns. However, between 1999 and 2001 foreign buying prior to the event is statistically insignificant. This may be an indication that the information asymmetry between domestic and foreign investors improved over time.

Figure 3 shows the behavior of foreign net buys around large negative returns. If domestic investors are better informed, net foreign buys should be positive prior to negative returns. However, the full sample results show that this is not the case, and that foreigners are not statistically significant buyers or sellers prior to negative returns. This suggests that domestic investors do not have private information about price declines. It is unclear why there would be any difference between private information about positive events and private information about negative events. If domestic investors can anticipate positive returns as shown in figure 2 they should also be able to anticipate negative returns. Yet figure 3 shows that if they do have this private information they do not trade to profit from it.

The three sub-samples show that only in the most recent sub-sample do foreigners buy prior to negative returns, indicating that during this time period domestic investors profit from their superior information. This suggests that the information asymmetry has increased over time, which is opposite of the inference made from the behavior prior to positive returns. Comparing these results with CKS shows that in Korea there is stronger evidence of information asymmetries. CKS find that foreigners are significant sellers prior to positive returns *and* significant buyers prior to negative returns. Also, the magnitude of net buys (as a percentage of shares outstanding) is roughly 50 times higher in Korea than in Indonesia. [7] CSK find that foreign net buys are on average 0.5 percent during the 5 days prior to positive returns, while I find the magnitude of net buys to be only 0.01 percent. This means that during the 5 days, foreign ownership changes by only 0.05 percent. The economic significance of this change in ownership depends on the initial level of ownership. If

[7] This assumes that CKS express the net buys in their table 4 in fractions rather than percentages. I am checking with CSK to confirm this.

foreigners initially own 25% of the stock, the 0.05 percent change in ownership translates to 0.25 percent difference in returns. Depending on the frequency of these events, the ability of domestic investors to anticipate positive returns could result in economically significant differences between domestic and foreign returns.

I now investigate whether the above results hold if only information events are considered. I again use the news data which begin only in April 1999. If a new story was posted after JSX trading hours it is treated as if it had occurred the next day. The few stories that are posted on Saturday and Sunday are treated as having occurred on Monday. Stories which appear on days with abnormal returns of greater than 5% are classified as good news. Bad news is classified analogously. There are 422 news announcements that are classified as good, and 311 bad.

The first panel in figure 4 shows the net foreign buys around good news. Foreigners are neither significant net sellers or buyers prior to good news. They do, however, react to good news by buying on the day of the news and they continue to buy on the next day. The second panel in figure 4 shows that foreigners are net buyers prior to bad news, but the average net buy is significant only at a 10% level of confidence. Overall, the results using news announcements are the same as those using all large returns.

How do these results compare to those by Seasholes? Using data from Taiwan he found that foreigners are better informed than domestic investors, i.e. they tend to buy prior to good news and sell prior to bad news. In order to compare my results to his, I widen the window to 22 days prior to the event which is the length used in his study. Interestingly, when using this time frame I also find that foreigners tend to buy prior to good news, although this result is significant only at a 10% level of confidence. [8] However, in contrast to Seasholes' findings, I find that foreigners are also significant buyers prior to bad news as shown in the last panel of figure 4. Thus, using Seasholes' method on my data yields the result that domestic investors are better informed.

Overall, the results in this section point to the conclusion that domestic investors have an information advantage. The results are not as strong as those found in by CSK in Korea, but they are far from the opposite conclusion found by Seasholes in Taiwan. In addition, the evidence does not appear stable over time and there seems to be a puzzling asymmetry between trading patterns prior to negative and positive returns. In particular, I find that earlier in the sample domestic investors buy prior to positive returns but do not sell prior to negative returns. This pattern is reversed in

[8] The magnitude of net buys is strikingly similar to that of found in Seasholes, i.e. about 40 basis points on a cumulative basis over the 22 day period.

the most recent sub-sample when domestic investors sell prior to negative returns but do not buy prior to positive returns.

5 What is the price impact of foreign vs. domestic trades?

The previous section looked at foreign flows around large returns. This section does the reverse: it looks at returns around large foreign flows. It investigates the price impact of large foreign and domestic purchases and sales on prices. If foreign or domestic investors trade as a result of information that they have, their trades should be associated with a permanent change in prices. Underlying this proposition is the assumption that shifts in the demand for stocks create no permanent changes in prices, i.e. excess demand curves are horizontal. There is evidence from developed markets that demand curves for stocks in fact slope down (see Shleifer (1986), and Kaul, Mehrotra and Mork (2000)). One reason for downward sloping demand curves is disagreement among investors over the value of securities (see Varian(1985)). Given that this disagreement is likely greater in emerging markets, excess demand curves are likely to be even more inelastic in emerging than in developed markets. Nonetheless, there are at least three reasons why looking at the price impact of foreign vs. domestic trades is a useful exercise for the purposes of this paper. First, I can compare the price impact of foreign and domestic investors. While all large trades may cause permanent price changes, large *informed* trades should have a greater impact than large *uninformed* trades. Hence, comparing the impact foreign and domestic trade imbalances of the same size can identify which trades contain more information. The second reason is that in Indonesia, traders know whether a particular order is by a foreign or domestic investor. Orders by foreign investors are shown in a separate column of the order book, which is available to all traders in real time. If traders believe that demand from a particular class of investors contains more or less information, they can immediately update their valuations. Hence, trades by the class that is believed to have more information should have a more permanent effect on prices. For example, if domestic investors believe that foreign purchases reveal that stocks' prospects are bright, foreign buys should have a permanent effect on prices. Finally, I would like to establish a benchmark for the price impact of foreign and domestic trades in Indonesia and compare it to that found by CKS in Korea.

I conduct two studies at different frequencies as was done by CKS. One is an intra-day study using five minutes intervals and the other is an inter-day study using daily data. In both studies, I use only price setting rather than all trades for each type of investor. A price setting buy is defined

as a trade where the buy order arrives after the sell order. This means that I look at the impact of foreign trades that were initiated by foreigners, and the impact of domestic trades that were initiated by domestic investors. It is reasonable to expect that price setting trades are information driven. The foreign price setting imbalances are calculated as the number of shares in price setting buys minus the number of shares in price setting sells. The difference is divided by shares outstanding. [9] The domestic trade imbalances are calculated analogously. Note that since only price setting trades are included, foreign imbalance is not necessarily equal to the negative of the domestic imbalance. The ten largest imbalances for each stock over the sample period are included in my calculations. The means of these largest imbalances for foreign and domestic investors, in both the intra-day and inter-day studies, are not statistically different. Therefore, I will be comparing the impact of trades of the same size. To avoid undue influence of reversals in low priced stock, all stocks which close below 100 rupiah during the sample period are excluded. [10]

5.1 Intra-day study

As in the earlier intra-day study each trading day is divided into 20 intervals of 15 minutes each. Since the time stamp on each transaction starts only in January 1999, I use the period from 1999 through 2001 in this subsection. There are many intervals when certain stocks are not traded. I therefore have to make an assumption about returns during those intervals. I assume that when a stock is not traded the return is zero. [11] I conducted the analysis using mean adjusted returns. These are defined as raw returns minus the mean return over the same time of the day interval. Since there is very little intra-day pattern in returns, the results are the same.

Figure 5 shows five minute interval returns around large foreign and domestic price setting imbalances. Cumulative returns over the 10 periods prior to the large imbalance $CAR(-10,-1)$ are also calculated. The immediate effect can be divided into the permanent and temporary components. The permanent effect is the cumulative return from the event through the next ten periods, $CAR(0,+10)$; and the temporary effect is the cumulative return from the period after the event

[9] Though not reported I performed the analysis using 20 day trading volume as the scaling factor and the results are unchanged.

[10] This deletes 120 out of 345 stocks. The minimum tick size for stocks priced below 500 rupiah is 5. The results without the 100 rupiah screen are similar, although they show somewhat stronger reversals.

[11] This is not the only way to do it. Different assumption regarding return processes in intra-day studies are discussed in Barclay and Litzenberger(1988). For example, I could have treated non-trading intervals as missing or, as Barclay and Litzenberger (1988) do, assume that stock returns follow a continuous time process and assign a particular return to each interval.

through the next ten periods, $CAR(+1,+10)$. The results show that large price setting imbalances of both foreign and domestic investors have a significant immediate impact on prices. Both foreign and domestic purchases have an immediate impact of about 4% which is somewhat larger than the impact of sales. The immediate impact of foreign and domestic sales is partially reversed while there are no reversals for purchases.

I now investigate which class of traders have a more permanent impact on prices and thus identify which trades contain more information. Foreign purchases have a *lower* permanent impact on prices than domestic purchases. The difference is 0.74% with the t-statistic of 1.75. Similarly, foreign sales have a lower permanent impact. The difference is 1.39% with the t-statistic of 3.37. In summary, at the two and half hours horizon domestic investors have greater permanent impact on prices than foreign investors though the difference is small. These results are similar to those found by CKS. They also find that at intra-day frequency the differences between the permanent impact of foreign and domestic trades are small. Interestingly, they also find that the impact of purchases is greater that the impact of sales. However, the magnitude of the price impact in Korea is considerable smaller than that found here for the JSX. The difference is about three percentage points for sales and one percentage point for sales. This indicates that the JSX market is probably less liquid than the Korean stock exchange.

5.2 Inter-day study

This sub-section investigates the price impact using daily frequency. I look at daily returns 10 days before and 10 days after large price setting imbalances. The time period used in this section starts in April 1996, since that is when information on price setting trades begins. I conduct the analysis using three different definitions of returns: raw returns, returns adjusted for day of the week effect and market adjusted returns, i.e. returns exceeding the return on the JSX composite index. The results are almost identical using these three definitions. Therefore, I present only results for market adjusted returns. These appear in figure 6. The first two panels show that both foreign and domestic purchases have a large immediate impact of about 7% on the day of the large imbalance. Most of the immediate effect is permanent with the difference in permanent effect of foreign and domestic purchases statistically insignificant. The difference is statistically insignificant. As for the impact of sales, both foreign and domestic sales have an immediate negative impact of about -3%. The impact of foreign sales is partially reversed while there is no reversal for domestic sales. The permanent impact of domestic sales is thus 0.89% greater than that of foreign sales

which is statistically insignificant. These results suggest that domestic purchases contain no more information than foreign ones but that domestic sales contain more information than foreign sales.

How do these findings compare to those of CKS? They find that large foreign trades, whether purchases or sales, have no permanent impact on prices. In contrast, both purchases and sales of domestic individual investors have a permanent impact on prices. Thus, the Korean evidence is more strongly in favor of better informed domestic investors.

Table 6 reports summary results for the three sub-samples. The findings show that domestic and foreign purchases have always similar permanent impact. Foreign sales have a small insignificant impact in the earliest sub-sample but no impact at all in the two most recent sub-samples. The impact of foreign sales since 1997 is always completely reversed with ten days after a large foreign sale. The reversal is strongest during the crises sub-sample. During that period, stocks sold by foreigners experience abnormal returns of about 3% in the ten days after the sale, while stocks sold by domestic investors had no such return. In summary, the evidence in this section suggests that domestic sales contain more information than foreign ones.

6 Conclusion

This paper employed several different approaches to infer whether domestic investors have an information advantage and concludes that in many instances they do. The strongest evidence is that foreigners systematically buy prior to large negative returns at intra-day horizons and sell prior to large positive returns at 5 day horizons. This suggests that domestic investors posses information that is only revealed later on. In addition, domestic sales appear to contain more information than foreign purchases.

The direction of change in information asymmetries over time appears ambiguous. The intra-day prices at which foreign investors trade have worsened substantially in recent years. Also, foreign buying prior to negative returns is stronger in recent sub-samples than in earlier sub-samples. Furthermore, the information content of domestic sales has increased over time. Conversely, foreign selling prior to positive returns has disappeared in the most recent sub-period.

In comparison with Korea, information asymmetries in Indonesia do not appear as severe. Specifically, I find that foreigners buy 5 days prior to negative returns only in the most recent sub-sample. I do not find that foreign purchases contain more information than domestic ones. However, foreign investors in Indonesia trade at even worse intra-day prices than foreign investors in Korea. Like

CKS, I find that foreigners trade at worse prices when they sell than when they buy. The fact that this finding is the same in both countries suggests that it reflects a more general phenomenon rather than a special feature of one market or the other.

In comparison with the work of Seasholes on Taiwanese data, I find that foreign buying 22 days prior to *good* news in Indonesia is positive but statistically weak. Contrary to Seasholes' finding, foreign buying 22 days prior to *bad* news is positive and statistically significant. Therefore, domestic investors appear to have an information advantage. Both CKS' and Seasholes' methods lead to the same conclusion when applied to Indonesian data. This suggests that information asymmetries in Taiwan may indeed be different than those in Korea and Indonesia. The interesting question is what makes the asymmetry in the Taiwanese market go the other way?

A number of other questions remain to be answered. In particular, what is the nature of the information advantage that domestic investors seem to have? Is it inside information or does it reflect better access and ability to analyze public information? There is some evidence that points to insider trading. First, domestic investors are significant sellers only hours prior to negative news announcements. It is unlikely that superior analysis of public information is responsible for such a pattern. Second, of 3,846 company news announcements only 888 are associated with price movements greater than 5% in absolute value. Hence, most company news are met with small or no price movements. It could be that news announcements do not convey information or that the information has already been fully incorporated into prices through insider trading as in Bhattacharya et al(2000). Another question that remains to be answered, but is beyond the scope of this paper is how the information asymmetry differ across firms. Is it more severe for small than large firms? Does it differ across industries or export intensity? These and many other questions are left for future research.

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Table 1: Description of JSX market during the sample period

The second column is the number of firms that were traded at least once during the sample period. The third column is the number of firms that were traded every day during the sample period. Foreign volume is calculated as foreign value bought plus sold divided by 2. Number of foreign trades is the number of trades where one or both parties are foreigners. Net foreign inflow is foreign value bought minus foreign value sold. Market capitalization is as of the end of the period.

year	no. of firms		no. of trades(mil.)		trading vol. ($bl.)		net inflow ($bl.)	market cap.($bl.)
	at all	every day	all	foreign	all	foreign		
1995	236	5	0.6	0.3	6.8	3.9(58%)	0.50	82.5
1996	252	10	1.7	0.8	18.6	9.5(51%)	0.11	131.5
1997	284	26	2.9	1.3	30.7	13.4(44%)	-0.43	36.3
1998	287	4	3.4	1.1	8.2	2.8(34%)	0.19	19.6
1999	289	22	4.4	1.0	15.9	4.2(26%)	0.56	53.4
2000	293	39	4.5	0.6	13.0	1.6(12%)	-0.08	25.0
2001	299	33	2.9	0.2	7.0	0.5(7%)	0.14	24.4
Full	343	0	20.3	5.4	100.2	35.9(36%)	0.99	24.4

Table 2: Equally weighted differences in intra-day prices paid by domestic and foreign investors

Differences in equally weighted average price paid for a stock by domestic and foreign investors during that day are scaled by average price of the stock during the day and expressed in percentages. The differences are averaged across stocks for each day and then across days. Standard errors are calculated using the variation across days. The number of stocks per day varies from 38 to 84 depending on how many stocks in a day were traded by both foreign and domestic investors. Trade sizes 1, 2 and 3 indicate day specific trade value groups where 1 is the smallest.

	all trades		by trade size					
	purchases	sales	purchases			sales		
			1	2	3	1	2	3
1995-2001 Days: 1658								
difference dom-for	-0.14	0.24	-0.2	-0.11	-0.08	0.22	0.25	0.21
t-stat H_0: diff=0	-11.29	16.76	-12.8	-9.22	-7.62	9.83	21.44	19.38
1995-1996 Days: 495								
difference dom-for	-0.05	0.11	-0.22	-0.06	0.02	0.15	0.18	0.11
t-stat H_0: diff=0	-3.32	5.75	-11.42	-4.27	1.42	2.92	13.54	9.54
1997-1998 Days: 492								
difference dom-for	-0.14	0.33	-0.18	-0.13	-0.08	0.3	0.37	0.29
t-stat H_0: diff=0	-4.62	10.91	-5.13	-4.39	-3.26	8.18	13.66	13.3
1999-2001 Days: 671								
difference dom-for	-0.21	0.26	-0.2	-0.13	-0.16	0.21	0.22	0.21
t-stat H_0: diff=0	-11.68	11.75	-8	-7.8	-9.24	7.12	11.97	11.65

Table 3: Trade weighted differences in intraday prices paid by domestic and foreign investors

Differences in trade weighted average price paid for a stock by domestic and foreign investors during that day are scaled by average price of the stock during the day and expressed in percentages. The differences are averaged across stocks for each day and then across days. Standard errors are calculated using the variation across days. The number of stocks per day varies from 38 to 84 depending on how many stocks in a day were traded by both foreign and domestic investors. Trade sizes 1, 2 and 3 indicate day specific trade value groups where 1 is the smallest.

	all trades		by trade size					
	purchases	sales	purchases			sales		
			1	2	3	1	2	3
1995-2001 Days: 1658								
difference dom-for	-0.04	0.17	-0.11	-0.05	-0.04	0.24	0.21	0.17
t-stat H_0: diff=0	-3.34	13.39	-4.44	-2.75	-3.07	8.61	10.95	13.19
1995-1996 Days: 495								
difference dom-for	0.02	0.1	0.02	0.06	0.03	0.13	0.16	0.1
t-stat H_0: diff=0	1.62	8.19	0.86	2.84	1.89	6.08	9.06	7.44
1997-1998 Days: 492								
difference dom-for	0	0.18	-0.05	0.03	0.01	0.24	0.25	0.18
t-stat H_0: diff=0	0.08	7.58	-1.42	1.32	0.34	6.2	9.15	7.54
1999-2001 Days: 671								
difference dom-for	-0.08	0.19	-0.23	-0.14	-0.07	0.28	0.2	0.18
t-stat H_0: diff=0	-3.93	8.46	-4.35	-4.31	-3.84	4.97	5.38	8.28

Table 4: Explaining relative intra-day prices of purchases and sales

Trades are classified as a purchase(sale) if the buy order arrived after(before) the sell order. The dependent variable is trade price divided by the average price at which the stock was traded during the day. Foreign buyer/seller dummy is equal to one if the buyer/seller is a foreigner. Trade size is the number of shares traded divided by stock's shares outstanding. Firm size is the logarithm of market capitalization. Broker dummies include dummies for sell broker as well as buy broker. T - statistics are in parentheses except for broker dummies column which shows F-statistic for joint significance of broker dummies.

	purchases						sales					
period	intercept	foreign buyer	foreign seller	trade size	firm size	broker dummies	intercept	foreign buyer	foreign seller	trade size	firm size	broker dummies
1996				n=182,746						n=161,273		
	1.003	-0.000	-0.001				0.996	0.001	0.001			
	(14417)	(-3.2)	(-10.4)				(14667)	(7.5)	(5.5)			
	1.007	-0.000	-0.001	-0.325	-0.000		0.966	0.000	0.000	-0.347	0.001	
	(930.8)	(-2.6)	(-9.8)	(-1.6)	(-3.1)		(922.8)	(2.2)	(1.5)	(-1.9)	(28.4)	
	1.002	0.000	-0.001	-0.071	-0.000		0.962	0.000	0.001	-0.329	0.001	
	(716.3)	(2.8)	(-3.8)	(-0.4)	(-2.6)	(4.32)	(718.0)	(1.9)	(2.9)	(-1.8)	(27.1)	(19.21)
1997-98				n=765,928						n=704,529		
	1.006	-0.003	-0.003				0.992	0.002	-0.000			
	(17311)	(-21.4)	(-26.4)				(18221)	(20.0)	(-4.1)			
	1.027	-0.002	-0.003	-5.791	-0.001		0.958	0.002	-0.000	0.225	0.001	
	(1144)	(-16.9)	(-23.3)	(-25.7)	(-23.1)		(1124)	(15.1)	(-1.2)	(1.3)	(39.7)	
	1.030	-0.003	-0.003	-5.132	-0.001		0.960	0.003	-0.000	0.316	0.001	
	(778.0)	(-16.0)	(-14.3)	(-22.6)	(-27.8)	(4.89)	(808.4)	(14.3)	(-0.1)	(1.8)	(33.4)	(5.52)
1999-01				n=1,593,876						n=1,290,785		
	1.005	0.000	-0.002				0.994	0.001	-0.001			
	(31933)	(2.5)	(-14.7)				(32554)	(4.1)	(-4.5)			
	1.017	0.000	-0.002	-0.084	-0.000		0.961	-0.000	-0.002	0.155	0.001	
	(2106)	(4.7)	(-11.2)	(-4.3)	(-25.3)		(1946)	(-3.7)	(-13.6)	(5.6)	(65.2)	
	1.014	0.001	-0.002	-0.096	-0.000		0.957	-0.000	-0.002	0.128	0.001	
	(1570)	(8.1)	(-11.6)	(-4.9)	(-19.5)	(20)	(1430)	(-2.4)	(-12.4)	(4.6)	(56.4)	(6.95)

Table 5: Stock by stock intra-day price regressions

In each sub-period regression equations are estimated for each stock with at least 500 trades. The dependent variable is trade price divided by the average price at which the stock was traded during the day. Independent variables are: foreign buyer/seller dummy (equal to one if the buyer/seller is a foreigner); trade size (defined as the number of shares traded divided by stock's shares outstanding); and broker dummies. Trades are classified as a purchase(sale) if the buy order arrived after(before) the sell order. Table shows the number of stocks for which foreign buyer/seller dummies are significantly positive/negative.

	purchases				sales			
period	# of stocks	avg. # of obs.	foreign seller (pos/neg)	foreign buyer (pos/neg)	# of stocks	avg. # of obs.	foreign seller (pos/neg)	foreign buyer (pos/neg)
1996	136	4,528	15/34	27/28	130	4,461	20/22	25/19
1997-98	201	15,163	14/81	34/69	200	13,780	36/36	60/14
1999-01	262	24,781	24/91	83/71	256	20,160	46/75	65/51

Figure 1: Intra-day foreign net buys around large returns

Net buys for each stock are calculated as a percentage of net shares bought of shares outstanding. Large daily returns for each stock are defined as abnormal returns exceeding 5% in absolute value. Event windows which overlap an earlier window for the same stock are excluded from the sample. Observations are averaged across stocks for each day and then across days. Dots represent net buys. Hyphens represent net buys +/- two standard errors. The avg(-5,-1) and avg(+1,+5) are the average net buys over the 5 days prior and after large returns respectively. The avg diff is the difference between net buys prior and net buys after the event. T-statistics are in parentheses.

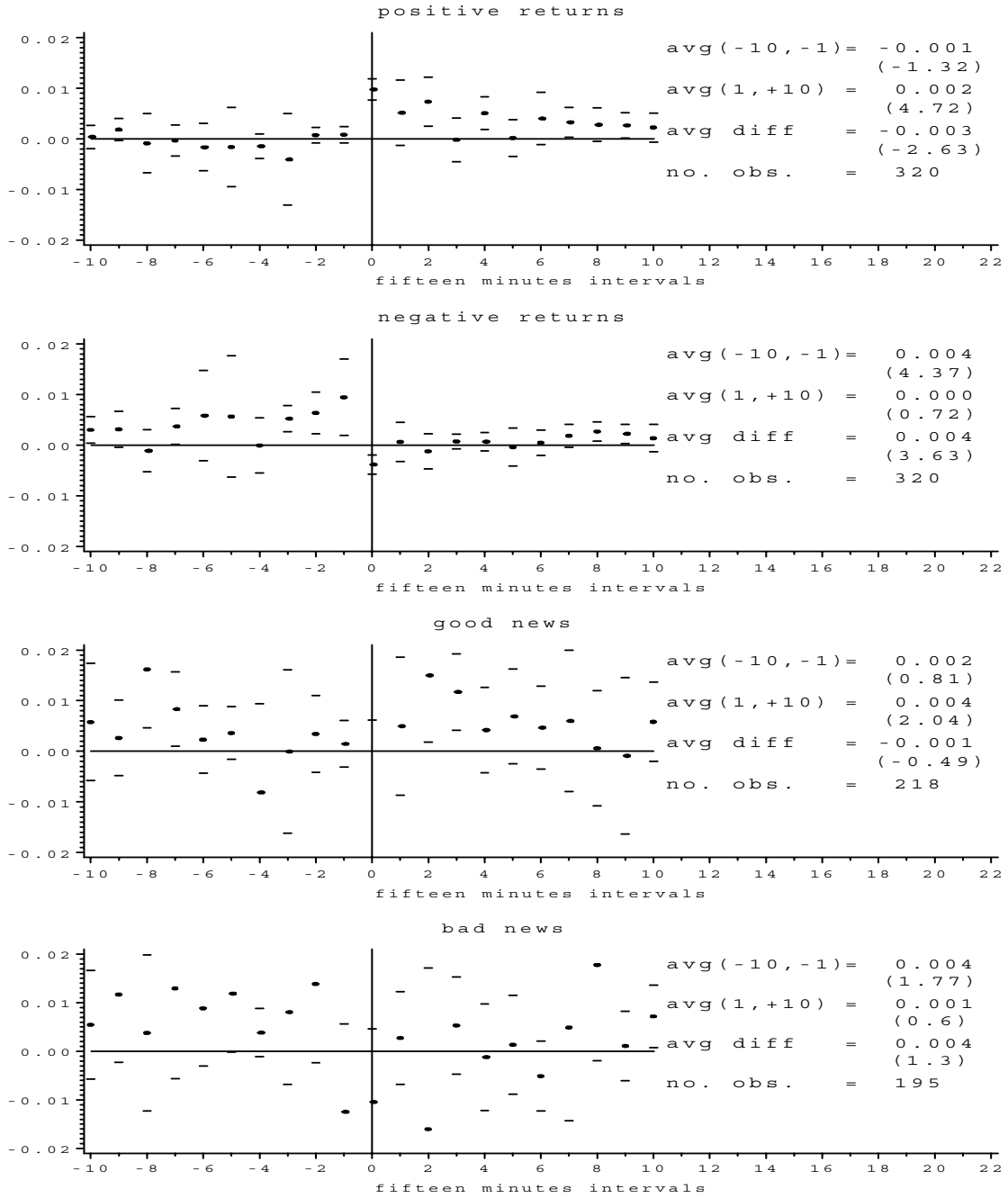

Figure 2: Daily foreign net buys around large positive returns

Net buys for each stock are calculated as a percentage of net value bought in market capitalization. Large positive daily returns for each stock are defined as abnormal returns exceeding 5%. Event windows which overlap an earlier window for the same stock are excluded from the sample. Observations are averaged across stocks for each day and then across days. Dots represent net buys. Hyphens represent net buys +/- two standard errors. The avg(-5,-1) and avg(+1,+5) are the average net buys over the 5 days prior and after large returns respectively. The avg diff is the difference between net buys prior and net buys after the event. T-statistics are in parentheses.

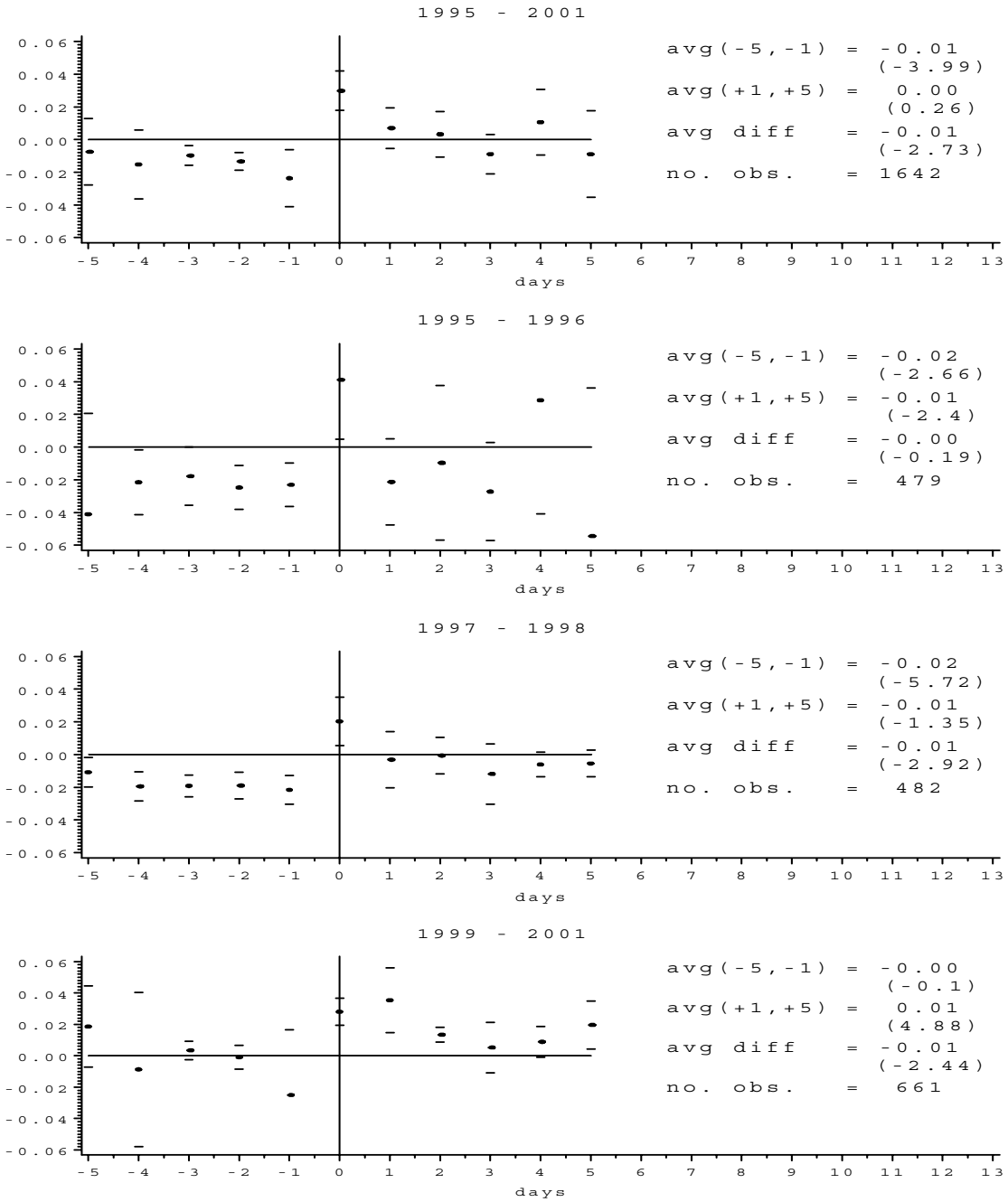

Figure 3: Daily foreign net buys around large negative returns

Net buys for each stock are calculated as a percentage of net value bought in market capitalization. Large negative daily returns for each stock are defined as abnormal returns below -5%. Event windows which overlap an earlier window for the same stock are excluded from the sample. Observations are averaged across stocks for each day and then across days. Dots represent net buys. Hyphens represent net buys +/- two standard errors. The avg(-5,-1) and avg(+1,+5) are the average net buys over the 5 days prior and after the large returns respectively. The avg diff is the difference between net buys prior and net buys after the event. T-statistics are in parentheses.

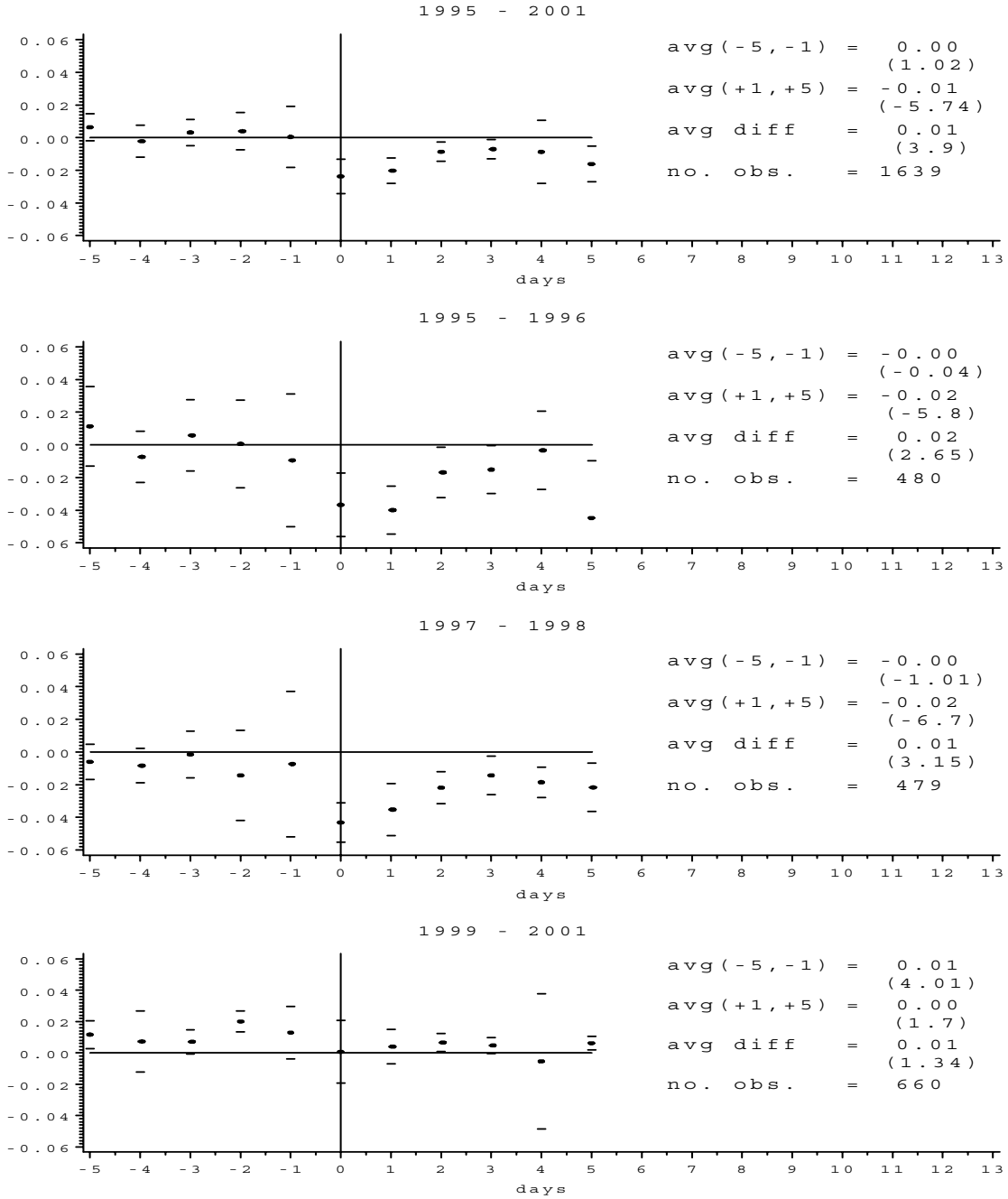

Figure 4: Daily foreign net buys around news announcements, 1999-2001

Net buys for each stock are calculated as a percentage of net value bought in market capitalization. Large negative daily returns for each stock are defined as abnormal returns below -5%. Event windows which overlap an earlier window for the same stock are excluded from the sample. Observations are averaged across stocks for each day and then across days. Dots represent net buys. Hyphens represent net buys +/- two standard errors. The avg(-5,-1) and avg(+1,+5) are the average net buys over the 5 days prior and after large returns respectively. The avg diff is the difference between net buys prior and net buys after the event. T-statistics are in parentheses.

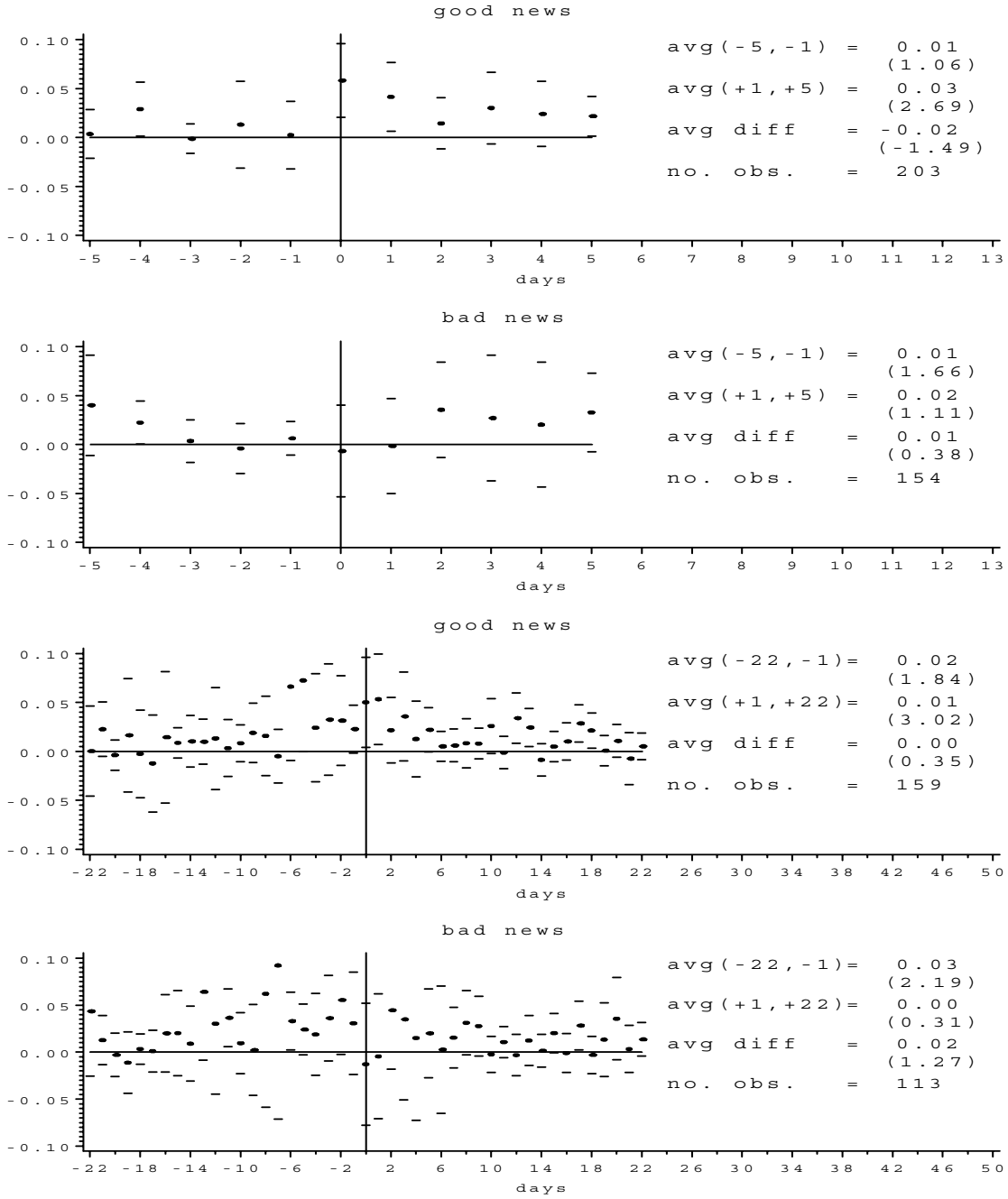

Figure 5: Intra-day percentage returns around large price setting trade imbalances

The sample includes the ten largest price setting trade imbalances during a 15 minutes intervals. The imbalances are calculated as net shares bought divided by shares outstanding. Event windows which overlap an earlier window for the same stock are excluded from the sample. Observations were averaged across stocks for each day and then across days. Dots represent percentage returns. Hyphens represent returns +/- two standard errors. The CAR(-10,-1), CAR(0,+10), and CAR(+1,+10) are the cumulative returns from days -10 to -1, 0 to +10 (permanent effect) and +1 to +10 (temporary effect) respectively. T-statistics are in parentheses.

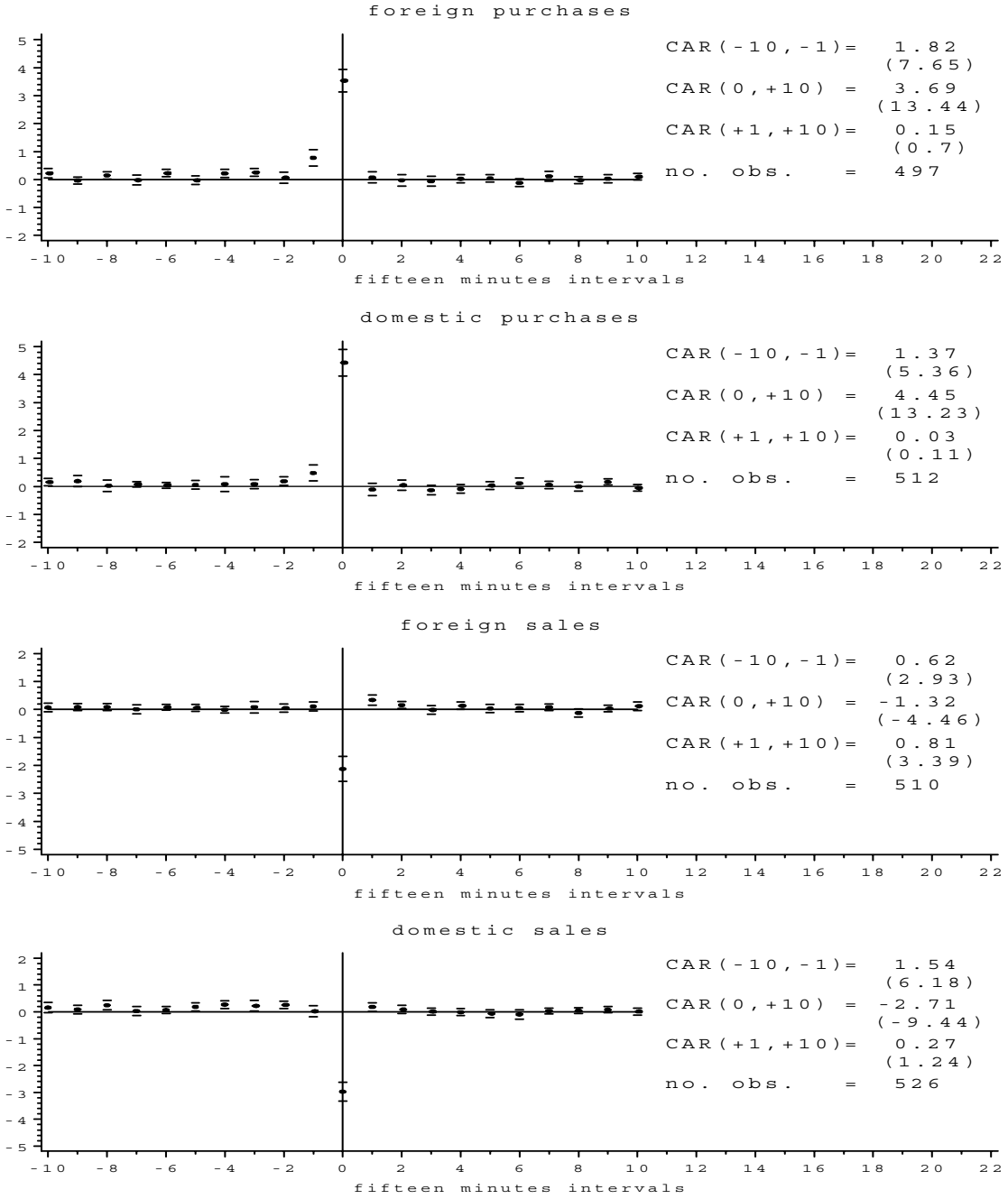

Figure 6: Price impact of large price setting trade imbalances

Events in each sample are the ten largest net daily foreign purchases for each stock. Net daily foreign purchases are calculated as net shares bought divided by shares outstanding. Events which overlap earlier windows for the same stock are excluded. The horizontal axis shows market adjusted percentage daily returns - i.e. returns exceeding the return on JSX composite index. Returns are represented by dots. Returns +/- two standard errors are represented by hyphens. The CAR(-10,-1), CAR(0,+10), and CAR(+1,+10) are the cumulative returns from days -10 to -1, 0 to +10 (permanent effect) and +1 to +10 (temporary effect) respectively. T-statistics are in parentheses.

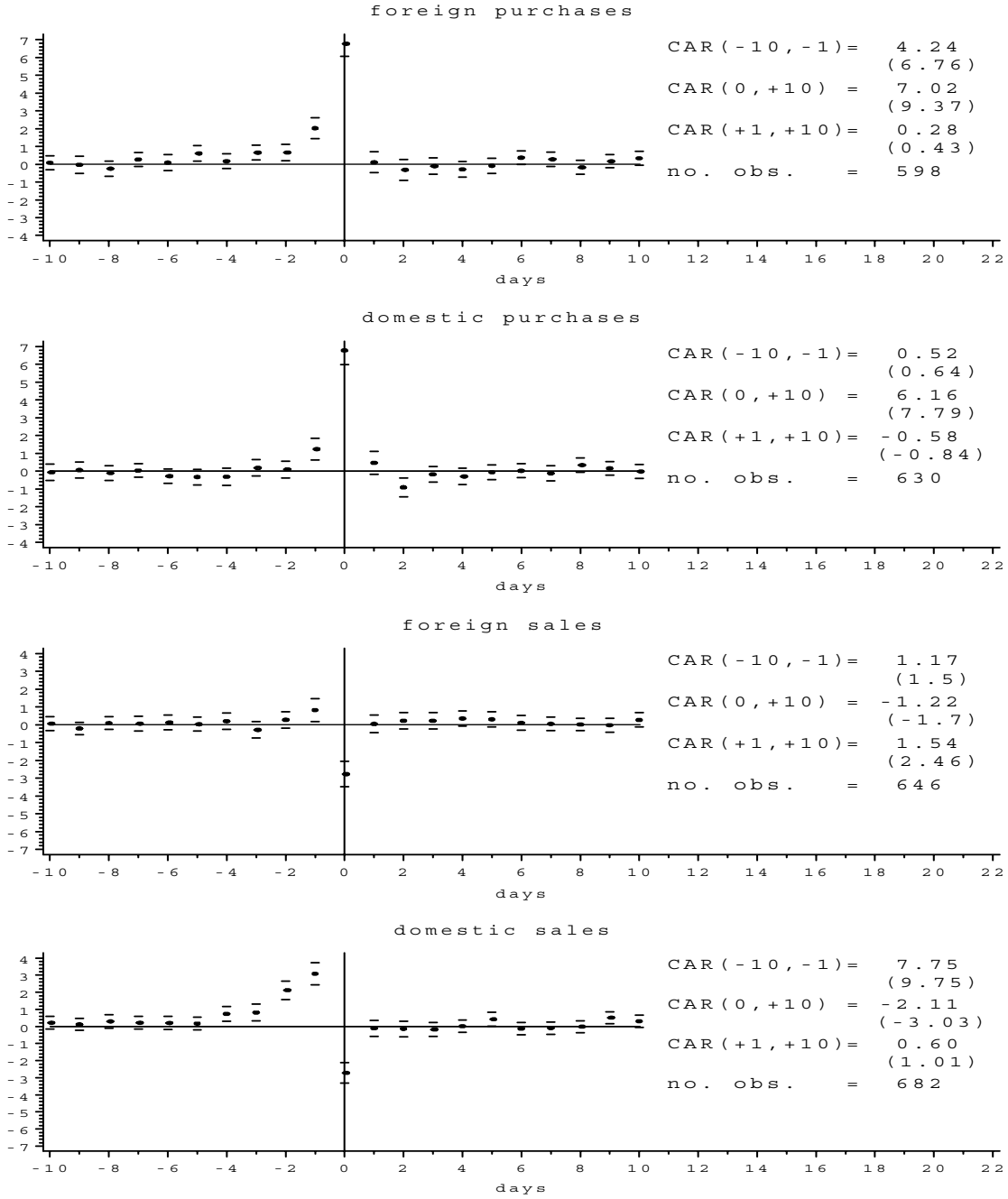

Table 6: Price impact of large price setting trade imbalances

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		purchases		sales	
		foreign	domestic	foreign	domestic
1995-1996	CAR(-10,-1)	-0.49	-1.29	1.54	3.70
		(-0.65)	(-1.31)	(1.70)	(4.39)
	D0	3.53	3.99	-1.21	-1.28
		(9.39)	(8.27)	(-3.43)	(-2.66)
	CAR(0,+10)	4.64	3.89	-1.16	-1.22
		(4.59)	(5.29)	(-1.67)	(-1.93)
	CAR(+1,+10)	1.11	-0.10	0.05	0.06
		(1.16)	(-0.17)	(0.08)	(0.10)
	no. obs.	150	158	154	152
1997-1998	CAR(-10,-1)	1.18	-3.29	-1.76	6.28
		(1.28)	(-2.76)	(-1.63)	(5.74)
	D0	5.55	4.65	-3.87	-2.58
		(13.35)	(6.93)	(-8.23)	(-5.89)
	CAR(0,+10)	5.53	5.26	-0.47	-1.65
		(5.90)	(4.65)	(-0.47)	(-1.86)
	CAR(+1,+10)	-0.02	0.61	3.40	0.93
		(-0.02)	(0.59)	(3.77)	(1.21)
	no. obs.	316	333	333	355
1999-2001	CAR(-10,-1)	3.25	0.52	1.73	5.81
		(4.34)	(0.68)	(2.08)	(8.42)
	D0	5.83	6.37	-2.04	-3.51
		(14.67)	(13.15)	(-5.45)	(-10.15)
	CAR(0,+10)	5.86	6.38	0.09	-1.59
		(7.10)	(7.28)	(0.10)	(-2.19)
	CAR(+1,+10)	0.03	0.00	2.12	1.92
		(0.05)	(0.01)	(2.89)	(3.19)
	no. obs.	393	414	404	470