

Institutional Trading and Stock Returns

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ABSTRACT

In this study, we explore the dynamics of the relation between institutional trading and stock returns. We find that stock returns Granger-cause institutional trading (especially purchases) on a quarterly basis. The robust and significant causality from equity returns to institutional trading can be largely explained by the time-series variation of market returns, that is, institutions buy more popular stocks after market rises. Stock returns appear to be negatively related to lagged institutional trading. An analysis of the behavior of trading and the returns of the traded stocks reveals evidence that stocks with heavy institutional buying (selling) experience positive (negative) excess returns over the previous 12 months.

1. Introduction

Institutions account for over 50 percent of trading in the US stock market. Cohen (1999) and Dennis and Strickland (2002) document that institutions and individuals differ in their trading behaviors. Meanwhile, several studies find that trading by institutions in general may have important price effects on stocks. Badrinath, Kale and Noe (1995) and Sias and Starks (1997) relate institutional ownership to distinct lead-lag patterns in stock returns. Gompers and Metrick (2001) find that the increase in institutional ownership explains part of the disappearance of the historical small-company stock premium. Chakravarty (2001) shows that institutional trades may impact stock prices because of superior information. Nofsinger and Sias (1999), Wermers (1999), Griffin, Harris and Topaloglu (2001), Sias, Starks and Titman (2001), and Boyer and Zheng (2002) all document a strong positive contemporaneous relation between institutional trading and stock returns.

In this study, we explore the dynamics of the relation between institutional trading and stock returns to address the following questions: (1) Is institutional trading related to changes in stock prices? (2) Does institutional trading “cause” stock returns or do institutions follow movements in stock prices? (3) Is it profitable for an uninformed trader to simply mimic the trading behavior of institutions?

Using quarterly Spectrum data, we first confirm the existence of a strong contemporaneous relation between the intensity of institutional trading and stock returns. To determine the more interesting issue of the causality between institutional trading and returns, we perform standard Granger-causality tests on each of ten portfolios sorted based on institutional trading. Our results show that net institutional purchases are positively related to past stock returns. This finding suggests that institutional investors follow a positive feedback strategy when they increase their stakes in stocks. We also find that stock returns are negatively related to lagged institutional trading. This finding is consistent with the price-pressure hypothesis that if institutional trading exerts temporary price pressure, stock returns should exhibit reversals as prices return to fundamental levels. Further analyses show that the inter-quarter relation between stock

returns and institutional trading is mainly due to the price movements in the aggregate stock market.

We also investigate the portfolio excess returns around institutional trading. We find positive excess returns for stocks with the most intensive institutional buying and negative excess returns for stocks with the most intensive institutional selling. However, we find no significant inter-quarter lead-lag relation between excess returns and institutional trading. The excess returns of stocks with intensive institutional buying or selling soon disappear in the quarter immediately following the portfolio formation period. This finding suggests that it would not be profitable for an uninformed investor to mimic institutional trading.

The rest of the paper is organized as follows. Section 2 summarizes the data and presents the methodology. Section 3 contains a discussion of the empirical results. Section 4 concludes.

2. Data and methodology

The SEC requires all institutions with greater than \$100 million of securities under discretionary management to report their holdings on the form 13F.¹ Each institution that submits a 13F form is assigned a manager type by Spectrum. The five types of managers are (1) banks, (2) insurance companies, (3) investment companies (mutual funds), (4) investment advisors, and (5) others. The institutional holdings data we used include the quarterly reports available on Spectrum from the third quarter of 1981 through the fourth quarter of 1996 (a total of 62 quarters). The common stocks examined in this study are restricted to those listed on both NYSE and AMEX and on the monthly tapes of the Center for Research on Security Prices (CRSP). There are a total of 5,891 stocks included over the sample period.

In this paper, *institutional trading* is computed as the change of institutional holdings from last quarter to the current quarter. *Net institutional trading* (also referred as “net institutional demand”) for a stock is defined as the sum of changes of holdings across all institutions.

¹ All common stock positions greater than 10,000 shares or \$200,000 must be disclosed.

Table 1 presents some sample statistics of the quarterly Spectrum data at the end of each of the fourth quarter from 1981 to 1996. Institutions' market share increased from 33.97% to 53.68% over this period, and the average numbers of stocks held and traded by each institution also display strong upward trends, each increasing by about 80% over the sample period. The table also shows that the average institution make trades in about 75% of stocks it holds in each quarter, with this frequency remaining surprisingly stable across the sample period.

We sort all sample stocks into ten portfolios at the end of each quarter between the third quarter of 1981 and the fourth quarter of 1996, based on percentage of net institutional trading, which is defined as the ratio of net institutional trading to the number of shares outstanding. Portfolio 1 consists of stocks with the lowest net institutional demand (sales) in that quarter, while portfolio 10 consists of stocks with the highest net institutional demand (purchases) in that quarter.

3. Institutional trading and stock returns

Before investigating the dynamics of the relation between stock returns and institutional trading, we establish the *contemporaneous* relations between stock returns and both institutional holdings and institutional trading (that is, changes in institutional holdings). For brevity, we do not report the detailed results, but our findings are fairly conclusive. Even after conditioning on the three Fama-French (1993) factors of book-to-market, size, and the market, there is a strong contemporaneous relation between returns and both institutional holdings and institutional trading. In fact, our finding suggests that institutional trading is more closely related to contemporaneous returns than institutional holdings. The strong contemporaneous relation between institutional trading and returns is consistent with the recent findings of Gompers and Metrick (2001), Nofsinger and Sias (1999), and Wermers (1999).

A. Causality tests

To investigate whether institutional investors, as a group, chase past returns or affect subsequent returns through their trading, we perform Granger causality tests on

institutional trading and portfolio raw returns.² We compute AIC (Akaike’s Information Criteria) for different combinations of lag length to determine the lag structure of the Granger causality test. The AIC in general selects a lag of one quarter. Thus for each of the ten portfolios sorted on net institutional trading percentage, we perform two sets of regressions:

$$Dem_t = \alpha + \beta Dem_{t-1} + \gamma Ret_{t-1} + u_t \quad t = 1, \dots, 62 \quad (1)$$

$$Ret_t = \alpha' + \beta' Dem_{t-1} + \gamma' Ret_{t-1} + u'_t \quad t = 1, \dots, 62 \quad (2)$$

where Dem_t and Ret_t are the time-series of net institutional trading percentages and portfolio raw returns, respectively, during the portfolio formation quarter, Dem_{t-1} and Ret_{t-1} are their respective values with a lag of one quarter, and u_t and u'_t are random disturbance terms with zero mean. For the regressions, we calculate Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors.

Estimates of the above regressions, and the corresponding F-tests, are presented in table 2. In panel A, portfolio 8, 9, and 10 exhibit p-values of less than 5%. Notably, portfolio 8, 9 and 10 are the most highly demanded portfolios, with coefficients on Ret_{t-1} all positive and significant. Moreover, the magnitude of the coefficients on the previous quarter’s returns increases as net institutional demand increases. This result indicates that when institutional investors make purchases, they engage in positive feedback trading, and the stocks with the highest institutional demand exhibit the greatest extent of positive feedback trading. Interestingly, there is no evidence of positive feedback trading for the portfolios with net institutional selling. We repeat the test using market returns instead of raw returns. We find that the inter-quarter causality from stock returns to institutional trading is mainly due to institutional investors’ positive feedback trading on market returns.

The evidence presented in panel B of table 2 suggests that stock returns are negatively related to lagged institutional trading. This relation is statistically significant for the middle deciles. This finding is consistent with the price-pressure hypothesis that

² Since non-stationarity of the examined time series could lead to spurious regression results, we perform Dickey-Fuller tests for both the demand and the portfolio return series. We are able to reject the null hypothesis of a unit root at the 1 percent significance level.

if institutional trading exerts temporary price pressure, stock returns should exhibit reversals as prices return to fundamental levels. When we decompose the stock returns into market returns and excess returns, we find that the inter-quarter causality from institutional trading to stock returns is mainly due to the reversal in market returns.

We plot the impulse responses of institutional trading to stock returns and stock returns to institutional trading respectively for portfolio 1, 5 and 10 in Figure 1.a and Figure 1.b. Portfolio 10 shows positive responses of institutional trading to stock returns. The responses go to zero after four quarters. Portfolio 5 shows negative responses of stock returns to institutional trading. The responses last for about 4 quarters.

B. Behavior of returns surrounding institutional trading

The strong correlation between institutional trading and returns, and the apparent tendency of institutional traders to indulge in positive feedback trading while making significant purchases, raises some interesting issues. How intense is the relative trading activity of institutions around the portfolio formation period? How do stocks purchased/sold by institutions perform before the portfolio formation period? How do institutional trades affect stock returns? Is it profitable to buy stocks with heavy institutional purchases and short sell stocks with heavy institutional sales?

Figure 2 shows the aggregate trading activity of all institutions before and after the portfolio formation period/quarter. We present the corresponding numbers in table 3. The time-series averages of the percentages of net institutional trading are calculated for each portfolio for each of the four quarters (quarter $t = -4$ to -1) before portfolio formation, the quarter (quarter $t = 0$) of portfolio formation, and the eight quarters (quarter $t = 1$ to 8) after portfolio formation.³

The patterns in figure 2 are obvious. In the quarter just preceding the portfolio formation period, portfolios 10 (1) experience a jump (fall) in net purchases, though the net activity is still positive in the latter. In the portfolio formation quarter, there is a dramatic increase in purchases in portfolio 10 securities, with net purchases increasing from about 4% to about 13%. Conversely, there is a dramatic increase in the sales of

³ For simplicity, we present the aggregate trading activity of institutions for portfolios 1, 5, and 10.

portfolio 1 securities, with the percentage of net sales about 9%. Following the portfolio formation period, the net activities fall close to 0% for both extreme portfolios.

Unlike the constraint imposed by the quarterly trading data, we can analyze the return behavior of the securities traded by institutions at a higher frequency. We consequently examine the monthly excess returns of the 10 portfolios one year prior to (month $t = -12$ to -1) and two years subsequent to (month $t = 3$ to 26) the portfolio formation quarter (month $t = 0$ to 2). For each of the 39 months, there are 10 portfolio returns. Again, for simplicity, we present excess returns of portfolio 1, 5, and 10 in figure 3. We report the corresponding numbers in table 4. Before analyzing the behavior of returns (measured on a monthly basis) in figure 3, and relating it to the behavior of trading (measured on a quarterly basis) depicted in figure 2, we need to emphasize that this analysis focuses on the relation between institutional trading and cross-sectional variations in stock returns and reflects any intra-quarter relation between the two.

The patterns of excess returns before and after institutional trading are striking. First, for stocks with the most intensive institutional buying (portfolio 10), positive excess returns exist in all the previous 12 months, and almost all are statistically significant. The excess returns also exhibit an apparent run-up over time and reach a peak of 1.83% in the first month of the portfolio formation quarter. For stocks with the most intensive institutional selling (portfolio 1), the reverse pattern is witnessed. The excess returns decline sharply until reaching a low of -2.26% in the first month of the portfolio-formation quarter, when the difference in the monthly returns of portfolios 10 and 1 is as large as 4.09%.⁴

Second, the excess returns of stocks with both intensive institutional buying and selling disappear in the quarter immediately following the portfolio formation period. In the following 24 months, the excess returns of all the 10 portfolios are almost all statistically close to zero. Specifically, the differences between the excess returns of portfolio 10 and portfolio 1 become minor and insignificant. The almost immediate disappearance of excess returns after the trading period suggests that it should not be profitable for individual investors to mimic institutional trading.

⁴ We find that the relation between aggregate patterns in trading and equity returns is driven mainly by the trading pattern of mutual funds and investment advisors.

Finally, a comparison of figures 2 and 3 shows a surprising similarity, although figure 2 shows quarterly patterns while figure 3 is based on monthly data. Portfolio 10 experiences high percentage of net institutional purchases in the previous four quarters, a further increase of net purchases over the quarter of portfolio formation, and a drop in the following quarter. The pattern of portfolio 1 is just about the opposite. This evidence shows that institutional trading and returns are highly contemporaneously correlated.⁵

We estimate two pooled regressions to examine the inter-quarter lead lag relation between the cross-sectional portfolio excess returns and the institutional trading. The first regression examines whether the cross-sectional variation in the lagged portfolio excess returns can explain the unexpected institutional trading. The second regression examines whether the cross-sectional variation in the lagged institutional trading can explain the unexpected portfolio excess returns. We define the unexpected institutional trading and the unexpected portfolio excess returns as the residuals of AR models. Our empirical results provide no evidence for a lead-lag relation between the portfolio excess returns and the institutional trading. Thus, the patterns in figure 2 and 3 are most likely due to the strong contemporaneous relation between institutional trading and stock excess returns.

4. Conclusion

In this paper, we investigate the dynamic relation between the aggregate trading activity of institutions and equity prices. Institutional trading is strongly related to contemporaneous returns. The causality tests suggest that institutions buy more popular stocks after market rises, while stock returns appear to be negatively related to previous quarter's institutional trading. The excess returns to the portfolios before and after significant trading by institutions however suggest that there is a run-up (down) in returns before and during the major buying (selling) activity by institutions, but any "excess" returns disappear soon after the peak in their trading activity.

⁵ The patterns in excess returns shown in Figure 3 are apparent even in returns adjusted for the Fama-French (1993) three-factor model, or the Carhart (1997) four-factor model. Since these models may not fully account for momentum, it is possible that Figure 3 is simply a reflection of an inadequate model of expected stock returns.

The evidence presented in this paper sheds light on the role of institutional trading in financial markets. While institutions indulge in positive feedback trading based on signals about the aggregate market, the finding that institutions are more likely to follow positive feedback trading in purchases than redemptions eases the concern that institutions could exacerbate the price decline by selling stocks after a market downturn.

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Table 1
Summary Statistics of Spectrum data

The sample consists of all 13F institutions from the 3rd quarter of 1981 through the fourth quarter of 1996. All summary statistics at the end of the fourth quarter of each year are shown below. Percentage of market share is the ratio of total value of institutional holdings to the total market capitalization. Average # of stocks held and average # of stocks traded are the mean values of number of stocks held and number of stocks traded across all institutions respectively. Average trading percentage is the ratio of average # of stock traded to the average # of stocks held.

YearQtr	# of institutions	# of stocks	Percentage of market share	Avg. # of stocks held	Avg. # of stock traded	Avg. trading percentage
814	600	4362	33.97%	171	133	77.91%
824	624	4573	37.09%	178	144	80.89%
834	682	5240	37.69%	192	152	79.21%
844	748	5343	39.67%	189	146	77.06%
854	822	5639	42.04%	203	162	79.84%
864	892	6024	43.89%	208	161	77.42%
874	939	6613	43.48%	215	177	82.00%
884	960	6581	44.10%	223	166	74.29%
894	989	6520	44.40%	228	172	75.43%
904	1030	6549	45.70%	217	159	73.37%
914	1100	6850	47.13%	227	171	75.63%
924	1167	7077	48.39%	239	182	76.43%
934	1205	8337	49.95%	260	191	73.64%
944	1239	9046	50.35%	263	200	75.90%
954	1375	9540	51.36%	262	202	76.87%
964	1441	10571	53.68%	273	203	74.34%

Table 2**Causality test of the relation between institutional trading and raw returns**

At the end of each quarter (3rd quarter of 1981 - 4th quarter of 1996), stocks are sorted into ten portfolios based on the percentage of net institutional trading. Portfolio 1 consists of stocks with the most negative institutional purchases (or the highest institutional sales) in that quarter, while portfolio 10 consists of stocks with the highest institutional demand in that quarter. Panel A presents the regression results of net institutional trading (or net institutional demand) percentage on its own lagged value and lagged portfolio raw return: $Dem_t = \alpha + \beta_1 Dem_{t-1} + \gamma_1 Ret_{t-1} + u_t, t = 1, \dots, T$. Panel B presents the regression results of portfolio raw return on its own lagged value and lagged net institutional trading (or net institutional demand): $Ret_t = \alpha' + \beta'_1 Ret_{t-1} + \gamma'_1 Dem_{t-1} + u'_t, t = 1, \dots, 62$, where Dem_t and Ret_t are the time-series of net institutional trading percentage and portfolio returns respectively during the portfolio formation period; Dem_{t-1} and Ret_{t-1} are their values with a lag of one quarter. The F- tests evaluate the null hypotheses, $\gamma_1 = 0$ in Panel A and $\gamma'_1 = 0$ in Panel B. We report t-statistics based on Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors in parentheses, and the R-squares, F-statistics, and p-values in the last three columns.

	Panel A						Panel B					
	Regression of net institutional demand on lagged raw returns						Regression of raw returns on lagged net institutional demand					
Portfolio	Intercept	Dem-1 (β_1)	Ret-1 (γ_1)	R-square	F-stat	p-value	Intercept	Ret-1 (β'_1)	Dem-1 (γ'_1)	R-square	F-stat	p-value
Portfolio 1	-0.09	-0.34	-0.03	0.10	0.09	0.76	-0.00	0.01	-0.13	0.01	1.86	0.18
(dem = -0.095)	(-21.71)	(-1.71)	(-0.26)				(-0.13)	(0.11)	(-0.55)			
Portfolio 2	-0.02	-0.05	0.02	0.02	0.68	0.41	0.00	0.04	-0.18	0.00	0.74	0.39
(dem = -0.016)	(-18.91)	(-0.79)	(0.59)				(0.26)	(0.38)	(-0.33)			
Portfolio 3	-0.01	-0.08	0.02	0.08	2.25	0.14	0.01	0.18	-1.10	0.13	7.93	0.01
(dem = -0.006)	(-9.75)	(-2.26)	(0.98)				(2.59)	(1.94)	(-2.17)			
Portfolio 4	0.00	-0.11	0.01	0.19	1.13	0.29	0.02	0.10	-1.60	0.16	11.14	0.00
(dem = -0.001)	(-2.44)	(-3.55)	(0.68)				(3.74)	(0.87)	(-2.47)			
Portfolio 5	0.00	0.08	0.01	0.18	2.23	0.14	0.01	0.03	-0.78	0.06	3.55	0.06
(dem = 0.001)	(1.47)	(1.52)	(1.45)				(3.23)	(0.25)	(-1.04)			
Portfolio 6	0.00	0.13	0.02	0.12	1.07	0.31	0.03	0.03	-1.32	0.11	6.62	0.01
(dem = 0.004)	(4.84)	(2.26)	(1.12)				(3.59)	(0.22)	(-1.44)			
Portfolio 7	0.01	0.21	0.03	0.15	2.73	0.10	0.01	-0.03	0.37	0.01	0.63	0.43
(dem = 0.009)	(5.77)	(2.57)	(1.46)				(1.67)	(-0.24)	(0.71)			
Portfolio 8	0.01	0.14	0.06	0.16	4.77	0.03	0.03	0.03	-0.46	0.02	1.03	0.31
(dem = 0.016)	(9.67)	(1.79)	(2.12)				(4.41)	(0.21)	(-1.38)			
Portfolio 9	0.02	0.21	0.09	0.23	7.36	0.01	0.03	0.09	-0.12	0.01	0.25	0.62
(dem = 0.031)	(14.27)	(3.35)	(2.85)				(3.91)	(0.80)	(-0.48)			
Portfolio 10	0.10	0.40	0.51	0.25	10.75	0.00	0.03	0.11	-0.12	0.02	0.92	0.34
(dem = 0.128)	(15.40)	(2.68)	(4.24)				(4.46)	(0.78)	(-1.11)			

Table 3**Net institutional demand before, during and after portfolio formation period**

This table presents quarterly percentages of net institutional demand for the 4 quarters before (Qtr -4 to Qtr -1), 1 quarter during (Qtr 0), and 8 quarters after (Qtr 1 to Qtr 8) the portfolio formation period for each of the ten portfolios. Portfolio 1 consists of stocks with the most negative institutional purchases (or the highest institutional sales) in that quarter, while portfolio 10 consists of stocks with the highest institutional demand in that quarter.

	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7	Portfolio 8	Portfolio 9	Portfolio 10
Qtr -4	2.53%	1.32%	1.17%	0.99%	0.52%	0.85%	1.16%	1.57%	1.84%	2.95%
Qtr -3	2.35%	1.37%	1.20%	0.62%	0.58%	0.85%	1.20%	1.52%	2.10%	3.15%
Qtr -2	2.73%	1.30%	1.01%	0.65%	0.56%	0.86%	1.26%	1.57%	1.98%	3.21%
Qtr -1	1.46%	0.94%	0.83%	0.51%	0.53%	0.85%	1.20%	1.58%	2.25%	4.47%
Qtr 0	-9.45%	-1.61%	-0.58%	-0.13%	0.09%	0.38%	0.86%	1.62%	3.07%	12.82%
Qtr 1	-0.56%	0.10%	0.37%	0.22%	0.16%	0.51%	0.72%	0.98%	1.48%	2.07%
Qtr 2	0.24%	0.33%	0.36%	0.22%	0.37%	0.53%	0.72%	0.83%	1.18%	1.19%
Qtr 3	0.81%	0.35%	0.35%	0.37%	0.29%	0.46%	0.62%	0.77%	0.87%	0.99%
Qtr 4	0.35%	0.54%	0.30%	0.31%	0.41%	0.38%	0.60%	0.74%	0.75%	1.31%
Qtr 5	0.52%	0.34%	0.49%	0.27%	0.43%	0.52%	0.51%	0.66%	0.88%	0.90%
Qtr 6	0.51%	0.66%	0.42%	0.37%	0.34%	0.46%	0.55%	0.52%	0.59%	0.68%
Qtr 7	0.44%	0.48%	0.47%	0.28%	0.36%	0.31%	0.47%	0.62%	0.52%	0.80%
Qtr 8	0.30%	0.45%	0.36%	0.34%	0.32%	0.54%	0.43%	0.57%	0.57%	0.66%

Table 4**Excess returns before, during and after portfolio formation period**

This table presents monthly excess returns for the 12 months before (Mon -12 to Mon -1), 3 months during (Mon 0 to Mon 2), and 20 months after (Mon 3 to Mon 22) the portfolio formation period for each of the ten portfolios. Portfolio 1 consists of stocks with the most negative institutional purchases (or the highest institutional sales) in that quarter, while portfolio 10 consists of stocks with the highest institutional demand in that quarter.

	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6	Portfolio 7	Portfolio 8	Portfolio 9	Portfolio 10
Mon -12	-0.12%	-0.39%	-0.04%	-0.09%	0.02%	-0.09%	-0.09%	-0.22%	-0.37%	0.22%
Mon -11	0.12%	0.08%	0.16%	-0.44%	-0.47%	-0.32%	-0.23%	-0.51%	-0.11%	0.51%
Mon -10	-0.54%	-0.15%	-0.13%	-0.44%	-0.16%	-0.23%	-0.26%	-0.54%	-0.08%	0.26%
Mon -9	-0.21%	-0.17%	0.13%	0.13%	-0.51%	0.02%	0.00%	-0.05%	-0.33%	0.57%
Mon -8	-0.10%	-0.19%	-0.12%	-0.26%	-0.71%	-0.38%	-0.35%	-0.36%	-0.16%	0.35%
Mon -7	-0.21%	-0.33%	-0.06%	0.00%	-0.22%	-0.20%	-0.15%	-0.37%	-0.33%	0.50%
Mon -6	-0.10%	0.22%	0.08%	0.03%	-0.16%	0.15%	0.02%	0.01%	-0.41%	0.64%
Mon -5	-0.34%	-0.18%	-0.26%	-0.29%	-0.42%	-0.37%	-0.24%	0.07%	-0.17%	0.70%
Mon -4	-0.39%	-0.39%	-0.18%	-0.42%	-0.58%	-0.31%	-0.22%	-0.35%	-0.39%	0.48%
Mon -3	-0.49%	-0.04%	0.02%	-0.43%	0.22%	0.10%	0.21%	0.16%	0.20%	0.70%
Mon -2	-0.62%	0.01%	-0.38%	0.02%	-0.29%	-0.50%	-0.29%	0.07%	0.16%	1.02%
Mon -1	-0.99%	-0.71%	-0.45%	-0.33%	0.09%	0.08%	-0.16%	0.04%	0.31%	1.18%
Mon 0	-2.26%	-1.44%	-0.81%	-0.30%	0.09%	0.65%	0.72%	0.99%	1.67%	1.83%
Mon 1	-0.73%	-1.11%	-0.64%	-0.37%	-0.46%	0.26%	0.31%	0.74%	1.24%	1.33%
Mon 2	-1.16%	-1.00%	-0.69%	-0.35%	-0.33%	0.06%	0.19%	0.65%	0.88%	1.29%
Mon 3	-0.45%	0.10%	0.23%	-0.07%	-0.21%	-0.10%	0.34%	0.20%	-0.18%	-0.03%
Mon 4	0.22%	0.10%	-0.11%	-0.07%	-0.50%	-0.12%	-0.22%	-0.15%	-0.16%	0.04%
Mon 5	-0.10%	-0.19%	0.17%	-0.08%	-0.38%	0.10%	-0.02%	0.05%	-0.08%	-0.02%
Mon 6	-0.20%	-0.02%	0.27%	0.15%	0.29%	0.63%	0.30%	0.17%	-0.12%	0.26%
Mon 7	-0.02%	0.44%	-0.04%	-0.10%	-0.38%	0.03%	-0.22%	0.13%	0.08%	0.16%
Mon 8	-0.30%	-0.34%	-0.15%	-0.09%	0.05%	-0.04%	-0.03%	-0.12%	0.20%	0.21%
Mon 9	-0.39%	-0.03%	0.01%	0.00%	0.37%	0.46%	0.06%	0.12%	0.13%	-0.19%
Mon 10	-0.04%	0.06%	-0.19%	-0.18%	-0.08%	-0.04%	0.00%	0.04%	0.32%	0.29%
Mon 11	-0.35%	-0.11%	-0.25%	-0.10%	0.23%	0.14%	0.02%	0.02%	0.09%	-0.07%
Mon 12	0.34%	0.06%	0.27%	0.47%	0.24%	0.35%	-0.04%	-0.03%	-0.10%	0.26%
Mon 13	0.03%	-0.22%	-0.20%	-0.53%	-0.24%	-0.75%	-0.36%	-0.12%	0.08%	-0.15%
Mon 14	-0.26%	-0.29%	-0.35%	0.25%	-0.13%	-0.08%	0.00%	0.10%	-0.08%	-0.06%
Mon 15	0.00%	0.25%	0.12%	-0.08%	-0.09%	-0.18%	-0.09%	-0.12%	-0.07%	-0.53%
Mon 16	0.11%	0.01%	0.05%	-0.07%	-0.22%	-0.28%	-0.07%	-0.18%	-0.16%	-0.16%
Mon 17	-0.35%	-0.17%	0.01%	-0.11%	0.02%	0.26%	0.12%	-0.19%	-0.10%	0.00%
Mon 18	0.08%	0.31%	0.25%	-0.11%	0.42%	0.17%	0.38%	0.06%	-0.31%	-0.02%
Mon 19	0.38%	0.35%	-0.29%	-0.15%	-0.20%	-0.33%	-0.13%	-0.18%	-0.11%	0.02%
Mon 20	-0.45%	-0.36%	0.03%	0.16%	0.41%	0.08%	0.16%	-0.40%	-0.20%	-0.27%
Mon 21	-0.12%	0.17%	0.02%	0.12%	-0.24%	-0.07%	0.34%	0.32%	-0.08%	-0.17%
Mon 22	0.10%	-0.03%	-0.41%	-0.39%	0.19%	-0.01%	0.08%	0.25%	0.23%	-0.07%

Figure 1.a.

This figure plots the impulse response of net institutional demand to one unit portfolio return shock at time t , based on regression results in Table 2. For simplicity, only portfolios 1, 5, 10 are presented.

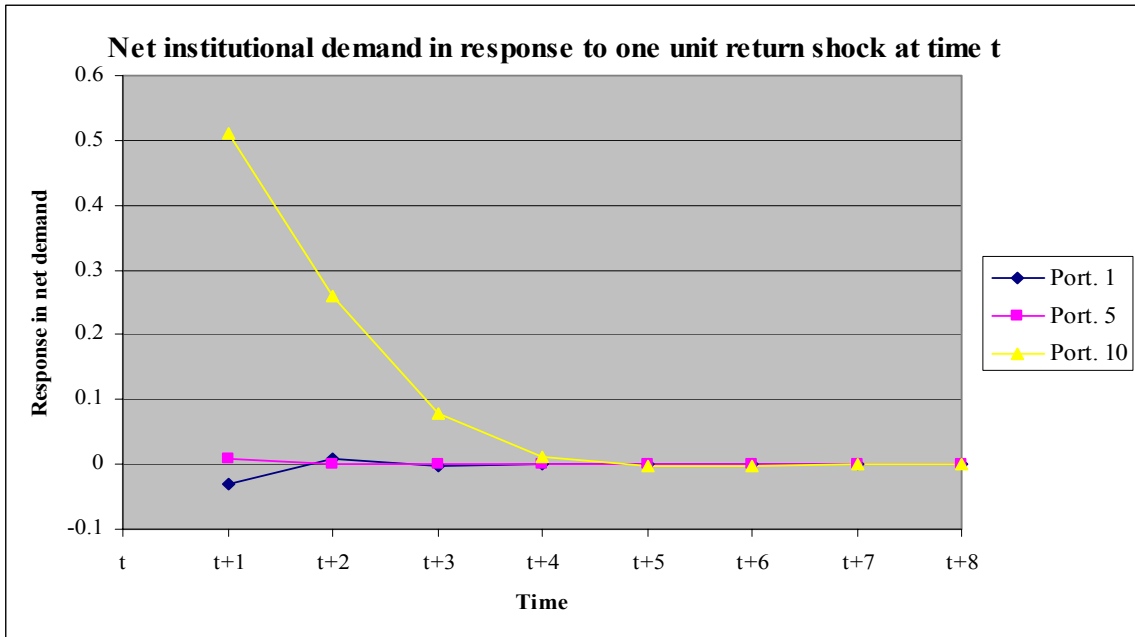


Figure 1.b.

This figure plots the impulse response of portfolio return to one unit net institutional demand shock at time t , based on regression results in Table 2. For simplicity, only portfolios 1, 5, 10 are presented.

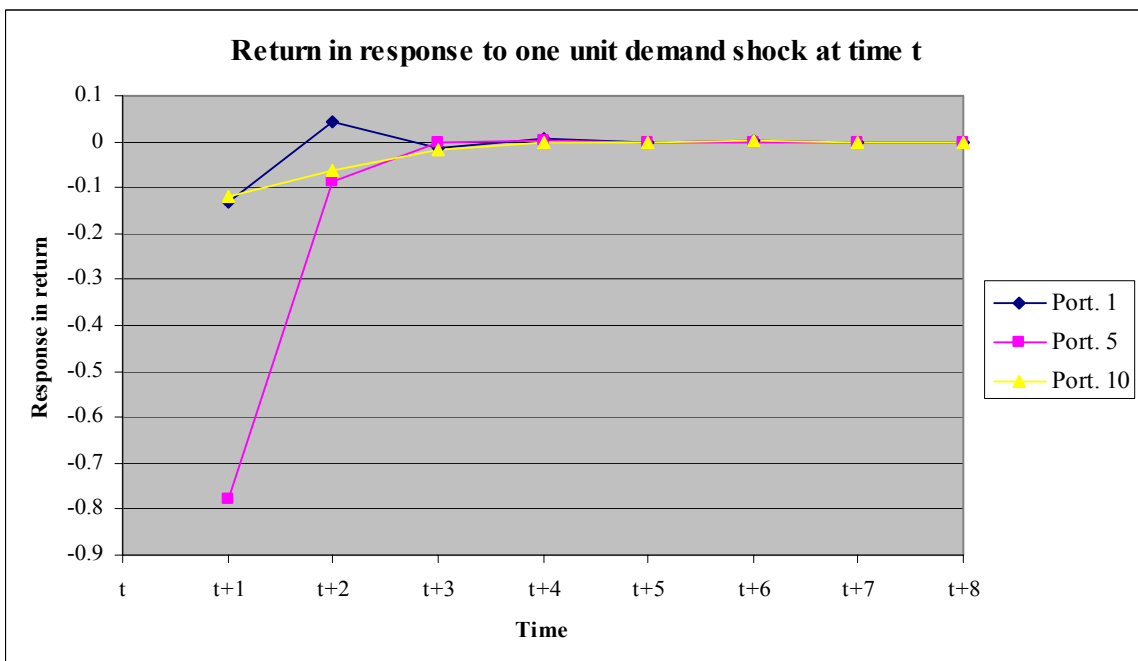


Figure 2

This figure shows the aggregate trading activity of all institutions before and after the portfolio formation period/quarter (the corresponding numbers are reported in table 3). The time-series averages of the percentages of net institutional trading are calculated for each portfolio for each of the four quarters (quarter $t = -4$ to -1) before portfolio formation, the quarter (quarter $t = 0$) of portfolio formation, and the eight quarters (quarter $t = 1$ to 8) after portfolio formation. For simplicity, only portfolios 1, 5, 10 are presented.

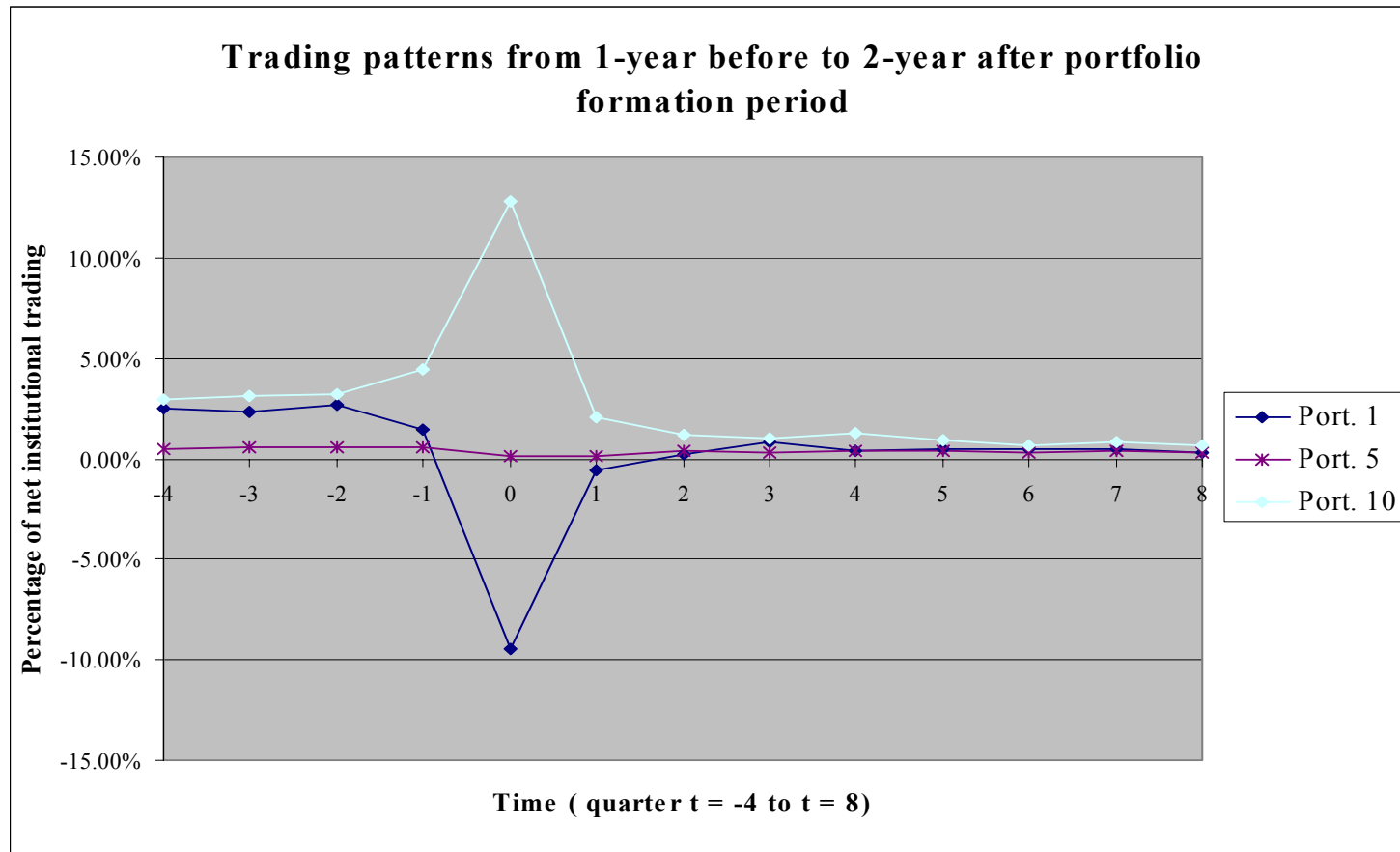


Figure 3

This figure shows the value-weighted monthly excess returns of the 10 portfolios one year prior to (month $t = -12$ to -1) and two years subsequent to (month $t = 3$ to 26) the portfolio formation quarter (month $t = 0$ to 2) (the corresponding numbers are reported in table 3). For simplicity, only portfolios 1, 5, 10 are presented.

