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Do retail investors and institutions pay the same spread?

Abstract

This study presents results suggesting that institutions have paid a lower effective bid-ask spread than individual investors between 1998 and 2004. The evidence points to a negative time-series correlation between the level of institutional trading and the average spread. It also shows a negative correlation between trade size and the average spread. Control variables are used. The results are also consistent with the hypotheses that (a) the spread has increased over time, even though it decreased a short term after decimalization, and (b) institutions have traded less after decimalization, but have returned to their former level of trading after the enactment of the Sarbanes-Oxley Act, by using smaller trades.

Keywords: spread, retail, institutions, trading.
JEL Classification: G10, G14.

Introduction

The implicit cost of institutional equity trading and its determinants have been extensively studied. For example, Chiyachantana et al. (2004) find an average price impact of 0.45% for the 1997-1998 period, and 0.41% for 2001, for their international sample. They also find that institutional buys have a larger price impact than sells in bullish markets, while the opposite holds in bearish markets. Conrad et al. (2003) report an average price impact of 0.71% for orders executed through multiple mechanisms, 0.43% for broker-filled orders, 0.19% for ECN-executed orders, 0.12% for day crosses, for their US sample in the 1996 Q1-1998 Q1 period. They conclude that broker-filled orders have higher total execution costs (implicit plus explicit costs) than orders executed by alternative trading systems.

Trades by individual investors have not received as much attention. Blume et al. (1986) report an average price impact of 0.2405% for their 1971-1979 sample. They also find NYSE implicit costs are smaller than ASE's for this type of investor. Barber and Odean (2000) find a mean impact of 0.27% for individual buys and 0.61% for individual sells for their 1991-1996 sample. They conclude that it is the high costs of trading (impact plus commission) and the frequency of trading, rather than portfolio selections, that explain the poor performance of individual investors.

There does not seem to be any study that has contemporaneously benchmarked institutional implicit costs against those paid by retail investors. Also, there does not seem to be any study of retail costs that spans recent periods. This paper attempts to fill these gaps by comparing implicit retail costs with institutional costs for the 1998-2004 period.

The price impact measure used in the studies above is the deviation of the trade price from an unperturbed price that would have prevailed if the trade had not taken place. Therefore, the resulting costs depend on the choice of the unperturbed price. An alternative measure of implicit trading cost is the quoted bid-ask spread (see, for example, Bessembinder, 1997). The bid-ask spread is the difference between the selling price and the buying price quoted by the market maker, and is considered to be her compensation for providing liquidity. However, the quoted spread may not be an accurate estimate of transaction cost. For example, many trades are executed inside the spread. Also, large block transactions, sometimes, are priced outside the quoted spread. For better accuracy, the effective bid-ask spread has been proposed in the literature as another measure of implicit trading cost. For example, Bessembinder (2003) writes that "the effective bid-ask spread is arguably the most relevant measure of trade execution cost" (p. 750). The effective spread is the difference between the transaction price and the quote midpoint. If the quote midpoint represents the "fair" value of the stock, the effective spread is the additional cost paid by the buyer for liquidity. For these reasons, the effective spread is used as the cost measure in this study, when comparing institutional implicit trading costs with retail costs.

In the following, Section 1 develops the paper's main hypothesis and the related variables. Section 2 discusses the data and results. Section 3 concludes the paper.

1. Hypothesis and variables

1.1. Hypothesis. Institutions try to minimize their trading costs. For example, Conrad et al. (2003) show that institutions tend to break up their orders into many trades. Smaller orders tend to be executed by single market mechanisms while larger orders tend to be executed by multiple mechanisms. The market mechanisms include day crosses, after-hour crosses, electronic communication networks (ECN), and brokerage. When using crosses, traders quote trade sizes without price. These trades are priced at pre-specified times at the primary-market price. An example of a day-cross mechanism is ITG's POSIT. After-hour crossing venues include Instinet Crossing. When using ECNs, anonymous traders can quote price and trade size. Some negotiation features are available, allowing traders to bargain over price and size under full anonymity. When using brokers, traders are relying on a third party who take care of execution.

When institutions have superior information, they tend to hide their trades to minimize trading costs; this phenomenon is known as stealth trading. Kyle (1985) formally showed that informed traders could minimize cost by breaking their trades into smaller pieces, allowing them to hide among noise traders. According to Barclay and Warner (1993), most of a stock's cumulative price change will take place on trades of medium size (between 500 and 9,999 shares), provided that informed traders use trade sizes that are neither too large, so they will not be detected, nor too small, so trading costs will remain low. They confirm their hypothesis for the cumulative price change during the pre-tender offer announcement by using a sample of 108 tender offers between 1981 and 1984. Chakravarty (2001) provides additional support for the stealth-trading hypothesis. He shows that almost all of the informative medium trades are initiated by institutions. He finds that medium-size trades are associated with 78.63% of the cumulative price change while using the trade, quote, order-processing, and audit trail data, between November 1990 and January 1991, on a sample of 97 stocks. Using August 1997-June 2000 data on 50 large-capitalization stocks, 50 small-capitalization stocks, and 41 closed-end mutual funds, Hughen and McDonald (2006) find evidence that supports the Barclay and Warner (1993) and Chakravarty (2001) findings on mid-sized trades. Using data on 144 NYSE stocks for the November 1990-January 1991 period, 200 NYSE stocks for 1995, 200 NYSE stocks for 1998, 200 NYSE stocks for 2002, 200 NASDAQ stocks for 1998, and 200 NASDAQ stocks for 2002, Alexander and Peterson (2007) study the issue of trade clustering. They conclude that orders and trades tend to cluster at multiples of 500, 1,000, and 5,000 shares. They also find that (a) rounded trades tend to be more informative (as measured by their price impact) than unrounded trades, (b) rounded trades of medium size tend to be more informative than those of large size, (c) a rounded trade is more likely to be followed by another rounded trade, (d) rounded trades initiated by buyers (sellers) are more likely to follow rounded trades initiated by buyers (sellers), and (e) the rounding of trade size tends to increase when trading is abnormally heavy. Their evidence is consistent with the hypothesis of stealth traders using rounded medium-sized transactions, especially during periods of heavy trading. Using an international sample, Chiyachantana et al. (2004) show that institutions do tend to break up their orders into smaller trades. The above evidence points to institutions being stealth traders.

Let us assume that a stock is traded by both institutions and individual investors. Let us assume further that each investor category has its own effective spread (ES) level for the same stock. If institutions pay a lower ES, an increase in institutional trading over time, will lead to a decrease in the *average* ES. Conversely, if institutions pay a higher ES, an increase in institutional trading over time will lead to an increase in the average ES. Given the above evidence that institutions try to minimize costs, this paper makes the assumption that institutions pay a lower ES, and therefore tests the hypothesis that an increase in institutional trading over time leads to a decrease in the *average* ES. Thus, this study circumvents the problematic assignment of numerical size ranges to both individual and institutional trades.

The above argument assumes that any decrease in the spread due to increased institutional trading is not caused by an increase in liquidity. This assumption is based on the findings of Nofsinger and Sias (1999) that institutions trade both as a herd and based on lagged returns. These findings imply that institutions tend to exert either a buy or a sell pressure, but not both; therefore, they tend to consume liquidity, not provide it. Indeed, the same paper concludes that institutional herdings impact prices more than individual-investor herdings. Sias et al. (2006) refine these conclusions by presenting evidence pointing to both temporary and permanent price effects of institutional trading.

1.2. Variables. Following Coughenour and Deli (2002) and others, the *ES* measure is:

$$ES_{it} = 2\left|P_{it} - M_{it}\right| / M_{it}\,, \tag{1}$$

where P_{it} is the transaction price, and M_{it} is the quote midpoint of the quotation that prevails when the trade is executed. The trades are lagged by 20 seconds when estimating this variable. For each stock, the ESs are averaged daily (this initial frequency is chosen to facilitate the comparison of some values in this paper with values found elsewhere); these daily averages are then aggregated quarterly (institutional holdings levels, used here, are updated on a quarterly basis).

Both Nofsinger and Sias (1999) and Sias et al. (2006) provide evidence of a liquidity effect resulting from changes in institutional holdings of a stock.

Specifically, they find that the positive contemporaneous correlation between stock returns and changes in institutional holdings is partially explained by the price impact of institutional trading. This implies a positive correlation between changes in institutional holdings and the level of institutional trading. To capture the combined effect of institutional buying and selling on the ES, this study uses the absolute value of the changes in institutional holdings as a proxy for the intensity of institutional trading. Institutional holdings are measured as the percentages of shares outstanding held by institutions. The change in institutional holdings in quarter q for each stock is the difference in institutional holdings between quarter q and quarter q-1.

The following control variables, found in the microstructure literature (see, for example, Coughenour and Deli (2002), and Stoll (2000)), are included: price, trade size, price range, trade frequency, volume, the percent of trades executed at NYSE, and depth. For each stock, they are averaged daily, before the quartely averages are computed. This allows a comparison with the daily figures reported in the literature.

2. Data and results

The sample includes 2,296 quarterly observations of 82 randomly chosen firms for which 1998-2004 NYSE TAQ intraday trade and quote data, as well as 1998-2004 Thomson Financial institutional shareholding data are available. For a comparison, Chakravarty et al. (2004) use a sample of 79 stocks, against a control sample, to study the effect of decimalization on spreads for a period covering April 2000-June 2000 and October 2000-March 2001.

2.1. Sample description and some results. Figure 1 shows the evolution of the median value of the effective spread from 1998 to 2004; the apparent upward trend will be formally confirmed below. Panel A of Table 1 contains the sample means, medians, and standard deviations of the variables in this study. The differences between means and medians may imply a departure from normality of the panel data; the Jarque-Bera test confirms this departure. Therefore, this study uses nonparametric tests; it also uses the rank, and not the value, of the effective spread, in the multivariate analyses that follow.

The mean effective spread is 1.31% and the median spread is 0.80% for the 1998-2004 sample period. These values are above the subsample means of 0.28% (2 times the effective *half* spread of 0.1394%) and 0.29% (2 times 0.1431%) reported in Coughenour and Deli (2002) for the September-December 1997 period. They are also greater than the predecimal mean of 0.652% (January 8-26, 2001) and the postdecimal mean of 0.389% (April 9-August 31, 2001) reported by Bessembinder (2003). This may be due to the upward time trend mentioned above. To investigate this issue, the sample is divided into subperiods. 3 intervals are considered: (a) 1998 Q1-2000 Q4 (heretofore P1), before the full implementation of decimal pricing on January 29, 2001, and the enactment of the Sarbanes-Oxley Act (SOA) on July 30, 2002 , (b) 2001 Q1-2002 Q2 (P2), after decimal pricing, but before SOA, and (c) 2002 Q3-2004 Q4 (P3) after both decimal pricing and SOA.

Panel B of Table 1 contains the periodic median values for the spread and institutional holdings variables. The hypothesis of equality of median values across each pair of periods is tested, using the Wilcoxon/Mann-Whitney, Median Chi-square, Kruskal-Wallis, and Van der Waerden statistics; the hypothesis is reported as being rejected when at least 3 out of the 4 statistics are significant at the 10%, or lower, significance level. The predecimal median effective spread of 0.413% is comparable with the Bessembinder (2003) averages of 0.652% and 0.389%. The median spread increases to 0.961% in P2, and the difference with the P1 value is statistically significant. In the same vein, the median increases again to 1.369% in P3, and the differences with both P1 and P2 values are significant. Therefore, the evidence points to an upward time trend for the effective spread between 1998 and 2004.

The above evidence, of an increase of the spread after decimalization, seems to contradict Bessembinder (2003)'s and others' finding of a spread decrease. To investigate this issue, the daily average spreads are aggregated into a January 8-26, 2001 average and on April 9-August 31, 2001 average for each stock. These periods are respectively the predecimal and postdecimal intervals used by Bessembinder (2003). The predecimal median spread for the sample is 0.530%, the postdecimal value is 0.423%, and the difference is statistically significant at the 5% level by the Wilcoxon/Mann-Whitney, Median Chi-square, Kruskal-Wallis, and Van der Waerden tests. Bessembinder's corresponding values are 0.652% and 0.389%. Therefore, this paper's sample conforms to Bessembinder's finding of a decrease of the spread *a short term after* decimalization. But it also points to a long-term increase of the same spread.

Institutional holdings have a median of 58.73% in P1, 61.49% in P2, and 68.07% in P3. For the whole 1998-2004 period, the median is 63.29%. The upward time trend agrees with Grinstein and Michaely (2005), who report increasing median holdings for their sample, culminating at 57.78% for 1991-1996, before P1. The proxy for institutional trading (i.e. the absolute value of the change in institutional holdings) has decreased from 0.0215% before decimalization, to 0.0189% after decimalization, and the difference is significant. This evidence is consistent with Chakravarty et al. (2005), who find a reduction in dollar adverse selection cost after decimalization on the NYSE and suggest that institutions trade less because of lower liquidity supply. Institutional trading increases back up to 0.0212% (equal to its predecimal level, by the tests above) after SOA; no other study seems to be available for comparison.

The sample median trade size of 948.7 shares per day is below the 1,717 shares/day and 1,805 shares/day means reported in Coughenour and Deli (2002) for their September-November 1997 matched samples. The median trade frequency of 603.37 transactions per day is above their 320.20 transactions/day and 298.63 transactions/day mean figures. These differences are consistent with the decrease in trade size and increase in trade frequency reported by Chakravarty et al. (2005). Specifically, they find an increase in the frequency of small trades (they interpret this to mean a greater participation by retail customers) that is not offset by the observed decrease in the frequency of medium and large trades (they interpret this to mean less institutional trading), after decimalization.

The median depth of 14.51 round lots is smaller than the 36.32 round lots and 38.30 round lots for Coughenour and Deli (2002)'s 1997 matched samples. The difference is consistent with Bessembinder (2003)'s finding of a depth reduction after decimalization.

The median price range of 3.04% is comparable with the 2.66% reported in Table 2 of Coughenour and Deli (2002). The median volume of $18.34 million per day is higher than the group means of $11.99 million and $8.58 million found in Table 1 of Coughenour and Deli (2002). The median percent of trades executed at the NYSE in P1 is 85.92%, which is comparable with the 84.01% and 85.05% subgroup averages for the initial sample in Coughenour and Deli (2002). Similarly, the median price of $29.88 is comparable with the subgroup averages of $32.09 and $31.37 in Coughenour and Deli (2002).

2.2. Multivariate results. The rank, and not the value, of the effective bid-ask spread, is used in the multivariate analyses that follow, because the data deviate from normality. Effective spread rank which goes from 1 to 28, is computed for each stock. Ordered probit models are used throughout this section. All Jarque-Bera tests on residuals cannot reject the hypothesis of normality. All results are shown in Table 2.

The first model uses all observations and the following explanatory variables: a period 2 (post-decimalization, pre-SOA) dummy variable, a period 3 (post-decimalization/SOA) dummy variable, absolute change in institutional holdings (the proxy for institutional trading), log(trade size), log(trade frequency), log(price), range, percent of NYSE trade executions, and log(depth). The use of logarithm mirrors Coughenour and Deli (2002). The 3 remaining models restrict the observations to each of the 3 periods (and remove the dummy variables). In the first model, the P2 variable has a positive and significant coefficient. This confirms the above univariate result showing a *long-term* increase in the effective spread after decimalization. The P3 variable has also a larger, positive, and significant coefficient, again confirming the univariate result. This seems to indicate an increase in the effective spread after the enactment of the Sarbanes-Oxley Act. The coefficient for institutional trading is negative and significant. This result supports the hypothesis of a lower effective spread for institutional trades. It is reinforced by the negative and significant coefficient for trade size: if individual investors trade in smaller sizes, as implied by Chakravarty et al. (2005), this evidence suggests that they pay a greater bid-ask spread.

When the sample is restricted to the predecimal period (1998 Q1-2000 Q4), the above results hold: the coefficients for both institutional trading proxy and trade size are negative and significant, implying that institutions may have paid a lower effective spread than retail traders. For the postdecimal, pre-SOA sample (2001 Q1-2002 Q2), the coefficient for institutional trading is negative but not significant. This coincides with the lower level of institutional trading, documented in the univariate test above (see Panel B, Table 1), and suggested by Chakravarty et al. (2005). Therefore, the lack of institutional effect on the spread during this period may be explained by the lack of institutional participation. However, the coefficient for trade size is still negative and significant. Hence, the evidence still points to a greater spread paid by individual investors. When the sample is restricted to the last period under study (postdecimal, post-SOA: 2002Q3-2004 Q4), the coefficient for the institutional trading proxy is back to negative and significant. This evidence of a lower institutional spread coincides with the increase in institutional trading to its predecimal level, shown in the univariate test above (in Panel B of Table 1) for this period. The coefficient for trade size is not significant. This is consistent with institutions using smaller trade sizes that are not distinguishable from retail traders'.

Conclusion

The results in this paper suggest that institutions have paid a lower effective bid-ask spread than individual investors between 1998 and 2004. In particular, there is a negative time-series correlation between the level of institutional trading and the average spread, as well as between trade size and the average spread, while control variables are used. Additional results are consistent with the hypotheses that (a) the spread has increased over time, even though it decreased a short term after decimalization, and (b) institutions have traded less after decimalization, and have returned to their former level of trading after the enactment of the Sarbanes-Oxley Act, by using smaller trades.

The result that institutions pay low effective spreads is congruent with results reported in other papers. Studies, such as Conrad et al. (2003), point to the fact that institutions use cost-minimizing strategies when executing orders. Orders are broken up into smaller trades. Larger orders are executed on multiple market mechanisms. The literature on stealth trading provides evidence that informed institutions hide their trades to minimize cost. Papers such as Barclay and Warner (1993), Chakravarty (2001), Hughen and McDonald (2006), and Alexander and Peterson (2007) show that even when informed institutions disguise their trades by breaking them up, they are also minimizing trading cost by ensuring that the size of trade is not too small. The main contribution of this study is to have compared this cost against a benchmark (retail cost).

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Appendix

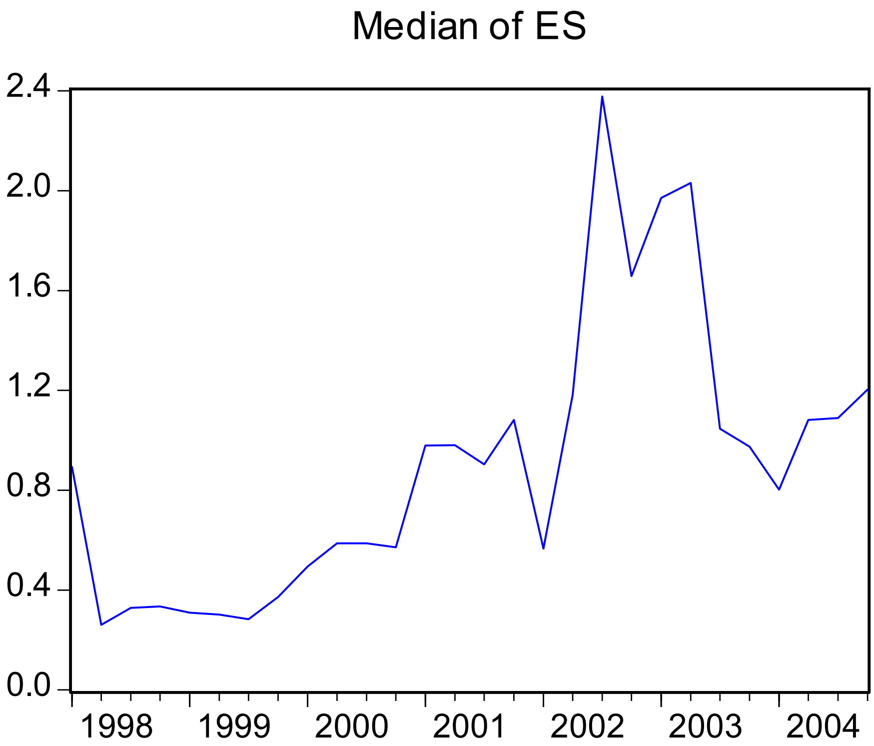

Fig. 1. The evolution of the effective bid-ask spread (Sample median) between 1998 and 2004

Table 1. Descriptive statistics. Panel A. Sample statistics

	Effective bid-ask spread (%)	Institutional holdings	|Change in institutional holdings|	Trade size	Trade frequency	Depth (round lots)	Volume ($ millions)	NYSE executions	Price	Range (%)
Mean	1.3064	0.6066	0.0340	1047.81	1097.94	23.92	50.50	0.8470	34.05	3.74
Median	0.7998	0.6329	0.0207	948.70	603.37	14.51	18.34	0.8592	29.88	3.04
Standard deviation	1.6750	0.1969	0.0426	633.38	1322.88	42.57	82.05	0.8542	22.28	2.63

Panel B. Selected subsample median values

	Subperiods			Hypotheses		
	1998 Q1-2000 Q4	2001 Q1-2002 Q2	2002 Q3-2004 Q4	P1=P2	P2=P3	P1=P3
Effective bid-ask spread (%)	0.4127	0.9605	1.3687	No	No	No
Institutional holdings	0.5873	0.6149	0.6807	No	No	No
|Change in institutional holdings|	0.0215	0.0189	0.0212	No	No	Yes

Notes: 1. The sample contains 2.296 quarterly observations, between 1998 and 2004, of 82 stocks listed on the NYSE. 2. The effective bid-ask spread (*ES*) is $2|P_{it} - M_{it}| / M_{it}$, where t is the time of the trade, P_{it} is the transaction price, M_{it} is the quote midpoint of the quotation that prevails when the trade is executed. Similar to Coughenour and Deli (2002), trades are lagged by 20 seconds. 3. The institutional holdings level is the number of shares held by institutions divided by the number of shares outstanding from the Thomson Financial database. The change in institutional holdings in quarter q for each stock is the difference in institutional holdings between quarter q and quarter q-1. 4. Price, trade size, price range, trade frequency, volume, the percent of trades executed at NYSE, and depth are estimated daily, for each stock, before the quartely averages are computed. The data are from the NYSE TAQ intraday trade and quote database. 5. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. 6. Panel B uses the Wilcoxon/Mann-Whitney, Median Chi-square, Kruskal-Wallis, and Van der Waerden tests of equality of median values across different periods. The hypothesis of equality is rejected when at least 3 out of the 4 statistics are significant at the 10% or lower level. 7. 1998 Q1-2000 Q4 (P1) is a pre-decimal pricing, pre-Sarbanes/Oxley period. 2001 Q1-2002 Q2 (P2) is a post-decimal pricing, pre-Sarbannes/Oxley period. 2002 Q3-2004 Q4 (P3) is a post-decimal pricing, post-Sarbanes/Oxley period.

Table 2. Ordered probit analysis of effective bid-ask spread

	Effective bid-ask spread rank (All periods)	Effective bid-ask spread rank (Period 1)	Effective bid-ask spread rank (Period 2)	Effective bid-ask spread rank (Period 3)
Period 2. Dummy variable	0.9141*** (11.23)			
Period 3. Dummy variable	1.46*** (13.84)			
|Change in institutional holdings|	-2.40*** (-4.67)	-2.41*** (-3.34)	-0.6918 (-0.6019)	-4.94*** (-5.13)
Ln(trade size)	-0.1405*** (-4.05)	-0.1683*** (-3.45)	-0.2126*** (-2.83)	0.0585 (0.1761)
Ln(trade frequency)	0.0369 (1.15)	0.0714 (1.35)	-0.0811 (-1.13)	0.0667 (1.14)
Ln(price)	-0.1545*** (-3.03)	-0.7581*** (-8.21)	-0.2094* (-1.95)	0.1438* (1.77)
Range (%)	0.0483*** (4.72)	0.0347* (1.88)	0.0350 (1.63)	0.0637*** (4.05)
NYSE executions (%)	-0.0105 (-0.4258)	-0.0107 (-0.4284)	0.7309* (1.82)	0.7908*** (2.49)
Ln(depth)	0.0395 (0.8307)	0.0219 (0.2938)	0.0622 (0.4937)	0.0093 (0.1233)

Notes: 1. z-statistics are in parentheses. 2. The sample contains 2,296 quarterly observations, between 1998 and 2004, of 82 stocks listed on the NYSE. 3. The effective bid-ask spread (*ES*) is $2|P_{it} - M_{it}| / M_{it}$, where t is the time of the trade, P_{it} is the transaction price, M_{it} is the quote midpoint of the quotation that prevails when the trade is executed. Similar to Coughenour and Deli (2002), trades are lagged by 20 seconds. 4. The institutional holdings level is the number of shares held by institutions divided by the number of shares outstanding from the Thomson Financial database. The change in institutional holdings in quarter q for each stock is the difference in institutional holdings between quarter q and quarter q-1. 5. Price, trade size, price range, trade frequency, volume, the percent of trades executed at NYSE, and depth are estimated daily, for each stock, before the quartely averages are computed. The data are from the NYSE TAQ intraday trade and quote database. 6. ***, ** and * represent statistical significance at the 1%, 5% and 10% levels respectively. 7. The ranking of values is repeated over all firms.