Valuable Information and Costly Liquidity: Evidence from Individual Mutual Fund Trades

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Abstract

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Abstract

Fund managers can demand liquidity for their trading ideas or provide liquidity for others' ideas. We identify the roles of these motives using a database of the individual transactions by Canadian equity funds. Both the cost and subsequent performance of their buys decline after strong inflows, indicating the depletion of ideas and substitution into liquidity provision as funds put new money to work. Sales show little of this substitution, consistent with funds' narrower latitude to provide liquidity to buyers. In general, the option to provide liquidity makes fund performance positive in the transactions costs of buys, but not of sells.

1. Introduction

Equity markets provide trade immediacy at a price, and traders can profit from either charging or paying that price. The literature on active mutual-fund management focuses largely on demanding, or paying, for immediacy: managers generate perishable trading ideas, and pay for the immediacy required to profit from the ideas before they expire, speculating that their value exceeds the price paid to execute them. Or maybe the managers do not have new ideas but are forced to trade anyway because of inflows or redemptions, and again pay for immediacy but now at a loss. These are the motives generally associated with institutional transactions. However, active managers could instead take the other side: providing, or selling, immediacy for the trades of others, now speculating that the price they charge exceeds the prospects of the other side.[1] In this paper we gauge the separate contributions of these motives to the transactions of active traders, paying particular attention to the role of the fund's inventory of trading ideas.

A fund has, to some extent, an inventory of trading ideas. That is, management invests in a process designed to generate trading ideas, and at some pace this process builds an inventory. If a new idea is to sell a current holding, then it can be executed at will in liquid markets. But if the new idea is to buy, then it requires cash from sales or inflows. So the arrival of cash fosters trades which reduce the inventory of new ideas, and if this reduction outpaces the arrival of new ideas then eventually the inventory is depleted. With a depleted inventory of ideas, demanding immediacy when the next cash arrives would be unprofitable. However, the manager could aim to supply immediacy instead. That is, looking across her investible universe, the manager could look for stocks to buy from motivated sellers at negative, or at least small, transactions costs. The manager could supply immediacy to motivated buyers as well, but would have only her fund's

[1] Keim (1999) examines this substitution between demanding and supplying liquidity in the context of a passive mutual fund.

holdings from which to choose stocks to sell. The diligence for such liquidity provision would presumably hinge on what the manager could infer about the other side.

Besides recent flows, another likely influence on trade cost and performance of considerable interest is the fund's size. In the view of Berk and Green (2004), a fund's size is an endogenous response to the fund's apparent value-added, and this value addition could manifest as cheaper trade execution, or better subsequent performance. Similarly, in the view of Gervais, Lynch, and Musto (2005), fund family size associates with higher managerial value-added, through its effect on the efficiency of managerial retention.

To shed light on whether the substitution from demanding to supplying immediacy is at work in funds' transactions costs, and also on the relation between transactions costs and fund size, we assemble a database of individual trades for a sample of mutual funds whose identities we know. This knowledge allows us to relate the individual trades to the fund-specific characteristics such as funds' flows and fund size, and to the market for the traded stocks.[2] The database starts with statutory filings by Canadian mutual funds: For ten years, Canadian funds were required to disclose every trade in year-end filings. The funds did not have to disclose the trade dates, but many funds did anyway, in large part because of the disclosure format chosen by the custodian rather than the mutual fund. We collected all such filings, identified the ones disclosing dates, and merged these data with another database showing the funds' flows, returns, and other specifics, and yet another database of intraday trades and quotes in Canada and the US. With the resulting file, we can estimate the transactions cost of each trade, as well as its subsequent performance and

[2] While much research has examined influences on individual fund trades (e.g., Chan and Lakonishok (1995); Keim and Madhavan (1997); DiMascio, Lines, and Naik (2016); Busse, Chordia, Jiang and Tang (2016); Anand, Irvine, Puckett, and Venkataraman (2012)), the fact that most prior studies did not know the identity of the funds in their samples meant that measurement of fund-specific influences on trade costs and performance was not possible.

the context, including fund flows, in which it occurred. So we can see the substitution from demanding to supplying liquidity, and the adverse-selection cost that the substitution imparts.

Looking ahead to our results, the key finding among trading costs is that the cost of purchases goes down as recent flows go up. So while inflows oblige funds to buy more than they planned, the funds avoid buying more immediacy than their less-informed trades call for. And consistent with a fund's lesser ability to satisfy motivated buyers, the same does not hold for sales; the transactions cost of sales shows no relation to recent flows.

The performance of the trades bears out this substitution hypothesis. While a fund's performance is positive in fund and family size, it is negative in flows: inflows correspond to flat or negative returns on stocks purchased, depending on the sample period, and outflows correspond to flat or positive returns on stocks sold.

After analyzing trading costs and performance separately, we relate the two, asking whether the performance of trades increases with their initial cost, and we find that it does: as trade cost increases, the stock does better the next day if the trade was a buy, and worse if it was a sell. We also find that funds' largest trades look from both perspectives like liquidity provision: they are struck at lower transactions costs, and the near-term performance of the trades is worse.

The paper is in seven sections. Section 2 is a brief review of relevant literature, Section 3 describes the data, Section 4 addresses trading costs, Section 5 addresses trade performance, Section 6 relates costs to performance, and Section 7 summarizes and concludes.

2. Related Literature

This paper contributes to two areas of mutual-fund research. There is the literature going back at least to Jensen (1969) on whether and how mutual funds add value through active trading, and a more recent literature on the benefits of liquidity provision by mutual funds.

The relation between mutual fund performance and trading costs has long been of interest to both practitioners and researchers. However, lack of individual trade reporting requirements has impeded empirical analysis. One remedy has been to estimate costs from Thomson (CDA/Spectrum) holdings data using quarterly changes of portfolio holdings. The test design in many of these studies, dating back to Grinblatt and Titman (1989), is to compare the gross returns (from, say, CRSP) of a portfolio assuming holdings were fixed for the quarterly period and compare these to the actual returns (net of fees and transactions costs) of the fund. More recently, Bollen and Busse (2006) compare trading costs derived from holdings changes and find that active managers experienced a significant change in trading costs after the change to decimalization compared to index funds.

This approach can shed some light on the relation between the cost and future performance of trades. Wermers (2000) combines the holdings data with the CRSP mutual fund file and finds that the gross returns of actively-managed funds exceed estimates of the costs of their implied trades. Using a similar approach, Kacperczyk, Sialm, and Zheng (2005) find that actively-managed funds with more concentrated holdings, presumably exploiting the manager's informational advantage, outperform less-concentrated (more diversified) funds, suggesting that effective trading ability varies by fund and contributes to overall performance. Chalmers, Edelen, and Kadlec (1999) and Edelen, Evans, and Kadlec (2013) also infer trading costs from portfolio data by estimating the effective spread for mutual fund equity holdings. Based on brokerage

commission data from the semi-annual N-SAR filings, they estimate that brokerage commissions add up to 0.30% of returns and spread costs are 0.47%. By relating fund's performance to transaction costs, they document a negative impact of aggregated trading costs on mutual fund returns.

There is another stream of literature – for example, Chan and Lakonishok (1995), Keim and Madhavan (1997), Anand at al. (2012), Frazzini, Israel, and Moskowitz (2015), DiMascio, Lines, and Naik (2016), Busse et al. (2016) – which, like this paper, compute trade costs from directly-observed individual transactions. Using data from proprietary sources like the Plexus Group and Abel-Noser Solutions, these papers focus on the relation between the cost of trade immediacy and the size of the trade, stock-specific factors, and the relative urgency of trade (e.g., momentum versus index managers.) Those data enable the researcher to identify who initiates the trade and, thereby, is demanding liquidity. The key contrast between those papers and ours is that those papers can identify a fund's intentions; for example, they can identify when two 10,000-share trades were actually part of a 20,000-share order. But because the funds in their data are anonymous, they can link trading activity only to general characteristics – mainly the investment style – of the traders. In this paper we do not observe the fund's trading intentions, only its outcomes; but because these filings are entirely public, we can link the trades to relevant information about the funds including subsequent fund performance. An exception among the papers referenced above is Busse et al. (2016) who use the anonymous individual trades from the Abel-Noser data, but develop an algorithm that matches the actual trading activity from Abel-Noser with quarterly changes in Thomson holdings data in an effort to identify the fund executing the Abel-Noser trades. This enables them to match trade costs to specific funds, and relate fund size and fund performance (estimated relative to a 4-factor model) to fund transactions costs.

Another exception is Frazzini, Israel, and Moskowitz (2015) who examine the trades of one large institution and, as a result, are unable to analyze cross sectional relations between trade costs and fund characteristics.

We, like Busse et al. (2016), examine the relation between trade costs and subsequent fund performance. Our focus, however, is on the change in a fund's trading in response to its inflows/redemptions through their effect on its inventory of potential trades. Because we can correlate individual trades with liquidity needs, we can estimate whether a given trade supplies or demands liquidity, and also estimate its information content and its contribution to the fund's performance. Thus, we contribute to a body of work documenting liquidity provision by mutual funds dating back to Keim (1999), which examines the substitution between demanding and supplying liquidity in the context of a passive mutual fund and shows how supplying liquidity can improve fund performance. Looking across investment styles, Da, Gao, and Jagannathan (2011) use quarterly portfolio changes to argue that growth-oriented funds tend towards stock selection whereas income-oriented funds tend towards liquidity provision. Zhang (2009) argues that liquidity provision can be beneficial especially when mutual funds supply liquidity to funds forced by outflows to sell. Bhattacharya, Lee, and Pool (2013) show that mutual funds are willing to supply liquidity to affiliated funds in the same fund family suffering from fire sales. In Anand, Irvine, Puckett, and Venkataraman (2013) the question is whether crises alter institutions' propensities to supply vs demand liquidity. Our question is not about rare macroeconomic disasters, but instead a potentially common microeconomic problem i.e. whether inflows exhaust a fund's trade ideas and lead it to provide liquidity instead.

3. Data Sources and Definition of Variables

We examine a public database of mutual fund filings available at SEDAR (www.sedar.com). We collect all the interim and annual statements of portfolio transactions dated between January 2001 and June 2004, yielding transaction data covering January 2001 through December 2003. These documents are all pdf files which require a labor-intensive transfer to usable form. Thus, we focused on only active mutual funds reporting transaction dates in their filings. We matched 199 active funds to Morningstar of which we observe 376 fund/years of data. The funds are in four broad categories: Canadian Equity (103 funds), US Equity (43 funds), International (18 funds), and Specialty Funds (35 funds).[3]

All trades for each of these funds were collected, but not all trades are in the final sample of the analysis, because we cannot match all trades to data sources for market prices for the traded stocks. Some of the stocks in our data were traded on markets outside Canada and the US so we did not match these trades. If we matched the name of a traded stock with a CUSIP, we identified the trade as a good match only if the execution price derived from the statement of transactions is between the maximum and minimum price for the day.

All fund-level data for our sample of Canadian mutual funds comes from Morningstar and is reported monthly. These data include historical returns of the funds, total net assets (which are aggregated across share classes for the same fund), sponsor identity, and fund category. Our sample covers 30% of the Canadian active mutual fund industry. In Table 1 we provide summary information about the funds in our sample (Panel A) and for the entire Canadian mutual fund

[3] Using Morningstar's category definitions, Canadian funds include Canadian Balanced, Canadian Dividend, Canadian Equity, Canadian Equity Pure, Canadian Tactical Asset Allocation, and Canadian Small Cap. US funds include US Equity, US Small and Mid-Cap, North American and High Yield. International funds include Emerging Markets, Global Balanced and Asset Allocation, Global Equity, and International Equity. Specialty funds include Healthcare, Financial Services, Natural Resources, Science and Technology, Real Estate, Precious Metals, and Miscellaneous.

universe (Panel B), averaging across each fund/month. For the 199 funds in our sample, the average total net assets for each fund is $406 million, the total net assets of the sponsor is $20 billion, average monthly net-flows are 1.24%, and the average monthly rate of return is 0.29%. For comparison to the overall industry (n=677), the average Canadian active mutual fund has a total net asset size of $349 million, the sponsor net assets average of $17.09 billion, average monthly net-flows are 2.7%, and the average monthly rate of return is 0.41%. Overall, our sample appears to be representative of an average fund in the industry.

Market-related data for the stocks traded come from four major sources: Datastream, CRSP, TSX Trade and Quotes Data, and US Trade and Quote Data. The daily information on market returns, stock returns, closing bid and ask prices used to calculate the spread, and market capitalization come from Datastream for Canadian stocks and CRSP for US stocks. The daily average trading volume for the 20 days before the trade, opening price, and the minimum and maximum price come from the trade and quotes data in each respective market. In the event that a stock is traded in both the US and Canada, we assume the stock traded in Canada and match with the Canadian data. To convert US prices to Canadian dollars, we use the daily exchange rate posted by the Bank of Canada. After some filtering to remove outliers and matching, we are left with 107,058 buy and 80,202 sell trades.

We test for the effect of flows on trades, where the statistics and tests are designed to make the best use of the available data. The available data on funds' assets under management are monthly so the flow data are monthly; accordingly, the flows we relate to a transaction are those over the month preceding the trade. We use the preceding month, rather than the same month, since the same-month flow looks ahead of the trade to the end of the month, and thus potentially introduces a look-ahead bias. Regarding the trades themselves, we get the date but not the time of

day, so when we relate a trade to the stock's recent return, the return ends with the close of the previous trading day, and when we relate it to the stock's subsequent return, it is the return starting with the close of the same day. For the same reason, we do not know the bid/ask spread that prevailed at the moment of the trade, so when we need the spread relevant to the trade we instead take the average spread over the previous twenty trading days. This averaging also serves to remove noise from the spread estimate. And when we benchmark the trade to calculate its cost, we use the same-day open price. Accordingly, the scenario that best fits our benchmarking is where the decision to make a trade is struck sometime between the previous day's close and the same day's open, because this is the scenario where the cost we measure is the trade's implementation shortfall.[4]

3.1 Trade- and stock-specific variables

We analyze trade costs by relating them to the relevant stock- and trade-specific forces and circumstances identified by the literature, and adding the fund-specific variables that the database provides. We do this by first calculating the trade costs as percentage departures from the same-day open, i.e.

$$TC_{d,buy} = \frac{P_d - P_{d,open}}{P_{d,open}} \qquad TC_{d,sell} = \frac{P_{d,open} - P_d}{P_{d,open}}, \tag{1}$$

where P_d is the execution price and $P_{d,open}$ is the stock's opening price on the same day, and then relating them in pooled cross-sectional and time-series regressions to the explanatory variables. The stock-specific explanatory variables include the bid-ask spread *Spread*, which is the average

[4] See Perold (1988) and numerous subsequent studies including Keim and Madhavan (1997), Anand et al. (2012, 2013) and Busse et al. (2016).

percentage spread over the previous twenty trading days, and the log of the stock's market capitalization, *log(MktCap)*. To capture the impact of dollar trading volume on the stock's price we include the popular measure drawn from Amihud (2002),

$$Log(Amihud) = \log\left(Mean(\frac{|Ret_{s,d}|}{Vol_{s,d} \cdot P_{s,d}})\right), \quad (2)$$

where $Ret_{s,d}$ is return and $Vol_{s,d}$ is volume of stock s on day d, and the mean is computed over the prior 20 trade days. To pick up any systematic differences between trading Canadian vs US stocks, we include *CanUS* which is 1 for Canadian stocks and 0 otherwise, and to allow for the effect of the recent performance of a stock on the cost of trading it, we include *XS_Ret_Pre_1Mo*, which is the stock's return over the month ending the day before the trade, minus the return of the domestic index (the TSE 300 or the S&P 500) over the same period. The dependent variables *XS_Ret_Post_1Day* and *XS_Ret_Post_1Week*, the excess returns over the day and week beginning with the close of the trade day, are calculated analogously.

The trade-specific variables include the size of the trade relative to the stock's trading volume, *TrSize/Vol*, where volume is the average shares traded over the previous twenty days. And finally, we include an indicator for whether the trade appears to be part of a package of trades, i.e. one of several pieces of a broken-up block trade. The database does not indicate this directly so we need to estimate. Our estimate is *ClosePastTrade*, which is 1 if the same fund traded the same stock in the same direction anytime in the week ending the day before the trade, and 0 otherwise.[5]

[5] We occasionally see the fund trade the same stock in the same direction on the *same* day, but we do not reference these trades in the calculation of *ClosePastTrade* since we do not know if they came before or after the trade in question, and we do not want to introduce a look-ahead bias.

3.2 Fund-specific variables

A fund's investment style has been found, for example by Chan and Lakonishok (1995), Keim and Madhavan (1995, 1997) and Da, Gao, and Jagannathan (2011), to influence its demand for immediacy and thus its trade costs. For example, momentum funds chasing short-term price trends demand relatively more immediacy, whereas value-oriented managers (e.g. Warren Buffett), relying on longer-lived information, can be more patient when building or liquidating positions and therefore demand relatively less. These differing demands for immediacy may influence trade costs.

A fund's size can also influence its trade costs. Existing research finds that fund costs are inversely related to fund size, consistent with economies of scale in running a fund (Collins and Mack (1997), Tufano and Sevick (1997), Chalmers, Edelen, and Kadlec (1999), and Edelen (1999)). Chalmers, Edelen, and Kadlec (1999) find that trade costs in particular, rather than fund costs in general, are less negative in size and thus indicate lower scale economies, perhaps due to the scale diseconomies promoted by Berk and Green (2004). However, the trade costs in Chalmers, Edelen, and Kadlec (1999) are only rough approximations, as they reflect only quarterly portfolio changes, as opposed to the actual trades reported by the data used here. To allow for fund-size effects we include $Log(TNA)$, the log of the fund's total net assets (TNA) as of the end of the month of the trade. To further allow for an effect of the size of the fund's family, such as economies from its stable of analysts or back-office operations, or diseconomies from replicating trades across multiple funds, we also include $Log(TNASponsor)$, i.e. the log of the aggregate TNA of all funds with the same sponsor on that date.

We calculate net flows from returns and TNA in the usual way. For a trade executed in month $t+1$ we measure $Flow$ as $\left(TNA_t - TNA_{t-1} \cdot (1+R_t)\right)/TNA_{t-1}$, where $TNA_t$is the fund's TNA at the end of month t and R_t is its net-of-fee-return during month t. In the later part of our analysis, we also construct cumulative m-month flows as $Flow_{t;t-m} = \prod_{k=0}^{m-1}(1 + Flow_{t-k}) - 1$.

Table 2 provides summary statistics for the constructed variables. To eliminate the effect of extreme outliers we winsorize TC, $TrSize/Vol$, $Log(Amihud)$, $Spread$, $Flow$, $XSRet\_Pre\_1Mo$, $XSRet\_Post\_1Day$, and $XSRet\_Post\_1Wk$ at the 1% and 99% level. As reported in Table 2, unconditional average trade costs are higher for sells ($TC_{sell} = 40$bps) than for buys ($TC_{buy} = 7$bps). The distributions of trade sizes are similar between buys and sells and skewed, with the average around 3 percent of daily volume and the median a tenth of that. Buys and sells are executed in similarly liquid markets, judging from our estimates of $Log(Amihud)$, $Spread$, and $Log(MktCap)$. The post-trade excess returns for the traded stocks are higher for buys than for sells, with a daily average over the subsequent week is 4bp for buys and −1.5bp/day for sells, both in the direction of valuable information motivating the trades.

4. Determinants of Trade Costs

The question for the data is whether flows deplete a fund's trading ideas, and in particular, whether they push the fund from demanding to supplying liquidity. We address this question by first relating flows and other explanatory variables to trade costs, and then relating trade costs to subsequent returns.

For a first look we relate trade cost to trade size in Figure 1. Trades are sorted by $TrSize/Vol$ into deciles and their costs are averaged within these buckets. Among buys, the

relation follows a hump shape, rising to the 7th decile and then falling. Among sells, cost does not rise with trade size but it does fall for the largest three deciles. These relations are consistent with the largest trades gravitating toward liquidity provision, perhaps reflecting reverse inquiry. To allow for this possibility in the regressions, we divide $TrSize/Vol$ at the 75th percentile (1.5 percent of volume for buys and 1.7 percent for sells) to create two variables: $Low\ TrSize/Vol$ is $\min(TrSize/Vol, P\ 75\%)$ and $High\ TrSize/Vol = TrSize/Vol - Low\ TrSize/Vol$.

4.1 Regression Model

We estimate the relation between trade costs and flows and the other explanatory variables using ordinary least squares (OLS) regressions, estimated separately for buys and sells, with three specifications for each: one with *TrSize/Vol* and two with the piecewise version of *TrSize/Vol*, one of which has *Log(Mcap*) interacted with *Log(TNA)*. The coefficients and t-values based on heteroscedasticity-consistent standard errors are in Table 3.

The main result is that the effect of flows is strong and statistically significant among buys, but not sells, for all three specifications. So as flows increase, transactions costs of buys go down, but those of sells appear unaffected. Among the other variables, we find that larger funds see lower costs for trades of the same size, but given that, larger fund families see higher costs, which could reflect trade ideas executed at the family level. We also see higher costs for larger stocks, which is not in line with the usual intuition that information is scarcer for smaller stocks, but breaking this out by fund size isolates the higher cost in larger funds, consistent with these funds focusing their information gathering on larger stocks. And momentum trading is expensive: buys are more expensive after good returns, and sells are more expensive after bad returns.

The regressions find a significant effect of the magnitude of lagged flows on the cost of buys, but not sells, which is consistent with the funds' wider latitude to satisfy motivated sellers than motivated buyers. In the next subsection we focus exclusively on buys and look beyond the most recent month to earlier months to gauge whether more distant flows are relevant to a fund's inventory of buy ideas.

4.2 Relation between trade costs and persistence of cash flows

The goal of this subsection is to gauge the effect of positive flows before the most recent month on trading costs, and by implication the inventory of trading ideas, in the current month. We do this by identifying the funds with two, three and four consecutive months of positive flows, and testing whether the incidence of negative estimated transactions costs among these funds is significantly higher than among the other funds.

There are four panels in Table 4, each with a two by two sort. Funds are sorted by recent flows, where those with positive flows in the most recent month (or, in panels B, C and D, each of the two, three or four most recent months) are in the top row, and all other funds are in the bottom row. In the left column is the number of transactions with positive estimated trading costs, and the right column is the number with negative estimated trading costs. Under the number is the percentage that number represents of the two numbers in that row. Thus, positive flows associate with a greater incidence of negative transactions costs, then the percentage in the upper right cell is higher than the percentage in the lower right cell. And as we go down the panels, we see the effect of increasingly distant flows on this incidence.

Looking across the panels, there is little evidence that flows before the most recent month are relevant to the current inventory of trade ideas, in that there is not a growing gap between the relevant percentages. Thus we focus the remainder of our tests on the most recent flows.

Given the evidence that flows in the recent month are the most relevant for the current inventory of trade ideas, we explore further the hypothesis that managers receiving larger flows increasingly tilt subsequent trades toward liquidity provision. This exploration is presented in Figure 2. The x-axis groups funds by their lagged flows in 1.25%-wide bins ranging from -5% to +5%. The y-axis reports the average trading costs for all funds in each of the fund-flow bins. Consistent with the regression results in Table 3 and the hypothesis that funds turn to liquidity provision as more and more flows come in, we see a strong negative relation between average trading costs and past flows.

5. Relation between buy costs and subsequent returns

Investors paying for immediacy presumably expect higher near-term returns. Is this what we see? We can test for this relation by using the same general regression design as in Table 3, except now trading costs are an explanatory variable, and the dependent variable is the stock's excess return (i.e. raw return minus the S&P or TSE, as appropriate) over the next day or week. The results are in Tables 5 (buys) and 6 (sells).

Among both buys and sells, we find a strong relation in the predicted direction over the next day. When funds pay more to buy a stock quickly, it does better the next day, and when they pay more to get out of a stock quickly, it does worse the next day. Over the next week, the relation is strongly significant among sells and weakly significant among buys. Conditional on the information impounded in trading costs, flows show a generally positive relation to the future returns of stocks the funds are buying, and negative relation to those of the stocks they are selling, which could reflect the herding dynamic documented elsewhere (e.g. Wermers (1999)). In the tables we find larger buys and sells doing relatively worse in the short term, implying that for a given trading cost, the larger trades are more likely to be liquidity provision rather than demand.

And we also find that the larger families make the better buys, and the larger funds make the better sells.

6. Relation between a fund's transactions costs and its performance

So far we find that funds incur trading costs judiciously on the buy side, when they have trading ideas, and otherwise substitute into liquidity provision. Providing liquidity is not so feasible on the sell side, and there we see little evidence of it. On both sides, higher transactions costs predict better performance, but for a given transactions cost, bigger trades do worse. Larger trades loom larger for the fund, so this leaves open the question what the relation between trading costs and performance means for the funds' shareholders. To find out, we run a last set of regressions where a fund's month-*t* performance is the dependent variable, and the independent variables include the value-weighted transactions cost of the fund's buys and of the fund's sells that month. We run the regression with and without fund and year/month fixed effects. The results are in Table 7.

The regressions find that, no matter the specification, the transactions costs of buys relate positively to performance the month of the trade. The relation to the cost of sells is never positive, and is significantly negative in half the specifications. So the bottom line from the mutual-fund investors' point of view is that the option to supply rather than demand liquidity allows their managers to get value for value when they pay for buys, but not when they pay for sells. And it is worth noting that none of this is picked up when the trade costs of buys and sells are not separated out.

7. Summary and Conclusion

We test a hypothesis about mutual funds' transactions costs: inflows deplete buy ideas, causing funds to tilt from liquidity demand to liquidity provision. We also test the companion hypothesis that outflows deplete sell ideas, and also lead to liquidity provision. We find strong evidence for the effect on buys but not on sells, consistent with the greater difficulty to a fund of satisfying motivated buyers, compared to motivated sellers. We also see that the largest trades tend toward liquidity provision. Looking ahead at the near-term performance of the trades, we find that more expensive buys and sells perform better, and also find more evidence that the largest trades tend toward liquidity provision. To the ultimate beneficiaries, the funds' shareholders, transactions costs in general are unrelated to concurrent performance, but by disaggregating costs we find that performance is positive in the cost of buys and negative in the cost of sells.

Our findings support the view that funds pay for immediacy judiciously, not buying more than they need for the task at hand. The assumption underlying this conclusion is that we can take an inventory view of a fund's trade ideas: research builds the inventory up, and then buys take it down. More inflows mean more buys and thus fewer remaining ideas, so that eventually selling immediacy to others creates more value. Further evidence on the production and use of trade ideas by fund families is an interesting area for future research.

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Table 1: Descriptive statistics of the matched sample and Morningstar universe. Panel A reports summary statistics for our sample of 199 Canadian active mutual funds for the period between January 2001 and June 2004. All data on mutual funds is collected from Morningstar Canada. Our sub-sample of mutual funds covers 30% of the Canadian mutual fund market. Panel B provides a comparison of our sample to the universe of active mutual funds located in Canada between January 2001 and June 2004. TNA is total net assets of the fund (aggregated across all share classes) and TNA SPONSOR is the total net assets of the sponsor of the fund. Net-flows denotes percentage fund's net-flows. Net monthly returns are the monthly returns of the fund measured at the end of the month and deducting any expenses. All variables for the fund are available on a monthly basis and the computed averages are at a fund-month level. Mutual funds in our sample are assigned based on Morningstar's category definitions into four broad categories: Canadian Equity (Canadian Balanced, Canadian Dividend, Canadian Equity, Canadian Equity Pure, Canadian Tactical Asset Allocation , and Canadian Small Cap), US Equity (US Equity, US Small and Mid-Cap, North American and High Yield), International (Emerging Markets, Global Balanced and Asset Allocation, Global Equity, and International Equity), and Specialty funds (Healthcare, Financial Services, Natural Resources, Science and Technology, Real Estate, Precious Metals, and Miscellaneous).

PANEL A: MATCHED SAMPLE

STYLE	TNA ($ millions)		TNA SPONSOR ($ billions)		NET-FLOWS (%)		NET-RETURN (%)		NUMBER OF FUNDS
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	
Canadian Equity	624.75	1,129.04	16.75	19.07	1.02	4.24	0.55	3.46	103
US Equity	185.16	256.48	19.81	21.02	2.47	8.75	-0.31	4.75	43
International	140.30	224.34	24.57	19.11	1.88	6.30	-0.22	3.95	18
Specialty	158.17	239.13	31.78	17.23	0.19	3.74	0.43	7.43	35
All	406.28	862.99	20.83	20.03	1.24	5.68	0.29	4.81	199

PANEL B: MORNINGSTAR UNIVERSE

STYLE	TNA ($ millions)		TNA SPONSOR ($ billions)		NET-FLOWS (%)		NET-RETURN (%)		NUMBER OF FUNDS
	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	Mean	St.Dev.	
Canadian Equity	513.38	1,058.69	16.15	14.35	3.45	11.47	0.61	2.93	299
US Equity	193.50	346.79	18.27	15.91	1.95	10.40	-0.18	4.31	88
International	259.46	789.31	17.46	13.96	2.30	11.77	0.35	4.30	219
Specialty	121.34	196.27	18.55	15.83	1.65	13.27	0.57	6.15	71
All	349.83	862.96	17.09	14.61	2.70	11.65	0.41	4.01	677

Table 2: Descriptive statistics of mutual funds and trading costs. This table reports summary statistics for our sample of active mutual funds in Canada based on their interim and annual statements of portfolio transactions between January 2001 and June 2004. The execution price of a trade is estimated as the net dollar value of the trade divided by the number of shares traded. TRADING COST for each trade is estimated as the difference between execution price, P, and same day opening price for a given stock. The buy-side trading cost is defined as: $TC_{D,BUY} = \frac{P_D - P_{D,OPEN}}{P_{D,OPEN}}$ and the sell-side trading cost as: $TC_{D,SELL} = \frac{P_{D,OPEN} - P_D}{P_{D,OPEN}}$. The trade size is measured as the number of shares traded divided by the average trading volume in the preceding 20 days of the trade, TR SIZE/VOL. A stock's liquidity is captured by Amihud (2002) measure LOG(AMIHUD) and average percentage bid-ask spread SPREAD in the preceding 20 days of the trade. LOG(TNA) is the log of total net assets of the fund (aggregated across all share classes) and LOG(TNASPONSOR) is the log of the total net assets of the sponsor of the fund. Total net assets for both the sponsor and the fund are reported for the month of a trade. NET FLOW is the difference between total net assets TNA_T, at the end of the month coinciding with the trade less the previous month's TNA adjusted for returns, $TNA_{T-1} \cdot (1 + R_T)$ and divided by last month TNA. LAGGED NET FLOW is a one month lagged net-flows. LOG(MKTCAP) is the log of a firm's market capitalization which is the closing price multiplied by the number of shares each day. XSRET PRE 1MO is a past month excess return prior to a trade. XSRET POST 1DAY denotes a next trading day excess return. The excess return for one week ahead, XSRET POST 1WK, is the average compounded daily returns over 5 trading days after the day of the trade. The log of daily excess returns are summed up across the 5 trading days and then divided by 5. Each daily return is measured in logs and in excess of its respecitve market, where TSX300 index return is the market used for Canada and the S&P500 is used for the US. Because of some extreme outliers, we winsorize SIZE/VOL, LOG(AMIHUD), SPREAD, NETFLOWS, XSRET PRE 1MO, XSRET POST 1DAY, and XSRET POST 1WK at 1% and 99% level. The reported summary statistics are for already winsorized variables.

PANEL A: Buy-side trading costs

	Mean	Median	St.Dev	Min	P 1%	P 5%	Lower Quartile	Upper Quartile	P 95%	P 99%	Max	NOBS
Trading Cost	0.001	0.001	0.023	-0.080	-0.072	-0.038	-0.009	0.011	0.038	0.068	0.086	107058
Tr Size/Vol	0.032	0.003	0.104	0.000	0.000	0.000	0.001	0.016	0.160	0.496	1.798	107058
Log(Amihud)	-21.138	-21.278	2.309	-26.726	-26.175	-24.742	-22.731	-19.681	-16.964	-15.216	-14.495	107058
Log(TNA)	5.242	5.130	1.801	-3.270	0.647	2.031	4.209	6.568	8.018	8.856	8.904	107058
Log(TNASponsor)	9.362	9.900	1.736	0.372	3.989	6.036	8.390	10.595	11.005	11.064	11.100	107058
Spread	0.006	0.004	0.007	0.000	0.000	0.001	0.002	0.007	0.019	0.037	0.045	107058
Lagged Net Flow	0.024	0.004	0.076	-0.223	-0.084	-0.018	-0.005	0.026	0.123	0.483	0.501	107058
XSRet Pre 1Mo	0.001	0.002	0.124	-0.395	-0.361	-0.210	-0.059	0.063	0.202	0.380	0.420	107058
Log(MktCap)	22.342	22.310	1.853	14.821	18.313	19.435	21.006	23.613	25.567	26.652	27.427	107058
XSRet Post 1 Day	0.001	0.000	0.029	-0.098	-0.083	-0.045	-0.012	0.014	0.049	0.089	0.103	107054
XSRet Post 1 Wk	0.003	0.002	0.057	-0.195	-0.168	-0.086	-0.024	0.030	0.098	0.181	0.201	107028

PANEL B: Sell-side trading costs

	Mean	Median	St.Dev	Min	P 1%	P 5%	Lower Quartile	Upper Quartile	P 95%	P 99%	Max	NOBS
Trading Cost	0.004	0.002	0.025	-0.076	-0.069	-0.033	-0.007	0.013	0.048	0.092	0.106	80202
Tr Size/Vol	0.036	0.004	0.110	0.000	0.000	0.000	0.001	0.020	0.177	0.549	1.789	80202
Log(Amihud)	-21.269	-21.360	2.173	-26.726	-26.127	-24.711	-22.756	-19.883	-17.440	-16.054	-14.495	80202
Log(TNA)	5.447	5.466	1.660	-1.772	1.701	2.506	4.370	6.596	8.144	8.859	8.904	80202
Log(TNASponsor)	9.385	9.913	1.691	2.363	4.510	6.247	8.385	10.607	11.018	11.064	11.100	80202
Spread	0.006	0.004	0.006	0.000	0.000	0.001	0.002	0.006	0.017	0.035	0.045	80202
Lagged Net Flow	0.005	-0.002	0.052	-0.223	-0.104	-0.027	-0.009	0.008	0.050	0.192	0.501	80202
XSRet Pre 1Mo	0.010	0.008	0.133	-0.395	-0.361	-0.211	-0.056	0.074	0.236	0.417	0.420	80202
Log(MktCap)	22.343	22.289	1.747	14.771	18.436	19.600	21.126	23.521	25.389	26.546	27.395	80202
XSRet Post 1 Day	-0.000	0.000	0.030	-0.098	-0.090	-0.051	-0.014	0.013	0.048	0.089	0.103	80190
XSRet Post 1 Wk	-0.001	-0.001	0.059	-0.195	-0.178	-0.100	-0.029	0.027	0.095	0.181	0.201	80168

Table 3: Trading cost regression. This table estimates trading costs of buys and sell for mutual funds in Canada based on their interim and annual statements of portfolio transaction between January 2001 and June 2004. The execution price of a trade is estimated as the net dollar value of the trade divided by the number of shares traded. TRADING COST for each trade is estimated as the difference between execution price, P, and same day opening price for a given stock. The buy-side trading cost is defined as: $TC_{D,BUY} = \frac{P_D - P_{D,OPEN}}{P_{D,OPEN}}$ and the sell-side trading cost as: $TC_{D,SELL} = \frac{P_{D,OPEN} - P_D}{P_{D,OPEN}}$. LAGGED NET FLOW is a percentage fund net-flow in a previous month. A fund's percentage flow is the difference between total net assets TNA_T, at the end of the month coinciding with the trade less the previous month's TNA adjusted for returns, $TNA_{T-1} \cdot (1 + R_T)$ and divided by last month TNA. CANUS is an indicator variable which takes the value 1 if the stock is traded in Canada and 0 if the stock is traded in the US. In the case of cross-traded securities, we assume the default market is Canada. CLOSE PAST TRADE takes the value 1 if a trade accureed within 5 trading days of another trade in the same stock at the same fund and 0 otherwise. TR SIZE/VOL is the number of shares traded divided by the average trading volume in the preceding 20 days of the trade. We use a spline function to construct LOW TR SIZE/VOLand HIGH TR SIZE/VOL. We define LOW TR SIZE/VOL as min(TR SIZE/VOL; P75) and HIGH TR SIZE/VOL= TR SIZE/VOL−LOW TR SIZE/VOL. LOG(AMIHUD) is Amihud's (2002) measure of stocks liquidity. LOG(TNA) is the log of total net assets of the fund (aggregated across shareclasses) and LOG(TNASPONSOR) is the log of the total net assets of the sponsor of the fund. Total net assets for both the sponsor and the fund are reported for the month of a trade. SPREAD is the difference between the closing ask and bid price for the stock divided by the midpoint and is expressed as a percent. XSRET PRE 1 MO is the lagged compounded excess return in percent for the stock over 21 trading days preceeding the trade (excluding the return on the trade day). LOG(MCAP) is the log of a firm's market capitalization which is the closing price multiplied by the number of shares each day. LOG(TNA) × LOG(MCAP) is an interaction term of stock's market capitalization and the log of fund's total net assets. t-statistics are reported in the brackets and standard errors are adjusted for heteroskedasticity.

	BUYS			SELLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Net Flow	-0.0055	-0.0061	-0.0053	-0.000020	0.000047	0.00030
	(-6.14)	(-6.79)	(-5.85)	(-0.01)	(0.03)	(0.22)
CanUs	-0.0026	-0.0033	-0.0032	-0.0028	-0.0027	-0.0026
	(-16.57)	(-20.31)	(-19.93)	(-14.31)	(-12.99)	(-12.59)
Close Past Trade	-0.0012	-0.0011	-0.0011	-0.0026	-0.0026	-0.0026
	(-8.32)	(-7.80)	(-7.65)	(-14.14)	(-14.18)	(-14.05)
Tr Size/Vol	-0.00033			-0.0017		
	(-0.48)			(-2.43)		
Low Tr Size/Vol		0.17	0.18		-0.021	-0.015
		(11.97)	(12.49)		(-1.48)	(-1.03)
High Tr Size/Vol		-0.0025	-0.0020		-0.0014	-0.00074
		(-3.57)	(-2.79)		(-1.97)	(-1.02)
Log(Amihud)	0.00065	0.00055	0.00053	0.00010	0.00012	0.000081
	(12.13)	(10.03)	(9.75)	(1.52)	(1.70)	(1.19)
Log(TNA)	-0.00016	-0.00034	-0.0039	-0.00017	-0.00015	-0.0059
	(-3.35)	(-6.53)	(-7.27)	(-2.30)	(-1.95)	(-7.83)
Log(TNASponsor)	0.00023	0.00026	0.00029	0.00056	0.00056	0.00058
	(4.97)	(5.67)	(6.36)	(8.51)	(8.52)	(8.78)
Spread	-0.0053	-0.010	-0.0091	-0.043	-0.043	-0.043
	(-0.33)	(-0.63)	(-0.57)	(-1.98)	(-1.95)	(-1.96)
XSRet Pre 1 Mo	0.0083	0.0079	0.0078	-0.019	-0.019	-0.019
	(10.39)	(9.95)	(9.80)	(-20.45)	(-20.46)	(-20.37)
Log(Mcap	0.00074	0.00086	0.000072	-0.00026	-0.00027	-0.0016
	(11.71)	(13.38)	(0.55)	(-3.11)	(-3.25)	(-8.50)
Log(TNA) × Log(Mcap)			0.00016			0.00026
			(6.77)			(7.80)
Constant	-0.0017	-0.0066	0.011	0.011	0.011	0.041
	(-1.40)	(-5.13)	(3.76)	(6.59)	(6.57)	(9.78)
Observations	107058	107058	107058	80202	80202	80202
R^2	0.020	0.021	0.022	0.034	0.034	0.035
Adjusted R^2	0.020	0.021	0.021	0.033	0.033	0.034

t statistics in parentheses

Table 4: Mutual fund sorts by trading costs and past cumulative flows – number of buy-side trades. This table reports a number of buy-side transactions with positive/negative trading cost executed by mutual funds with cumulative cash in-/out-flows over past one to four months. The data on buy-side trades for Canadian mutual funds comes from their interim and annual statements of portfolio transaction from January 2001 and June 2004. The execution price of a trade is estimated as the net dollar value of the trade divided by the number of shares traded. TRADING COSTS for each trade are estimated as the difference between execution price, P, and same day opening price for a given stock. The buy-side trading cost is defined as: $TC(\text{BUY}) = \frac{P_D - P_{D,OPEN}}{P_{D,OPEN}}$. ONLY POSITIVE $\text{FLOWS}_{T;T-K}$ requires funds to have only positive monthly flows within a period T and T-K. AT LEAST 1 $\text{OUTFLOW}_{T;T-K}$ includes those funds that experience at least one month of negative net-flows during a period T and T-K. In Panel A, the buy side trades are sorted into four groups: positive vs negative trading costs and only-positive vs at-least-once-negative flows over past month. The χ^2 independence test are reported at the bootom of the table. t-statistics are reported in the brackets.

PANEL A: FLOWS IN THE PREVIOUS MONTH

	+TC	-TC
POSITIVE FLOWS_{T-1}	33,732	30,679
	(52.37%)	(47.63%)
NEGATIVE FLOWS_{T-1}	22,809	19,926
	(53.37%)	(46.63%)

PANEL B: FLOWS OVER LAST TWO MONTHS

	+TC	-TC
ONLY POSITIVE $\text{FLOWS}_{T-1;T-2}$	26,865	24,144
	(52.67%)	(47.33%)
AT LEAST 1 $\text{OUTFLOW}_{T-1;T-2}$	26,994	23,564
	(53.39%)	(46.61%)

PANEL C: FLOWS OVER LAST THREE MONTHS

	+TC	-TC
ONLY POSITIVE $\text{FLOWS}_{T-1;T-3}$	22,354	20,132
	(52.61%)	(47.39%)
AT LEAST 1 $\text{OUTFLOW}_{T-1;T-3}$	24,249	20,132
	(54.64%)	(45.36%)

PANEL D: FLOWS OVER LAST FOUR MONTHS

	+TC	-TC
ONLY POSITIVE $\text{FLOWS}_{T-1;T-4}$	19,151	17,022
	(53.95%)	(46.05%)
AT LEAST 1 $\text{OUTFLOW}_{T-1;T-4}$	28,106	24,490
	(53.43%)	(46.57%)

Panel A: Pearson $\chi^2 = 9.8404$ Pr $= 0.002$
Panel B: Pearson $\chi^2 = 5.3577$ Pr $= 0.021$
Panel C: Pearson $\chi^2 = 35.7333$ Pr $= 0.000$
Panel D: Pearson $\chi^2 = 2.1071$ Pr $= 0.147$

Table 5: Information in buy-side trades regression. This table reports coefficient estimates from a panel regression of a stock's one day and week future excess returns on the buy trading cost and other control variables. The data on buy trades for Canadian mutual funds comes from their interim and annual statements of portfolio transaction from January 2001 and June 2004. The execution price of a trade is estimated as the net dollar value of the trade divided by the number of shares traded. TRADING COSTS for each trade are estimated as the difference between execution price, P, and same day opening price for a given stock. The buy-side trading cost is defined as: $\text{TC(BUY)} = \frac{P_D - P_{D,OPEN}}{P_{D,OPEN}}$. The log of daily excess returns are summed up across the five trading days and then divided by five. Each daily return is measured in log and in excess of its respective market where TSX300 index return is the market used for Canada and the S&P500 is used for the US. CANUS is an indicator variable which takes the value 1 if the stock is traded in Canada and 0 if the stock is traded in the US. In the case of cross-traded securities, we assume the default market is Canada. CLOSE PAST TRADE takes the value 1 if a trade accureed within 5 trading days of another trade in the same stock at the same fund and 0 otherwise. TR SIZE/VOL is the number of shares traded divided by the average trading volume in the preceding 20 days of the trade. We use a spline function to construct LOW TR SIZE/VOLand HIGH TR SIZE/VOL. We define LOW TR SIZE/VOL as min(TR SIZE/VOL; P75) and HIGH TR SIZE/VOL= TR SIZE/VOL − LOW TR SIZE/VOL.LOG(AMIHUD) is Amihud's (2002) measure of stocks liquidity. LOG(TNA) is the log of total net assets of the fund (aggregated across shareclasses) and LOG(TNASPONSOR) is the log of the total net assets of the sponsor of the fund. Total net assets for both the sponsor and the fund are reported for the month of a trade. SPREAD is the difference between the closing ask and bid price for the stock divided by the midpoint and is expressed as a percent. XSRET PRE 1 MO is the lagged compounded excess return in percent for the stock in the 21 trading days preceeding the trade (excluding the return on the trade day). LOG(MCAP) is the log of a firm's market capitalization which is the closing price multiplied by the number of shares each day. LOG(TNA) × LOG(MCAP) is an interaction term of stock's market capitalization and the log of fund's total net assets. *t*-statistics are reported in the brackets and standard errors are adjusted for heteroskedasticity.

	One Day			One Week		
	(1)	(2)	(3)	(4)	(5)	(6)
TC(Buy)	0.061	0.061	0.061	0.017	0.018	0.018
	(10.76)	(10.75)	(10.72)	(1.61)	(1.65)	(1.67)
Lagged Net Flow	0.00082	0.00081	0.0011	0.0042	0.0044	0.0040
	(0.72)	(0.70)	(0.99)	(1.89)	(1.98)	(1.79)
CanUs	-0.00037	-0.00039	-0.00037	-0.0018	-0.0016	-0.0016
	(-1.90)	(-1.89)	(-1.78)	(-4.55)	(-3.77)	(-3.82)
Close Past Trade	-0.0000062	-0.0000044	0.0000044	0.00028	0.00026	0.00025
	(-0.03)	(-0.02)	(0.02)	(0.79)	(0.73)	(0.70)
Tr Size/Vol	-0.0029			-0.0058		
	(-3.26)			(-3.15)		
Tr Low Size/Vol		0.0013	0.0045		-0.061	-0.065
		(0.07)	(0.25)		(-1.72)	(-1.82)
Tr High Size/Vol		-0.0030	-0.0028		-0.0051	-0.0054
		(-3.21)	(-2.96)		(-2.68)	(-2.80)
Log(Amihud)	-0.000063	-0.000065	-0.000071	0.000043	0.000076	0.000083
	(-0.88)	(-0.91)	(-0.99)	(0.30)	(0.53)	(0.58)
Log(TNA)	-0.000011	-0.000016	-0.0015	-0.000021	0.000036	0.0018
	(-0.19)	(-0.25)	(-2.28)	(-0.18)	(0.29)	(1.31)
Log(TNASponsor)	0.00016	0.00016	0.00017	0.00049	0.00047	0.00046
	(2.76)	(2.77)	(3.00)	(4.32)	(4.22)	(4.05)
Spread	0.041	0.041	0.041	0.12	0.12	0.12
	(2.03)	(2.02)	(2.04)	(2.95)	(2.98)	(2.97)
XSRet Pre 1 Mo	-0.0054	-0.0054	-0.0055	-0.0064	-0.0063	-0.0062
	(-5.34)	(-5.35)	(-5.40)	(-3.22)	(-3.17)	(-3.14)
Log(Mcap	-0.00028	-0.00028	-0.00061	-0.0012	-0.0012	-0.00086
	(-3.30)	(-3.22)	(-3.68)	(-7.13)	(-7.28)	(-2.62)
Log(TNA) × Log(Mcap)			0.000065			-0.000075
			(2.29)			(-1.32)
Constant	0.0046	0.0045	0.012	0.027	0.028	0.020
	(3.13)	(2.86)	(3.35)	(9.04)	(9.07)	(2.85)
Observations	107054	107054	107054	107028	107028	107028
R^2	0.015	0.015	0.015	0.010	0.010	0.010
Adjusted R^2	0.015	0.015	0.015	0.010	0.010	0.010

t statistics in parentheses

Table 6: Information in sell-side trades regression. This table reports coefficient estimates from a panel regression of a stock's one day and week future excess returns on the sell trading cost and other control variables. The data on buy trades for Canadian mutual funds comes from their interim and annual statements of portfolio transaction from January 2001 and June 2004. The execution price of a trade is estimated as the net dollar value of the trade divided by the number of shares traded. TRADING COSTS for each trade are estimated as the difference between execution price, P, and same day opening price for a given stock. The buy-side trading cost is defined as: $\text{TC(SELL)} = \frac{P_{D,OPEN} - P_D}{P_{D,OPEN}}$. The log of daily excess returns are summed up across the five trading days and then divided by five. Each daily return is measured in log and in excess of its respective market where TSX300 index return is the market used for Canada and the S&P500 is used for the US. CANUS is an indicator variable which takes the value 1 if the stock is traded in Canada and 0 if the stock is traded in the US. In the case of cross-traded securities, we assume the default market is Canada. CLOSE PAST TRADE takes the value 1 if a trade accureed within 5 trading days of another trade in the same stock at the same fund and 0 otherwise. TR SIZE/VOL is the number of shares traded divided by the average trading volume in the preceding 20 days of the trade. We use a spline function to construct LOW TR SIZE/VOLand HIGH TR SIZE/VOL. We define LOW TR SIZE/VOL as min(TR SIZE/VOL; P75) and HIGH TR SIZE/VOL= TR SIZE/VOL – LOW TR SIZE/VOL.LOG(AMIHUD) is Amihud's (2002) measure of stocks liquidity. LOG(TNA) is the log of total net assets of the fund (aggregated across shareclasses) and LOG(TNASPONSOR) is the log of the total net assets of the sponsor of the fund. Total net assets for both the sponsor and the fund are reported for the month of a trade. SPREAD is the difference between the closing ask and bid price for the stock divided by the midpoint and is expressed as a percent. XSRET PRE 1 MO is the lagged compounded excess return in percent for the stock in the 21 trading days preceeding the trade (excluding the return on the trade day). LOG(MCAP) is the log of a firm's market capitalization which is the closing price multiplied by the number of shares each day. LOG(TNA) × LOG(MCAP) is an interaction term of stock's market capitalization and the log of fund's total net assets. t-statistics are reported in the brackets and standard errors are adjusted for heteroskedasticity.

	One Day			One Week		
	(1)	(2)	(3)	(4)	(5)	(6)
TC(Sell)	-0.065 (-10.13)	-0.064 (-10.12)	-0.065 (-10.19)	-0.050 (-4.07)	-0.050 (-4.06)	-0.051 (-4.13)
Lagged Net Flow	-0.0018 (-1.08)	-0.0021 (-1.26)	-0.0020 (-1.18)	-0.0098 (-2.85)	-0.010 (-2.99)	-0.0100 (-2.90)
CanUs	-0.00073 (-3.11)	-0.0013 (-4.92)	-0.0012 (-4.76)	-0.00061 (-1.28)	-0.0014 (-2.73)	-0.0013 (-2.57)
Close Past Trade	-0.000029 (-0.14)	0.000061 (0.28)	0.000073 (0.34)	-0.0017 (-3.86)	-0.0015 (-3.54)	-0.0015 (-3.47)
Tr Size/Vol	0.0059 (6.10)			0.0068 (3.34)		
Low Tr Size/Vol		0.097 (5.54)	0.10 (5.73)		0.15 (4.10)	0.15 (4.30)
High Tr Size/Vol		0.0045 (4.47)	0.0048 (4.80)		0.0046 (2.18)	0.0053 (2.52)
Log(Amihud)	-0.000071 (-0.83)	-0.00014 (-1.56)	-0.00015 (-1.77)	-0.00022 (-1.29)	-0.00032 (-1.85)	-0.00036 (-2.06)
Log(TNA)	-0.00018 (-2.16)	-0.00028 (-3.25)	-0.0033 (-3.65)	-0.00090 (-5.43)	-0.0011 (-6.16)	-0.0074 (-4.03)
Log(TNASponsor)	-0.000074 (-0.94)	-0.000076 (-0.96)	-0.000066 (-0.83)	0.00017 (1.09)	0.00017 (1.07)	0.00019 (1.20)
Spread	-0.0012 (-0.04)	-0.0040 (-0.15)	-0.0042 (-0.16)	-0.030 (-0.57)	-0.034 (-0.66)	-0.034 (-0.67)
XSRet Pre 1 Mo	-0.0091 (-8.04)	-0.0092 (-8.10)	-0.0091 (-8.07)	-0.0090 (-3.98)	-0.0091 (-4.02)	-0.0090 (-3.99)
Log(Mcap	0.00012 (1.11)	0.00019 (1.76)	-0.00053 (-2.25)	-0.00039 (-1.86)	-0.00028 (-1.32)	-0.0018 (-3.77)
Log(TNA) × Log(Mcap)			0.00013 (3.41)			0.00028 (3.55)
Constant	-0.0024 (-1.26)	-0.0053 (-2.66)	0.010 (2.04)	0.0077 (2.00)	0.0033 (0.81)	0.036 (3.53)
Observations	80190	80190	80190	80168	80168	80168
R^2	0.014	0.015	0.015	0.0079	0.0081	0.0083
Adjusted R^2	0.014	0.014	0.014	0.007	0.008	0.008

t statistics in parentheses

Table 7: Mutual fund performance with aggregate buy- and sell-side trading costs. This table reports coefficient estimates from a panel regression of monthly performance on mean buy and sell trading cost in a given month and other control variables. MEAN TC(BUY) = $\sum_{i=1}^{N} \omega_{i,t,f} \cdot \text{TC(BUY)}$ and $\omega_{i,t,f} = \frac{\text{SHARES}_{i,f,t} \cdot p_{i,t}}{\sum_{i=1}^{N} \text{SHARES}_{i,f,t} \cdot p_{i,t}}$. $\text{SHARES}_{i,f,t}$ is a number of shares bought by fund f of stock i on a given day at month t and $p_{i,t}$ is an execution price. The data on buy and sell trades for Canadian mutual funds comes from their interim and annual statements of portfolio transaction from January 2001 and June 2004. The execution price of a trade is estimated as the net dollar value of the trade divided by the number of shares traded. LAGGED NET FLOW is a fund's percentage net flow from a previous month. Fund flow is the difference between total net assets TNA_t, at the end of the month coinciding with the trade less the previous month's TNA adjusted for returns, $\text{TNA}_{t-1} \cdot (1 + \text{R}_\tau)$ and divided by last month TNA. LOG(TNA) is the log of total net assets of the fund (aggregated across shareclasses) and LOG(TNASPONSOR) is the log of the total net assets of the sponsor of the fund. Total net assets for both the sponsor and the fund are reported for the month of a trade. Turnover is a percentage of buy-trades in a given month that has been turned around within 6 months. t -statistics are reported in the brackets and standard errors are adjusted for heteroskedasticity. The reported coefficients on Log(TNA) and Log(TNASpon) have been scaled by 100.

	MUTUAL FUND PERFORMANCE											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
MEAN TC(BUY)	0.538		0.663		0.273		0.285		0.284		0.300	
	(5.49)		(5.36)		(3.53)		(2.84)		(3.59)		(2.90)	
MEAN TC(SELL)		-0.507	-0.504			-0.219	-0.176			-0.133	-0.145	
		(-4.16)	(-3.64)			(-2.13)	(-1.41)			(-1.26)	(-1.17)	
MEAN TC				-0.0493				-0.0391				0.0410
				(-0.46)				(-0.46)				(0.48)
LAGGED FLOW	-0.0219	-0.0267	-0.0446	-0.0120	-0.0134	-0.0145	-0.0232	-0.00937	-0.000803	-0.00623	-0.0197	0.00345
	(-1.24)	(-1.18)	(-2.00)	(-0.81)	(-1.34)	(-1.46)	(-2.08)	(-1.20)	(-0.07)	(-0.48)	(-1.52)	(0.37)
LOG(TNA)	0.0209	0.0150	0.0211	0.0178	-0.000910	-0.000794	-0.00142	-0.000548	0.00471	0.00389	0.00686	0.00348
	(4.24)	(2.00)	(3.23)	(3.36)	(-1.96)	(-1.49)	(-2.41)	(-1.27)	(1.12)	(0.59)	(1.17)	(0.76)
TURNOVER	-0.00744	-0.00668	-0.0134	-0.00431	-0.000605	-0.00271	-0.00386	-0.0000732	-0.00418	-0.00229	-0.00708	-0.00160
	(-1.36)	(-0.97)	(-1.74)	(-0.85)	(-0.24)	(-0.82)	(-1.14)	(-0.03)	(-1.19)	(-0.49)	(-1.33)	(-0.48)
LOG(TNASPON)	0.0317	0.0382	0.0266	0.0385	0.000542	-0.000115	0.000744	-0.000124	-0.00745	-0.0117	-0.0114	-0.00932
	(3.30)	(3.24)	(2.23)	(4.06)	(1.23)	(-0.23)	(1.34)	(-0.30)	(-1.19)	(-1.50)	(-1.39)	(-1.54)
YM FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes
Observations	2154	2094	1699	2549	2154	2094	1699	2549	2154	2094	1699	2549
R^2	0.168	0.164	0.219	0.128	0.534	0.499	0.540	0.500	0.605	0.590	0.632	0.572
Adjusted R^2	0.097	0.092	0.148	0.065	0.526	0.490	0.529	0.492	0.564	0.547	0.589	0.535

t statistics in parentheses

Figure 1: Buy- and sell-side trading costs for each Tr Size/Vol decile. This figure shows average buy- (solid line with circles) and sell-side trading costs (dashed line with diamonds) for each Tr Size/Vol buy- and sell-side trades decile. We define Tr Size/Vol as a number of shares traded divided by the average trading volume in the preceding 20 days of the trade.

Figure 2: Average buy-side trade cost for eight bins of lagged net-flows.
This figure depicts equally weighted average buy-side trade cost grouped into eight bins based on mutual fund net-flows in a previous month. Each bin has a width of 1.25 percentage point. The numbers next to the plot reflect a number of funds in each bin.