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Liquidity provision and trading skill: Evidence from mutual funds' daily transactions

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Abstract

Examining risk-adjusted returns for executed trades over horizons of up to 1 year, we document strong evidence of short-term trading skill using daily mutual fund transactions from Finland. We find that trading performance is highly persistent up to the 1 month horizon, with an annualized Carhart abnormal return of 5.03% observed for both buys and sells. Moreover, the returns observed for the first week account for almost 36% of a fund's 1 year trade return, underscoring the significance of short-term trading in mutual funds. For the best-performing funds, this short-term performance also translates into sustained long-term outperformance. Investigating possible sources, we find that liquidity provision, rather than price pressure, is a significant contributor. In addition, short-term trading performance is significantly positively related to trade size, fund size, and expenses, depending on whether buys or sells are considered.

KEYWORDS
liquidity provision, manager skill, mutual funds, performance, trading

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1 | INTRODUCTION

This article investigates how short-term contrarian trading affects mutual fund performance. Only a small number of studies examine short-term mutual fund trading as detailed data on mutual funds' investment activity at the transaction-by-transaction level have been largely unobtainable until now (e.g., Da et al., 2011; Ignashkina et al., 2022). Those studies that look closely at mutual fund trading activity find that a significant proportion of the returns are generated by short-term trades (with holding periods between 1 and 90 days), and that the short-term trading strategy of mutual funds is commonly contrarian in nature (mutual funds often buy at falling prices and sell at rising prices when entering their short-term trades); this indicates that liquidity provision and arbitrage are likely motivators for these trades.

Recent research, including Grinblatt et al. (2020), Jame (2017), and Jylhä et al. (2014), provides empirical evidence that institutional investors such as hedge funds act as short-term contrarian traders, which explains a large part of their abnormal returns. Da et al. (2011) and Ignashkina et al. (2022) study mutual fund trading and demonstrate that some mutual funds act as contrarians and provide liquidity, while others demand liquidity in their strategies. The latter authors examine 5 days reversal returns and show that liquidity-providing trades are associated with positive returns, while other mutual funds seek liquidity and suffer costs from this trading. Nagel (2012) investigates short-term reversal returns in the U.S. market and finds that the 5 days horizon is the most relevant. Additionally, Etula et al. (2020) show that liquidity-demanding trades—in their context, near the turn of the month—have a strongly negative impact on mutual fund returns, while liquidity-providing trades have a positive impact. This stream of literature highlights the importance of liquidity provision in mutual fund trading; however, it is not well understood how this affects their trading performance. Most prior studies utilize fund holdings data or selected institutional investor transactions, such as ANcerno.[i] Our proprietary Finnish mutual fund dataset with a full 20 years of transaction records gives us the advantage to explore the role of short-term trades, such as liquidity provision, in the trading performance of mutual funds assessed in both the short and long run.

In response to the well-known puzzle of why mutual funds continue to attract a very large proportion of capital despite their inability to outperform the benchmark, the well-established literature on mutual fund performance has arrived at a consensus. Studies such as Grinblatt and Titman (1989, 1992), Cohen et al. (2005), Kosowski et al. (2006), and Cremers and Petajisto (2009) show that selected fund managers demonstrate stock-picking skills. Supported by Pástor et al. (2017), a stream of literature, including Chen et al. (2000), Kacperczyk et al. (2005), Alexander et al. (2007), and Baker et al. (2010), examines the actual stock selection using mutual fund holdings data and provides evidence that active fund managers add value because the stocks they buy have significantly higher returns than the stocks they sell. As documented by Grinblatt and Titman (1992) and Cuthbertson et al. (2008), a manager's stock selection skill translates into a persistent outperformance for a group of top-performing actively managed funds that consistently outperform their peers. However, this literature is unable to show how exactly these returns are generated, as they do not have access to the actual trading decisions made by mutual funds.

In this study, we use a precise performance measurement[ii] based on a fund's executed trades and find that the risk-adjusted monthly abnormal return for traded stocks averages 0.41% for both buys and sells, translating into an annualized return of 5.03%.[iii] While this short-term outperformance is present for the majority of funds, it is also very persistent for at least the next 5 upcoming years. These results support the notion that intra-quarter trading contributes significantly to fund performance, which is not detectable when trading is inferred from changes in holdings using quarterly data. In terms of long-term performance, examining our 6 months and 1 year return measures, only the best-performing funds are able to generate sustained outperformance over both the short and long run, as suggested by previous literature. In addition, we do find that, economically, the stocks bought generally outperform the stocks sold.

Mutual funds execute a significant market share of trading due to their size, especially after index rebalancing and some corporate events. This type of short-term trading thus imposes price pressure, which is a potential reason for the observed short-term trading performance. To investigate whether the short-term outperformance is due to price pressure, we construct a measure of price pressure using a fund's aggregate trading imbalance in a traded stock over the corresponding trade return evaluation window. We rule out that price pressure leads to short-term outperformance. Instead, our results suggest that liquidity-providing trades, derived from the direction of a trade and the respective expected 5 days stock excess return, contribute significantly to a fund's short-term trading performance, improving the abnormal return of the first week by 35 bps. Moreover, we observe a noteworthy positive relationship between short-term trading performance and variables such as trade size, fund size, and expenses, contingent upon whether we are analyzing buys or sells.

Our study contributes to the literature in several ways: First, our novel transaction data offer full details on mutual fund trading over a period of 20 years. By matching the mutual funds in these transaction data with the Lipper, Bloomberg, and Morningstar databases, as well as the Refinitiv Datastream and Compustat Global databases, we combine daily trading information with reported holdings, fund characteristics, and stock information. This allows us to provide comprehensive insights into a fund's daily trading activity, liquidity provision, and performance, free of survivorship and selection bias. Second, our sample of funds is highly representative of the entire domestic mutual fund industry in Finland and thus serves as an alternative reference point to previous research on mutual fund investment activity at the transaction-by-transaction level, focusing on a subsample of U.S. mutual funds.

The remainder of this article is organized as follows: Section 2 introduces the data, including variable construction, methodology, and summary statistics; Section 3 provides our analysis of trading performance; and Section 4 concludes.

2 | DATA AND METHODOLOGY

2.1 | Data

We rely on multiple databases to obtain a fund's trades, holdings, reported returns, and other characteristics. For the evaluation of trading performance, this study utilizes daily transactions and portfolio holdings for Finnish domestic equity mutual funds from January 1995 to June 2014.[iv] The transaction data are sourced from Euroclear Finland Ltd., the national central securities depository of Finland. Since every investor wishing to trade on the Nasdaq OMX Helsinki Exchange must register with Euroclear, all transactions and holdings in Finnish equities are captured in the database. Every private and institutional investor receives a unique account through which all transactions are recorded, so that the database is not affected by any survivorship and selection bias.

Euroclear's registry provides detailed transactions for each fund in our sample. If a fund trades the same stock multiple times on the same day, those trades are listed separately. The database also contains transactions associated with changes in holdings due to extraordinary reasons, such as stock splits. Using a trade type identifier, we exclude these transactions from our analysis as they do not reflect actual mutual fund trading. Further trade information includes the transaction date, a buy or sell indicator, the transaction price, the volume of shares traded, the ISIN of the stock traded, and a unique numerical identifier for the fund's account.

Since Euroclear transaction data are anonymous, we employ a fund identification procedure similar to that of Busse et al. (2021) to match funds from the Euroclear transaction database with the Refinitiv Lipper or Bloomberg database. We collect the names and fund ISINs of all Finnish equity funds investing in Finland from Investment Research Finland. Using these ISINs, we retrieve monthly holdings data from the Refinitiv Lipper database. Where Lipper data is missing, we obtain quarterly holdings data from Bloomberg. Since the Lipper holdings data come with a Refinitiv RIC identifier, we use Refinitiv Datastream to match these RICs with their corresponding stock ISINs. By subtracting the previous month's or quarter's holdings from the current holdings, we calculate the change in holdings over time for each stock and fund. In the Euroclear data, we then net transactions based on share volume (buys minus sells) by account, stock ISIN, and date, giving us a daily holdings change measure. To compare the Euroclear holdings changes with the calculated Lipper and Bloomberg holdings changes, we then aggregate our daily dataset on a monthly or quarterly basis. This procedure allows us to match holdings changes between these databases to identify mutual funds in the Euroclear database. We consider an account to be matched if it meets the following criteria: (i) there are holdings change matches for at least five different stocks, (ii) the number of holdings change matches is greater than 10, and (iii) there are at least five holdings change matches with odd numbers.[v] We also manually review each matched account for at least two random years.

After the matching procedure, we obtain our final sample consisting of 29 mutual funds with daily transaction data for a 20 years period beginning on January 1, 1995 and ending on June 30, 2014.[vi] Despite the relatively small number of funds identified, our data includes the main domestic mutual funds of each of the leading fund families in the market, reflecting a market share of total mutual fund capitalization of approximately 88%; thus, it is reasonably representative of the mutual fund industry in the Finnish market.[vii]

We initially obtain mutual fund trading information for 241 Finnish stocks, including common and preferred stocks of the same company. Given the availability of information such as daily stock prices, market capitalizations, and book values provided by Refinitiv Datastream and Compustat Global, our study eventually covers 191 stocks, for which we calculate dividend and stock-split adjusted discrete stock returns.[viii] This sample of stocks represents all listed companies in Finland with a sufficient history and data availability.

Having the transaction data and the portfolio holdings at the beginning of each fund time series allows us to track a fund's daily holdings balances in addition to the changes in holdings. We use these holdings balances to calculate a fund's total net assets (TNA).[ix] To verify the quality of the transaction data and our estimates, we compare our results with a subsample of portfolio holdings calculated by Euroclear. We document no significant deviations, indicating that our data and matching are reliable. In addition to the calculated fund TNA, we collect data on several fund characteristics from Morningstar Direct: The expense ratio is the annualized percentage of fund assets used to pay for operating expenses, management fees, and 12b-1 fees. The turnover ratio, obtained from the fund's annual report, is defined as the lesser of purchases or sales divided by average monthly net assets. We also retrieve information on whether a fund charges any fees based on front-end loads or deferred loads. For the estimation of a fund's age, we use the inception date of the fund's oldest share class. The funds' daily net returns are based on total return indices provided by Morningstar.

2.2 | Comparing the data from Euroclear Finland to other transaction level databases

Studies examining daily transaction data for mutual funds and other institutional investors have shown that there is value in investigating intra-quarter mutual fund activity. For instance, using institutional U.S. trading data from Abel

Noser (ANcerno), Puckett and Yan (2011) document significant abnormal returns of 1.80% for round-trip trades within a quarter, reflecting short-term trading skill. Assuming holding periods until the end of the quarter for each trade, the authors find that bought stocks outperform sold stocks by 0.74%. Chakrabarty et al. (2017) evaluate the performance of round-trip trades as a function of the holding period of a trade. They suggest that the returns on short-duration trades are strikingly negative. For instance, trades held for less than 3 months show an average abnormal return of −1.24%, which is in stark contrast to the results of Puckett and Yan. Busse et al. (2019) propose a measure of trading regularity and find that funds that trade regularly outperform those that trade less regularly and that this outperformance persists for at least 1 year. Measuring the fund performance of executed trades to quarter end, they note a significant return difference of 0.73% between the top and bottom quintiles.

We follow this line of research to investigate the trading performance of Finnish active domestic equity mutual funds. Although the abovementioned studies have utilized fund transaction data from ANcerno, producing new insights into fund trading skills, it is notable that these data cover a subsample of U.S. mutual funds. Puckett and Yan (2011) and Busse et al. (2021) report that ANcerno clients might differ systematically from typical institutions.[x] Thus, prior studies utilizing ANcerno data have been potentially exposed to selection bias. In this article, we instead use a proprietary dataset provided by the central securities depository Euroclear Finland Ltd., which contains all mutual fund trade data from the Nasdaq OMX Helsinki Exchange at the transaction-by-transaction level. These data include the exact trading dates and prices, and trade times can be inferred from exchange intraday trading records. Since any change in stock ownership is recorded in the share registry as part of the clearing process, these data are reliable and free of selection and survivorship bias. Furthermore, Finnish domestic investment funds are not allowed to use nominee accounts for their holdings, so each individual fund has its own unique share registry account with Euroclear, that is, the data are complete. This fund sample was identified only recently, making our analysis a unique out-of-sample test of the trading skills of mutual fund managers.

2.3 | Trading measures

We calculate variables to measure daily fund trading activity and trading imbalance at the market, fund, stock, and fund-stock levels, which are based on either the number of executed transactions (NUM), the volume of traded shares (VOL), or the euro volume of traded shares using the respective transaction prices (VAL). For the trading imbalance, we follow Klemkosky (1977) and Griffin et al. (2003) using the difference between buy and sell transactions. The measure of trading activity is the sum of these two.

Because mutual fund trade orders are typically large, a fund may split its orders into multiple transactions per day or use various brokers to reduce potential market impact. For this reason, we evaluate trades at the fund-stock-day level rather than using each individual transaction separately. This approach is similar to that of Anand et al. (2012) and Busse et al. (2019), who consider transactions at the "ticket" level and thus bundle transactions executed by the same broker. However, since the Euroclear dataset, unlike ANcerno, does not provide information on the original order or on individual brokers, aggregation at the ticket level is not possible here. For the aggregation of individual transactions at the fund-stock-day level, we use the trading imbalance measure $\text{TIB\_VAL}_{j,i,t}$ as described below:

$$\text{TIB\_VAL}_{j,i,t} = \sum\nolimits_{z=1}^{n} \text{VAL}_{z,j,i,t}^{\text{Buys}} - \sum\nolimits_{z=1}^{m} \text{VAL}_{z,j,i,t}^{\text{Sells}} \tag{1}$$

$\text{VAL}_{z,j,i,t}^{\text{Buys}}$ refers to the euro volume of buys for each executed transaction z of fund j in stock i on day t, and $\text{VAL}_{z,j,i,t}^{\text{Sells}}$ refers to the respective volume of selling transactions. This results in a net of two trading positions if a fund buys and sells the same stock on the same day. We also use a measure of the associated trade size by determining the absolute value of $\text{TIB\_VAL}_{j,i,t}$:

$$\text{TradeSize}_{j,i,t} = \left|\text{TIB\_VAL}_{j,i,t}\right| \tag{2}$$

This allows us to examine whether the subsequent calculated performance of executed trades correlates with the capital that a fund deploys through these trades.

2.4 | Trade returns

We calculate various "trade returns" to evaluate a manager's trading performance. The return metrics we use are post-trade raw, market-, and risk-adjusted stock returns up to 1 year.[xi] When assessing a manager's trading skills, sells are considered short sales. For instance, if a fund j sells (net) a stock i on day t and the return for that stock is negative, this results in a positive trade return for that stock because the trade reflects a correct managerial decision. We acknowledge that the calculated sell trade returns are rather hypothetical and are generally not directly captured as a return because most sell trades are unlikely to be short sales; however, in the context of evaluating a manager's decision to sell, this is not important.

We define the raw, market-adjusted, and risk-factor-adjusted trade returns at the fund-stock-day level as follows:

$$\mathrm{TR}^{\mathrm{raw}}_{j,i,[t+1;t+T]} = I_{j,i,t} * R_{i,[t+1;t+T]} \tag{3}$$

$$\mathrm{TR}^{\mathrm{madj}}_{j,i,[t+1;t+T]} = I_{j,i,t} * \left(R_{i,[t+1;t+T]} - R^{vw}_{m,[t+1;t+T]}\right) \tag{4}$$

$$\mathrm{TR}^{\mathrm{CAPM}}_{j,i,[t+1;t+T]} = I_{j,i,t} * \alpha^{\mathrm{CAPM}}_{i,[t+1;t+T]} \tag{5}$$

$$\mathrm{TR}^{\mathrm{FF}}_{j,i,[t+1;t+T]} = I_{j,i,t} * \alpha^{\mathrm{FF}}_{i,[t+1;t+T]} \tag{6}$$

$$\mathrm{TR}^{\mathrm{Car}}_{j,i,[t+1;t+T]} = I_{j,i,t} * \alpha^{\mathrm{Car}}_{i,[t+1;t+T]} \tag{7}$$

$\mathrm{TR}^{\mathrm{raw}}_{j,i,[t+1;t+T]}$ refers to future stock returns for trades made by fund j in stock i on day t. Here, the subscript $[t+1;t+T]$ denotes the length of the window of trading days for which we calculate trade returns. With T equals to 5, we consider a 1 week return by compounding the respective daily stock returns. Other windows used are 10 (2 weeks), 15 (3 weeks), 20 (1 month), 40 (2 months), 60 (3 months), 120 (6 months), and 250 (1 year) trading days. $I_{j,i,t}$ is a dummy variable that takes the value 1 if the trade is a buy and the value −1 if the trade is a sell, as indicated by the trading imbalance at the fund-stock-day level in Equation (1). For the calculation of $\mathrm{TR}^{\mathrm{madj}}_{j,i,[t+1;t+T]}$, the market-adjusted trade return, we subtract the corresponding value-weighted market return from the stock return. $\mathrm{TR}^{\mathrm{CAPM}}_{j,i,[t+1;t+T]}$ reflects risk-adjusted abnormal trade returns based on an out-of-sample Jensen (1968) alpha calculation using the CAPM. Similarly, $\mathrm{TR}^{\mathrm{FF}}_{j,i,[t+1;t+T]}$ and $\mathrm{TR}^{\mathrm{Car}}_{j,i,[t+1;t+T]}$ equal risk-adjusted abnormal returns based on the Fama and French (FF, 1993, 2012) 3-factor model and the Carhart (1997) 4-factor model. Therefore, all factor loadings used for the calculation of out-of-sample stock alphas are obtained from rolling regressions over a window of 60 trading days, which we use to calculate a stock's corresponding $t+1$ risk factor returns (Sharpe, 1992).[xii] After compounding the risk-free rate[xiii] and the risk factor returns over the respective future valuation window, we subtract these returns from the adequately compounded stock return to obtain the maturity-adjusted 1-, 3-, and 4-factor alphas.

2.5 | Summary statistics

Table 1 presents summary statistics for the transaction data along with various stock and fund characteristics at the market, fund, stock, and fund-stock levels on a daily basis.

Panel A shows market-level statistics for stock market size, total net assets of funds, market returns, and trading measures. The average size of the Finnish equity market is about EUR 149 billion, while the net assets of the mutual fund industry are EUR 1.5 billion. With an average market share in equity trading of 4%–6%,[xiv] Finnish domestic equity funds appear to play an important role in institutional trading. Based on the number of transactions, Stoffman (2014) reports that Finnish financial institutions in aggregate account for 30% of equity trading.

In Panel A, we also report several specifications for daily market returns. The equally weighted market return has a mean of 0.06% and a standard deviation of 0.87%, while the value-weighted market return has a slightly higher mean of 0.07% and a standard deviation of 1.99%. Comparing the statistics of our value-weighted market return with the return

TABLE 1 Summary statistics.

	N	Mean	SD	Percentile 10	25	50	75	90
Panel A: Market level (t)								
Stock Market Size (€B)	4874	149.01	72.52	57.60	113.20	138.10	179.27	234.20
TNA (€B)	4874	1.50	1.14	0.15	0.43	1.35	2.54	3.08
Return OMXH (%)	4874	0.06	1.85	−2.01	−0.80	0.10	0.96	1.98
Return Market VW (%)	4874	0.07	1.99	−2.14	−0.88	0.09	0.99	2.15
Return Market EW (%)	4874	0.06	0.87	−0.89	−0.37	0.10	0.53	0.99
Return Traded Stocks VW (%)	4833	0.12	2.23	−2.35	−0.97	0.16	1.19	2.48
Return Traded Stocks EW (%)	4833	0.16	1.45	−1.53	−0.58	0.21	0.92	1.72
Number of transactions	4833	131.12	110.39	46.00	67.00	99.00	154.00	254.00
Traded shares	4833	1,486,115	1,728,855	342,500	566,467	1,030,000	1,890,244	3,077,981
Traded EUR volume	4833	15,770,824	12,181,988	4,331,068	7,049,500	12,319,222	21,169,046	31,507,994
Panel B: Fund level (j,t)								
TNA (€M)	94,900	76.84	100.60	7.05	16.18	42.45	99.71	176.37
Net return fund (%)	94,208	0.04	1.37	−1.52	−0.62	0.09	0.75	1.50
Age (years)	94,900	10.12	6.15	2.38	5.00	9.44	14.69	18.94
Expense ratio (% p.a.)	46,422	1.59	0.54	0.56	1.33	1.64	1.95	2.15
Turnover ratio (% p.a.)	37,729	106.86	141.77	10.35	31.21	61.02	129.21	236.60
Number of transactions	60,429	10.37	23.59	1.00	2.00	4.00	10.00	24.00
Traded shares	60,429	118,019	287,555	4500	13,510	44,000	122,312	282,912
Traded EUR volume	60,429	1,247,971	2,303,299	54,030	164,100	507,316	1,402,000	3,097,350
Panel C: Stock level (i,t)								
Return stock (%)	500,176	0.06	3.18	−2.59	−0.95	0.00	0.96	2.68
Market capitalization (€B)	497,534	1.33	8.19	0.02	0.04	0.15	0.65	1.91
Volatility (%)	496,332	2.54	1.93	1.13	1.49	2.06	2.98	4.31
Number of transactions	133,999	4.73	12.97	1.00	1.00	2.00	4.00	9.00
Traded shares	133,999	53,600	269,784	500	2528	12,934	48,000	118,990
Traded EUR volume	133,999	568,813	1,336,267	5462	27,755	150,000	555,287	1,454,364
Panel D: Fund-stock level (j,i,t)								
Number of transactions	217,647	2.61	8.57	1.00	1.00	1.00	2.00	4.00
Traded shares	217,647	29,688	118,986	456	2000	10,000	25,000	62,877
Traded EUR volume	217,647	307,521	669,349	5550	25,553	112,000	330,500	749,000
TIB_NUM	217,647	0.13	8.83	−2.00	−1.00	1.00	1.00	2.00
TIB_VOL	217,647	2041	115,808	−30,000	−8880	250	10,000	35,000
TIB_VAL (€)	217,647	10,434	642,328	−395,785	−108,350	3018	111,580	419,380
Trade size (€)	217,647	291,320	572,562	5462	25,100	109,995	323,500	725,000

Note: This table reports summary statistics on a daily basis for executed mutual fund transactions, stock and fund characteristics, and returns. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. At the market level (Panel A), statistics on the size of the Finnish stock market are provided by aggregating the stocks' market capitalization. Total Net Assets (TNA, in €B) is the aggregation of the funds' individual TNA, which in turn are calculated using the transaction data and exclude the cash position. Market returns are the returns of the OMX Helsinki Allshare Index, value-weighted (VW) and equal-weighted (EW) stock returns, and value-weighted and equal-weighted returns using a portfolio containing only the stocks traded on day t in the mutual fund market. At the fund level (Panel B), statistics are reported for individual fund TNA (in €M), net returns derived from total return indices, age in years using the inception date of the fund's oldest share class, expense ratio as the annualized percentage of fund assets used to pay for operating expenses, management fees, and 12b-1 fees, and annual turnover, defined as the lesser of purchases or sales divided by average monthly net assets. At the stock level (Panel C), statistics are shown for dividend and stock split-adjusted stock returns, market capitalization, and volatility, which is the return standard deviation calculated over the preceding 30 trading days. For the trading-based variables, the number of executed transactions (NUM), the volume of traded shares (VOL), and the euro volume of executed transactions (VAL) are reported at the market, fund, stock, and fund-stock level, excluding observations without trading. At the fund-stock level (Panel D), statistics are also provided for the trading imbalance (TIB), which is the difference between the aggregate buy and sell transactions executed by fund j in stock i on day t. TIB_VAL therefore serves as a trading variable to identify whether a fund bought or sold (net) a particular stock on day t. Trade size is the absolute value of TIB_VAL.

of the OMX Helsinki Allshare Index, we find that they are very similar, suggesting that our market return is reliable and representative. Based on stocks traded by mutual funds, the value-weighted portfolio has an average daily return of 0.12%, which is approximately twice the market return. This seems to be a first indication of possible superior trading performance. However, this higher return is accompanied by a higher standard deviation of 2.23%.

For the market-level measures of trading activity presented in Panel A, the average number of daily transactions is 131. Comparing the number of observations between these trading measures and market returns, we find that there were 41 days in our sample when the fund market did not trade. This suggests that funds do not trade every day. Besides the number of transactions, these funds traded an average of 1.5 million shares worth EUR 15.8 million.

We present the summary statistics of fund characteristics in Panel B. The average fund in our sample has a size of EUR 76.8 million, an expense ratio of 1.59% p.a., a turnover ratio of 106.9% p.a., and is around 10 years old. Further, we find an average net return of 0.04%, which is below the value- and equal-weighted market return shown in Panel A but exhibits a relatively high standard deviation of 1.37%. This result suggests that, on average, a Finnish fund may even underperform the market when fees and expenses are taken into account. In contrast to the market-level activity shown in Panel A, an ordinary mutual fund executes 10 transactions per day and trades 118,000 shares worth approximately EUR 1.2 million.

From the stock level statistics in Panel C, we observe a median stock return of zero, which is not surprising as the Finnish market is well-known for stale prices and illiquid stocks (see, e.g., Martikainen & Puttonen, 1996). The market capitalization of a Finnish stock is about EUR 1.3 billion by mean value and EUR 150 million by median value. This remarkable difference is due to the high market capitalization of Nokia, which at times dominated the Finnish market.[xv] For fund trading at the stock level, we report an average of five transactions per stock, with 53,600 shares traded, valued at EUR 568,813.

Panel D of Table 1 reports statistics for various trading measures at the fund-stock level, which forms the basis for most of our analysis. We observe an average trading activity of 2.6 executed transactions per fund, stock, and day. This corresponds to 29,688 shares traded worth EUR 307,521. With respect to the daily trading imbalances as defined in Equation (1), we find positive means for all three trading definitions (NUM, VOL, and VAL). This indicates that there has been more net buying than net selling and that the Finnish fund market has grown over time. However, when comparing the 10th and 25th percentiles (net sells) with the 75th and 90th percentiles (net buys), the values for the trading imbalance appear to be quite similar in absolute magnitude. This suggests that the funds in our sample are constantly rebalancing their portfolios. The average of $\text{TradeSize}_{j,i,t}$, which corresponds to the absolute value of $\text{TIB\_VAL}_{j,i,t}$ as defined in Equation (2), is EUR 291,320. It is noticeable that the statistics are very close to the trading activity measured by the euro volume of shares traded. This reflects the fact that in our data, there are only a few cases where a fund decides to buy and sell the same stock on the same day, and even when it does, the fund usually takes a distinct buy or sell position.

3 | TRADING PERFORMANCE ANALYSIS

3.1 | Average trading performance

To examine mutual fund trading performance over the short but also the long term, we compute raw and abnormal trade returns for executed trades at the fund-stock-day level across different horizons, as detailed in Equations (3) to (7) introduced in Section 2.4. Table 2 shows the pooled averages corresponding to all trades, as well as for buys and sells separately, to capture potential asymmetries.[xvi] To assess the significance of means, we cluster standard errors at the fund, stock, and day levels, controlling for a downward bias in standard errors resulting from identical observations.[xvii]

Panel A of Table 2 reports the results for trade returns using future raw stock returns. For buys, the mean returns range from 0.57% (1 week) to 11.7% (1 year) and are highly significant at the 1% level. This suggests that, on average, stock prices have increased following a buy. In contrast, the mean values for sells are negative. Given that sell trade returns are multiplied by −1, this implies that the prices of the stocks sold have also increased. Nevertheless, when comparing the absolute values of the averages between buys and sells, it becomes apparent that buys have outperformed sells. This is also evident when pooling both buys and sells together, with the means positively significant up to 6 months.[xviii]

In Panel B, we provide univariate statistics on average market-adjusted trade returns by subtracting market returns from stock returns. The results suggest significant outperformance for executed buys with returns up to 1 month, that is, the stocks selected by the fund manager outperform the market in the short term. In the longer term, however, this advantage becomes insignificant. For sells, the trading performance persists longer, with a time horizon of up to 3 months. Although the mean value of the 1 year returns is no longer statistically significant, it remains economically relevant,

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TABLE 2 Average trading performance over different time horizons.

	1 week	2 weeks	3 weeks	1 month	2 months	3 months	6 months	1 year
Panel A: Raw returns								
Buys and sells	0.27***	0.38***	0.41***	0.45***	0.67***	0.83***	1.00*	1.34
	(0.06)	(0.09)	(0.11)	(0.12)	(0.18)	(0.26)	(0.49)	(1.04)
Buys	0.57***	0.86***	1.06***	1.27***	2.16***	3.18***	5.62***	11.70***
	(0.10)	(0.15)	(0.19)	(0.22)	(0.37)	(0.54)	(1.06)	(2.28)
Sells	−0.09	−0.18	−0.33*	−0.48**	−1.02***	−1.85***	−4.27***	−10.61***
	(0.09)	(0.13)	(0.16)	(0.21)	(0.36)	(0.49)	(0.94)	(2.16)
Panel B: Market-adjusted returns								
Buys and Sells	0.22***	0.31***	0.37***	0.39***	0.50***	0.49**	0.40	0.39
	(0.05)	(0.07)	(0.09)	(0.10)	(0.14)	(0.19)	(0.30)	(0.54)
Buys	0.25***	0.33***	0.34**	0.31*	0.26	0.21	0.10	−0.28
	(0.07)	(0.10)	(0.13)	(0.15)	(0.25)	(0.36)	(0.67)	(1.41)
Sells	0.19***	0.28***	0.40***	0.49***	0.78***	0.82**	0.74	1.15
	(0.06)	(0.10)	(0.13)	(0.16)	(0.28)	(0.38)	(0.70)	(1.59)
Panel C: CAPM alphas								
Buys and sells	0.23***	0.33***	0.37***	0.42***	0.57***	0.63***	0.71**	0.94
	(0.05)	(0.07)	(0.09)	(0.10)	(0.14)	(0.20)	(0.33)	(0.64)
Buys	0.30***	0.42***	0.45***	0.47***	0.56*	0.67	0.73	1.21
	(0.07)	(0.11)	(0.15)	(0.17)	(0.30)	(0.45)	(0.85)	(1.83)
Sells	0.15**	0.22**	0.29**	0.35**	0.57*	0.59	0.69	0.62
	(0.06)	(0.10)	(0.13)	(0.16)	(0.28)	(0.38)	(0.68)	(1.46)
Panel D: Fama and French 3F alphas								
Buys and Sells	0.23***	0.31***	0.36***	0.41***	0.52***	0.54***	0.54**	0.50
	(0.04)	(0.06)	(0.07)	(0.08)	(0.11)	(0.15)	(0.21)	(0.38)
Buys	0.27***	0.35***	0.37***	0.38**	0.33	0.33	0.18	0.13
	(0.07)	(0.10)	(0.13)	(0.15)	(0.27)	(0.38)	(0.68)	(1.49)
Sells	0.19***	0.27***	0.35***	0.44***	0.74***	0.79**	0.94	0.93
	(0.06)	(0.09)	(0.12)	(0.14)	(0.25)	(0.33)	(0.62)	(1.35)
Panel E: Carhart 4F alphas								
Buys and sells	0.24***	0.31***	0.36***	0.41***	0.51***	0.53***	0.59***	0.66*
	(0.04)	(0.06)	(0.07)	(0.07)	(0.11)	(0.14)	(0.19)	(0.34)
Buys	0.28***	0.38***	0.41***	0.41***	0.35	0.34	0.25	0.32
	(0.06)	(0.09)	(0.11)	(0.13)	(0.22)	(0.30)	(0.54)	(1.22)
Sells	0.18***	0.24***	0.31***	0.41***	0.69***	0.76**	0.97*	1.05
	(0.05)	(0.08)	(0.10)	(0.12)	(0.21)	(0.28)	(0.50)	(1.13)
Observations								
Buys and sells	193,060	193,060	193,060	193,060	193,059	193,057	193,041	185,342
Buys	102,938	102,938	102,938	102,938	102,938	102,937	102,931	99,305
Sells	90,122	90,122	90,122	90,122	90,121	90,120	90,110	86,037

Note: This table reports the means of cumulative post-trade stock returns at window lengths of 5 (1 week), 10 (2 weeks), 15 (3 weeks), 20 (1 month), 40 (2 months), 60 (3 months), 120 (6 months), and 250 (1 year) trading days starting at time t + 1. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. Multiple buy or sell transactions of the same fund in the same stock on the same day are aggregated into one trade by calculating the trading imbalance at fund-stock-day level, which is the difference between the sum of all buy and sell transactions using the traded euro volume. A positive (negative) trading imbalance therefore indicates a buy (sell). For sells, calculated post-trade returns are multiplied by −1. Panel A shows means of cumulative stock raw returns. Panel B contains market-adjusted returns by subtracting corresponding value-weighted market returns. Panels C and D use out-of-sample alphas for abnormal returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model. Therefore, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective windows, these benchmark returns are subtracted from the corresponding cumulative stock return. ***, **, and * denote significance of a two-tailed t-test with clustered standard errors (in parentheses) at fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

showing a positive value of 1.15%. Consequently, even if the stocks purchased do not outperform the market in the long run, managers appear to prevent underperformance by selling stocks with poor future performance.

Recognizing that market-adjusted returns may not adequately account for market risk and other factors, we calculate abnormal trade returns by subtracting expected stock returns as predicted by the CAPM (Panel C), FF 3-factor model (Panel D), and Carhart 4-factor model (Panel E). These results largely confirm most of our earlier findings. In fact, when considering the pooled averages of both buys and sells for Carhart-adjusted trade returns, the outperformance seems to persist up to the 1 year horizon, showing a value of 0.66%, significant at the 10% level. However, in comparison to the 1 week trade return average of 0.24%, it is noteworthy that almost 36% of the 1 year outperformance already stems from the first week.

One potential explanation for this observation is that Finnish domestic mutual funds act as contrarian traders, providing liquidity to the market and earning significant short-term returns by capitalizing on mean reversion patterns present in the stock market. For instance, Ignashkina et al. (2022) show that at least some mutual funds in the U.S. consistently supply liquidity, thereby significantly contributing to the funds' excess returns. Alternatively, abnormal short-term returns could arise from price pressure due to consecutive institutional trading of the same stocks in the same direction. Therefore, to gain further insight into whether liquidity provision or price pressure plays a significant role in the observed short-term trading performance, Sections 3.4 and 3.5 implement a comprehensive panel regression analysis.[xix]

While documenting an extraordinary strong performance during the first week, the results of Table 2 also add new insights to the literature on interim trading. Puckett and Yan (2011) report an abnormal interim trading performance for executed buy transactions when using returns through the end of the quarter. Our evidence suggests that, after a fund buys the stock, it experiences an abnormal positive return in the following month. For instance, the annualized average abnormal Carhart return for executed buys (and sells) on the 1 month horizon equals 5.03%, indicating that this short-term performance is economically relevant. This supports the notion that funds can realize profits through intra-quarter trading but may not be detectable once trading must be inferred from changes in holdings using quarterly data.

We also contribute to the discussion regarding the asymmetry between buys and sells. Puckett and Yan (2011) provide evidence that buy transactions generate significant returns, while sells do not. The authors argue that, given buys are unconstrained and can fully reflect firm-specific news, managers have a limited number of options for sells because short selling is often restricted (Chan & Lakonishok, 1993). However, our results indicate that the fund managers' sell decisions perform quite well. While there are only weak signs of an asymmetry between the positive performance of buys and sells in the short run, the abnormal returns of sells are even higher than the returns of buys in the long run. Section 3.5 will delve deeper into differences between buys and sells, analyzing determinants such as fund and stock characteristics.

3.2 | Short-term vs. long-term trading performance: quartile analysis

To examine whether trading performance during the first week varies significantly across funds and if this short-term performance is associated with corresponding long-term results, Table 3 presents a univariate quartile sort based on the funds' average 1 week trade returns adjusted by the Carhart 4-factor model. Quartile 1 (Q1) contains the 25% of funds with the lowest 1 week trade return averages, while Quartile 4 (Q4) contains the 25% of funds with the highest 1 week trade return averages. Conditional on this sorting, the mean of the fund trade return averages is calculated for each time horizon and quartile. Q4–Q1 reports the difference to test for the equality of means between the best- and worst-performing quartiles.

Panel A shows the results considering both buys and sells. As implied by the sorting approach, the average 1 week trading performance steadily increases from 0.08% in Q1 to 0.59% in Q4. The significant Q4–Q1 difference of 0.51% in the funds' average trade returns suggests substantial variation in trading performance between the best- and worst-performing funds. However, in the absence of costs, even Q1 funds demonstrate an outperformance that is significant at the 1% level, suggesting the existence of significant short-term trading skills in the Finnish mutual fund market.

When comparing the 1 week results with time horizons of up to 1 year, we find that a fund's short-term trading performance also predicts its long-term performance relative to other funds. For instance, with a corresponding 1 year trade return average of −0.01% (2.43%), Q1 (Q4) funds continue to exhibit the poorest (best) performance. For Q4 funds, the long-term outperformance even persists to be significant at the 1% level. Similar to the results in Table 2, it is remarkable that almost 24% of this risk-adjusted long-term return is already generated during the first week after trade execution, highlighting the importance of the short term in mutual fund trading. Nevertheless, only the best-performing funds appear to be able to provide significant positive returns when evaluating their trades over both the short and long term, as

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TABLE 3 Quartile sorting of average fund trading performance using 1 weeks trade returns.

		Buys and sells						
Panel A	***N***	**1 week**	**2 weeks**	**3 weeks**	**1 month**	**3 months**	**6 months**	**1 year**
Q1	8	0.08**	0.13*	0.19**	0.25**	0.42	0.55	−0.01
		(0.03)	(0.06)	(0.07)	(0.10)	(0.28)	(0.35)	(0.31)
Q2	7	0.25***	0.44***	0.41***	0.57**	0.79	1.08	1.08
		(0.02)	(0.11)	(0.06)	(0.18)	(0.41)	(0.76)	(0.68)
Q3	7	0.36***	0.50***	0.53***	0.58***	0.73**	0.72	1.15
		(0.01)	(0.05)	(0.08)	(0.08)	(0.20)	(0.37)	(0.70)
Q4	7	0.59***	0.77***	0.99***	1.13***	1.66***	1.63***	2.43***
		(0.04)	(0.06)	(0.09)	(0.10)	(0.22)	(0.37)	(0.59)
Q4–Q1		0.51***	0.64***	0.80***	0.88***	1.24***	1.08*	2.44***
		(0.05)	(0.08)	(0.11)	(0.15)	(0.36)	(0.50)	(0.64)
		Buys						
Panel B	***N***	**1 week**	**2 weeks**	**3 weeks**	**1 month**	**3 months**	**6 months**	**1 year**
Q1	8	0.06	0.01	0.03	−0.06	−0.90	−1.68	−2.13
		(0.04)	(0.13)	(0.15)	(0.25)	(0.80)	(1.44)	(2.10)
Q2	7	0.31***	0.41***	0.37***	0.42***	0.46	0.46	−0.05
		(0.01)	(0.06)	(0.09)	(0.09)	(0.31)	(0.48)	(1.26)
Q3	7	0.42***	0.72***	0.68***	0.62**	−1.00	−0.98	−1.54
		(0.02)	(0.18)	(0.15)	(0.18)	(1.25)	(1.12)	(1.19)
Q4	7	0.70***	1.00***	1.19***	1.25***	1.72***	1.89*	3.09**
		(0.07)	(0.10)	(0.13)	(0.15)	(0.40)	(0.77)	(1.13)
Q4–Q1		0.63***	0.99***	1.16***	1.32***	2.62**	3.57*	5.22*
		(0.07)	(0.17)	(0.19)	(0.30)	(0.94)	(1.70)	(2.49)
		Sells						
Panel C	***N***	**1 week**	**2 weeks**	**3 weeks**	**1 month**	**3 months**	**6 months**	**1 year**
Q1	8	−0.03	−0.04	0.01	0.11	0.44	0.81	−0.02
		(0.05)	(0.09)	(0.12)	(0.19)	(0.40)	(0.57)	(0.68)
Q2	7	0.17***	0.26***	0.38***	0.44***	0.58***	0.31	0.53
		(0.03)	(0.07)	(0.09)	(0.11)	(0.11)	(0.19)	(0.46)
Q3	7	0.30***	0.50***	0.52***	0.82***	1.88*	2.42	2.29
		(0.00)	(0.08)	(0.09)	(0.19)	(0.87)	(1.26)	(1.28)
Q4	7	0.56***	0.76***	0.97***	1.26***	2.45**	2.63**	4.18*
		(0.13)	(0.17)	(0.21)	(0.27)	(0.71)	(0.98)	(1.91)
Q4–Q1		0.60***	0.80***	0.96***	1.15***	2.01**	1.82	4.20**
		(0.13)	(0.19)	(0.23)	(0.32)	(0.79)	(1.10)	(1.92)

Note: This table reports the means of a univariate quartile sorting based on pooled fund averages of cumulative trade returns (TR) calculated for both executed buys and sells (Panel A), buys only (Panel B), and sells only (Panel C) at window lengths of 5 (1 week), 10 (2 weeks), 15 (3 weeks), 20 (1 month), 60 (3 months), 120 (6 months), and 250 (1 year) trading days starting at time t + 1. For all time horizons considered, Quartile 1 (Q1) contains the 25% of funds with the lowest average 1 week trade returns and Quartile 4 (Q4) contains the 25% of funds with the highest average 1 week trade returns. Multiple buy or sell transactions of the same fund in the same stock on the same day are aggregated into one trade by calculating the trading imbalance at the fund-stock-day level, which is the difference between the sum of all buy and sell transactions using the traded euro volume. A positive (negative) trading imbalance therefore indicates a buy (sell). For sells, the calculated post-trade returns are multiplied by −1. The trade returns are based on out-of-sample stock alphas from the Carhart 4-factor model. Therefore, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective windows, these benchmark returns are subtracted from the corresponding cumulative stock return. Q4–Q1 reports the difference to test for the equality of means between the best- and worst-performing quartile. The standard errors of two-tailed t-tests are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. Returns in %.

the means for the funds contained in Q1–Q3 start to become insignificant after a horizon of 1 month. Still, the question remains whether this outperformance is based on skill or rather luck. This will be examined in more detail in the next section.

Panels B and C present the results for buys and sells separately, that is, we sort and assess funds based solely on whether they were superior buyers or sellers, rather than being the best or worst at both simultaneously, which might lead to a different allocation of funds into quartiles. Nonetheless, our main findings do not seem to be affected. As in Panel A, Q4 shows persistent and significant outperformance over all time horizons considered, while Q1 continues to underperform. The most relevant differences from Panel A are the 1 week trade return results in Q1; in both Panels B and C, buys and sells show an insignificant mean. Hence, when ranking funds using buys and sells separately, the poorest performing funds do not achieve significant outperformance. In fact, they do not achieve it over any of the time horizons considered. For buys in Panel B, the 1 year trade return average even shows an economically relevant mean of −2.13%, although still statistically insignificant. However, from the results in Panel A, it is evident that, if a fund underperforms other funds on buys, it tends to outperform on sells, as in the aggregate perspective there are significant positive means up to 1 month, even for Q1 funds.

3.3 | Persistence in trading performance

We find that the short-term trading performance of Finnish mutual funds is significant for both buy and sell trades and that it varies across funds, with the quarter of the best-performing funds also showing significant long-term performance. Following the existing literature, such as Carlson (1970), Lehmann and Modest (1987), Grinblatt and Titman (1992), Brown and Goetzmann (1995), and Carhart (1997), we test for the persistence in returns to gain better insight into whether trading performance is a fund manager attribute or merely coincidental.

We sort funds into quartiles each year ("formation year") based on their average trading performance using the calculated Carhart-adjusted trade returns from executed buys and sells in that year. For each quartile, we then calculate the mean of the funds' annually calculated trade return averages for the formation year and each of the subsequent 5 years. The funds with the lowest trade return averages comprise Q1, and the funds with the highest trade return averages comprise Q4. Q4–Q1 tests the difference in risk-adjusted returns between the best- and worst-performing quartiles. The means of the trade return averages are shown in Table 4.

Panel A of Table 4 illustrates the results using 1 week trade returns. Once again, the mean in the formation year increases monotonically across the quartiles due to the annual resorting. Only for Q1 we observe a significantly negative mean of −0.24%, while the remaining three quartiles—representing approximately 75% of the fund years—exhibit a significantly positive trading performance ranging from 0.24% to 1.11%. The difference of 1.35% between Q4 and Q1 is highly significant at the 1% level. We find that the Q4 funds also continue to significantly outperform the Q1 funds in some of the following 5 years, but with much smaller magnitudes ranging from 0.14% to 0.19%, indicating superior short-term investment skills compared to the managers of other funds. Interestingly, despite the negative average return in the formation year, Q1 shows a reversal in subsequent periods, also demonstrating a significantly positive trading performance. In fact, with the exception of the formation year, all means exhibit significantly positive values. Thus, in the short run, all fund managers obtain abnormal and persistent trade returns from their trades.

The results for performance persistence using a 1 month horizon are presented in Panel B of Table 4. The results are very similar to those in Panel A. An exception is the difference between Q4 and Q1, which is significantly different from zero only in the formation year and the subsequent 2 years. Again, this is not only because the performance of Q4 funds declines in the following years, but also because in Q1, the managers return to provide positive trade returns after the initially poor formation year. As with the 1 week returns, we find that, on average, all fund managers appear to have superior and sustained trading skills.

When we evaluate the returns of traded stocks over longer time horizons, such as the 6 months period in Panel C or the 1 year period in Panel D, we obtain slightly different results. While we continue to see persistence in risk-adjusted trade returns achieved over the subsequent 5 years for Q4 (and partly for Q3) based on the significantly positive means, the poor performance in Q1 does not seem to recover as strongly as in the 1 week or 1 month case. Their means after the formation year are mostly insignificant. This is also illustrated by the statistical significance of some of the Q4–Q1 differences. Consequently, trading performance seems to be a managerial characteristic that also differs across funds. The outperformance and the differences between funds, as already documented in Table 2 and Table 3, do not seem to be purely coincidental. The results suggest that only the very talented managers are able to

TABLE 4 Persistence analysis using Carhart-adjusted trade returns of buys and sells.

	Panel A: 1 week								Panel B: 1 month							
	N	Formation year	+ 1 year	+ 2 years	+ 3 years	+ 4 years	+ 5 years	*N*	Formation year	+ 1 year	+ 2 years	+ 3 years	+ 4 years	+ 5 years
Q1	68	−0.24**	0.27***	0.26***	0.29***	0.20***	0.19***	69	−0.51***	0.33**	0.50***	0.54***	0.40***	0.50***
		(0.10)	(0.05)	(0.04)	(0.07)	(0.06)	(0.04)		(0.10)	(0.12)	(0.13)	(0.12)	(0.09)	(0.13)
Q2	63	0.24***	0.30***	0.34***	0.23***	0.28***	0.31***	64	0.38***	0.63***	0.48***	0.52***	0.49***	0.41***
		(0.03)	(0.06)	(0.06)	(0.08)	(0.04)	(0.06)		(0.05)	(0.12)	(0.09)	(0.11)	(0.13)	(0.09)
Q3	71	0.46***	0.44***	0.39***	0.35***	0.32***	0.25***	68	0.86***	0.56***	0.47***	0.53**	0.69***	0.64***
		(0.05)	(0.08)	(0.04)	(0.03)	(0.04)	(0.05)		(0.08)	(0.17)	(0.12)	(0.18)	(0.12)	(0.16)
Q4	62	1.11***	0.46***	0.38***	0.38***	0.38***	0.33***	63	2.06***	1.00***	0.84***	0.60***	0.64***	0.61***
		(0.19)	(0.07)	(0.08)	(0.06)	(0.08)	(0.03)		(0.33)	(0.12)	(0.12)	(0.15)	(0.20)	(0.13)
Q4–Q1		1.35***	0.19**	0.12	0.09	0.18*	0.14**		2.57***	0.66***	0.34*	0.05	0.25	0.11
		(0.19)	(0.07)	(0.08)	(0.08)	(0.09)	(0.05)		(0.37)	(0.16)	(0.17)	(0.18)	(0.21)	(0.18)
	Panel C: 6 months								Panel D: 1 year							
	N	Formation Year	+ 1 year	+ 2 years	+ 3 years	+ 4 years	+ 5 years	*N*	Formation Year	+ 1 year	+ 2 years	+ 3 years	+ 4 years	+ 5 years
Q1	70	−2.79***	0.08	0.43	0.56*	0.28	0.62**	66	−5.59***	−0.58	0.11	0.14	0.80	0.78
		(0.51)	(0.50)	(0.39)	(0.27)	(0.42)	(0.28)		(0.96)	(0.73)	(0.69)	(0.63)	(0.65)	(0.48)
Q2	63	−0.02	0.30	0.08	0.48	0.79**	0.86***	57	−0.50	1.34	0.14	0.95	0.36	0.92**
		(0.30)	(0.25)	(0.42)	(0.34)	(0.35)	(0.24)		(0.60)	(0.95)	(0.63)	(0.73)	(0.70)	(0.41)
Q3	69	1.39***	0.77**	0.73*	0.26	0.78**	0.30	62	1.77***	0.04	0.72	−0.19	0.48	0.59
		(0.27)	(0.26)	(0.37)	(0.40)	(0.34)	(0.40)		(0.40)	(0.89)	(0.87)	(0.66)	(0.64)	(0.63)
Q4	62	4.03***	1.49**	0.85	1.24***	0.91***	0.92*	55	6.57***	2.28***	1.30**	1.29	1.07***	1.22*
		(0.46)	(0.55)	(0.66)	(0.34)	(0.11)	(0.46)		(1.00)	(0.63)	(0.58)	(0.79)	(0.22)	(0.67)
Q4–Q1		6.82***	1.40**	0.42	0.68	0.64*	0.30		12.16***	2.86***	1.19	1.15	0.27	0.44
		(0.61)	(0.61)	(0.49)	(0.43)	(0.32)	(0.47)		(1.52)	(0.68)	(0.94)	(0.97)	(0.36)	(0.71)

Note: This table reports the means of a univariate quartile sorting based on the funds' annually calculated averages of cumulative trade returns (TR) computed for executed buys and sells at window lengths of 5 (1 week, Panel A), 20 (1 month, Panel B), 120 (6 months, Panel C), and 250 (1 year, Panel D) trading days starting at time t + 1. For this purpose, funds are grouped into quartiles each year (formation year). Quartile 1 (Q1) contains the funds with the lowest annually calculated trade return averages and Quartile 4 (Q4) contains the funds with the highest annually calculated trade return averages. Conditional on the sorting in each formation year, the table also reports the means of the funds' corresponding trade return averages in each of the following 5 years. Q4–Q1 reports the difference to test for the equality of means between the best- and worst-performing quartile. Before the trade return calculation, multiple buy or sell transactions of the same fund in the same stock on the same day are aggregated into one trade by calculating the trading imbalance at fund-stock-day level, which is the difference between the sum of all buy and sell transactions using the traded euro volume. A positive (negative) trading imbalance therefore indicates a buy (sell). For sells, calculated post-trade returns are multiplied by −1. The trade returns are based on out-of-sample stock alphas from the Carhart 4-factor model. Therefore, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective windows, these benchmark returns are subtracted from the corresponding cumulative stock return. ***, **, and * denote significance of a two-tailed t-test with clustered standard errors (in parentheses) at the fund and year levels, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

maintain a consistent short- and long-term outperformance in traded stocks by demonstrating superior trading skills. In contrast, as shown in Panels A and B, most fund managers seem to exhibit persistent short-term trading skills, given that they buy and sell in time.

3.4 | Trading performance influencing factors: the role of trade size, liquidity provision, price pressure, and fund characteristics

Section 3.3 presents evidence supporting the notion that the average short-term outperformance observed in the majority of Finnish mutual funds is very persistent, implying that it is not merely a result of chance. Moreover, there is an indication of sustained performance variation across funds, with the best-performing quartile also showing positive risk-adjusted returns over the long term. This suggests that trading performance could be considered a managerial attribute. However, while recognizing the potential presence of manager skill in terms of average returns, the unresolved question at this point is whether managers are capable of predicting not only the direction but also the magnitude of stock returns at a more granular level. If they possess genuine talent, they may also be adept at allocating more capital to their trades when expecting better performance. As a result, larger trades should predict larger abnormal returns.

Another question that arises is whether the strong short-term performance documented for our sample is truly based on information trading. Especially with respect to the short term, there are two common explanations that could contribute significantly to this performance. One possible source could be liquidity provision, that is, Finnish mutual funds act as contrarian traders and earn abnormal returns by taking advantage of temporary price pressure in the preceding days due to order imbalances in stocks (e.g., Chordia & Subrahmanyam, 2004; Grossman & Miller, 1988; Nagel, 2012). For instance, Blume and Edelen (2004) note that index fund transactions demand liquidity from the market after an index rebalancing. By taking the opposite side, managers can profit from temporary mispricing and mean reversion patterns in stock returns over the next few days. Da et al. (2011) and Ignashkina et al. (2022) show that some mutual funds act as contrarians and provide liquidity, whereas others demand liquidity. The latter examine 5 days reversal returns and find that liquidity-providing trades are associated with positive returns, while liquidity-demanding mutual funds instead suffer large costs of immediacy. Given that Grinblatt and Keloharju (2000) report that foreign funds in the Finnish market predominantly trade on momentum, domestic mutual funds could appear as a group of contrarian traders by consistently providing liquidity to the market, which may be the main reason for their significant positive short-term returns.

The second reason for positive risk-adjusted trade returns could be price pressure caused by autocorrelated institutional trades. Sias et al. (2006) report that changes in aggregate institutional ownership have contemporaneous effects on stock returns in the same quarter. Chan and Lakonishok (1995) and Keim and Madhavan (1997) find that trades by individual institutional investors already exert pressure on stock prices. This effect might be particularly pertinent in the Finnish market, where stocks are often characterized by illiquidity and stale prices. Thus, when fund managers trade the same stocks in the same direction on adjacent days, some of these trades may appear to predict abnormal returns, but this is just an artifact of subsequent price pressure and not the result of skillful trading.

Mutual fund trading performance might also be related to fund characteristics. On the one hand, funds that employ managers with better trading skills could charge higher fees or be larger in size. For instance, Berk and Green (2004), among others, suggest that fund size is positively related to manager skill. On the other hand, even if these characteristics are not directly connected to manager attributes, they could still affect trading performance in a similar way as they affect fund alphas calculated from reported returns.[xx]

Therefore, in order to study the effects of trade size, liquidity provision, price pressure, and fund characteristics on trading performance, this section implements a multivariate panel regression model defined as follows:

$$\begin{aligned}\mathrm{TR}^{\mathrm{Car}}_{j,i,[t+1;t+T]} = \;& b_0 + b_1\left(\frac{\mathrm{TradeSize}_{j,i,t}}{\mathrm{TNA}_{j,t}}\right) + b_2\mathrm{LiquidityProvision}_{j,i,t} + b_3\left(\frac{\mathrm{TIB}_{j,i,[t+1;t+T]}}{\mathrm{MCAP}_{i,t}}\right) + \sum_{k=4}^{9} b_k \mathrm{Characteristics}^k_{j,t} \\ & + \sum_{k=10}^{14} b_k \mathrm{Controls}^k_{i,t} + \varepsilon_{j,i,t}.\end{aligned} \tag{8}$$

$TR^{Car}_{j,i,[t+1;t+T]}$ refers to Carhart risk-adjusted trade returns for both executed buys and sells at the fund-stock-day level as defined in Equation (7). To investigate whether larger trades predict larger abnormal returns, we incorporate $\frac{TradeSize_{j,i,t}}{TNA_{j,t}}$ into the regression, representing the corresponding trade size scaled by TNA of the respective fund. The adjustment accounts for a trade's relative importance given the size of the fund.

$LiquidityProvision_{j,i,t}$ refers to a dummy variable with a value of one if a trade can be considered as liquidity-providing. Thus, trades that demand liquidity have a value of zero. To classify liquidity-providing and liquidity-demanding trades, we adapt the methodology outlined in Jylhä et al. (2014) and Ignashkina et al. (2022). Liquidity-providing (-demanding) trades are transactions in which mutual funds buy (sell) stocks that have a positive 5 days expected excess return and sell (buy) stocks that have a negative 5 days expected return. To calculate 5 days expected excess returns, we first estimate the stocks' return reversal patterns by cross-sectionally regressing on each day the stocks' next 5 days' excess returns on each of the stocks' past 20 days' excess returns. Second, using the average of the coefficients obtained from the 120 past days' cross-sectional regressions, we then calculate a stock's expected 5 days excess return on day t using the stocks' past 20 days' excess returns. We use the return of the Finnish market to determine a stock's excess return.[xxi]

To examine a possible impact of price pressure on trade returns, we include $\frac{TIB_{j,i,[t+1;t+T]}}{MCAP_{i,t}}$ in the regression, which is represented by the market capitalization ($MCAP_{i,t}$) of the stock scaled aggregate trading imbalance of the fund in the traded stock over the corresponding trade return evaluation window T, utilizing the respective euro trading volumes during these days. Positive values for $TIB_{j,i,[t+1;t+T]}$ indicate subsequent net buying by the fund in the same stock, while negative values indicate selling. For executed sells, these values are multiplied by −1, since our definition of trade returns signifies positive values when stock prices have actually declined.[xxii] We scale $TIB_{j,i,[t+1;t+T]}$ by market capitalization, recognizing that for a given trading imbalance, the impact on the security prices of smaller stocks is larger. If stock prices are affected by funds trading the same stock in the same direction on subsequent days, the coefficient b_3 should load positively, indicating that price pressure from autocorrelated institutional trades is, at least in part, responsible for the strong short-term trading performance documented earlier.

We also include several fund characteristics. The fund's trading activity measured as the natural logarithm of the total euro trading volume, the natural logarithm of the fund's TNA, the fund's age in years, the fund's annualized expense ratio, a time-invariant dummy variable that equals one for load funds, and the fund's annual turnover ratio. Other controls are the natural logarithm of $MCAP_{i,t}$ to account for a stock's liquidity and size,[xxiii] $Volatility_{i,t}$ to capture a stock's risk, measured as the return standard deviation calculated over the previous 30 trading days, and three dummy variables to identify whether a trade was executed in February, March, or December.[xxiv] Standard errors are clustered by fund, stock, and day.

Table 5 shows the results using pooled as well as fund, year, or stock fixed effects regressions. For brevity, we only report results for the 1 week (Columns 1–4), 1 month (Columns 5–8), and 1 year (Columns 9–12) horizons.[xxv] For relative trade size, we find a significant positive correlation with future 1 week trade returns. Using the coefficient of 0.1199 from the pooled regression in Column 1, a one standard deviation increase in relative trade size of 0.66% leads to an increase in abnormal trade returns of approximately 8 bps. While this may seem to be small in magnitude, it represents an annualized return of 4.25%. Even after applying fund fixed effects in Column 2, the coefficient remains significant at the 10% level, suggesting that the relationship is not driven solely by cross-sectional differences between funds. However, the effect diminishes for 1 month trade returns and becomes insignificant for 1 year trade returns. Thus, according to the size of their bets, fund managers seem to be able to predict stock returns only in the short run, but not in the long run. This is consistent with our findings of significant short-term trading skills evidenced in the previous sections.

With respect to our dummy variable examining whether liquidity provision serves as a relevant source for abnormal returns, we find significant positive coefficients on 1 week trade returns. Unlike trades that demand liquidity, 1 week trade returns are on average 35 bps higher when a fund executes trades that provide liquidity to the market. Considering that the corresponding pooled mean shown in Table 2 is 24 bps, liquidity provision seems to contribute substantially to the documented short-term trading performance. Intriguingly, while this effect becomes insignificant for 1 month trade returns despite a persistent surplus of 22 bps, the coefficients on 1 year trade returns are again significant at the 5% level, ranging from 1.09% to 1.23%. Liquidity-providing trades also appear to dominate liquidity-demanding trades in the long run. This is unexpected, given that return differences due to temporary order imbalances in the market are usually considered to be a rather short-lived phenomenon.

TABLE 5 Panel regression explaining Carhart-adjusted trade returns of buys and sells.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Carhart TR	**1 week**	**1 week**	**1 week**	**1 week**	**1 month**	**1 month**	**1 month**	**1 month**	**1 year**	**1 year**	**1 year**	**1 year**
Trade $\text{Size}_{j,i,t}/\text{TNA}_{j,t}$	0.1199***	0.0878*	0.1154***	0.1217***	0.1972*	0.1080	0.1941*	0.2100**	−0.0681	−0.3633	−0.0462	0.0277
	(0.0415)	(0.0468)	(0.0404)	(0.0418)	(0.0968)	(0.1107)	(0.1007)	(0.0946)	(0.3551)	(0.3249)	(0.3320)	(0.3088)
Liquidity $\text{Provision}_{j,i,t}$	0.3461***	0.3501***	0.3473***	0.3507***	0.2194	0.2171	0.2281	0.2207	1.1185**	1.2268**	1.0902**	1.1644**
	(0.0764)	(0.0760)	(0.0754)	(0.0759)	(0.1483)	(0.1459)	(0.1446)	(0.1444)	(0.4893)	(0.5071)	(0.4889)	(0.4892)
$\text{TIB}_{j,i,[t+1;t+T]}/\text{MCAP}_{i,t}$	−1.1993	−1.2139	−1.2242	−1.1636	−3.2801**	−3.3549**	−3.2363**	−3.3177**	−10.1780	−10.4036	−10.1191	−10.6432
	(0.9112)	(0.9236)	(0.9129)	(0.9292)	(1.4356)	(1.4648)	(1.4781)	(1.5937)	(6.6826)	(6.7128)	(6.6878)	(7.0314)
$\ln(\text{Trading Activity})_{j,t}$	−0.0698***	−0.0550***	−0.0720***	−0.0680***	−0.1531***	−0.1204**	−0.1542***	−0.1399***	−0.1819	−0.1310	−0.1797	−0.1483
	(0.0188)	(0.0165)	(0.0181)	(0.0188)	(0.0458)	(0.0455)	(0.0476)	(0.0464)	(0.1901)	(0.2311)	(0.1942)	(0.1973)
$\ln(\text{TNA})_{j,t}$	0.0952**	0.0309	0.0954**	0.1031***	0.1155	−0.1368	0.1333	0.1586	−0.3671	−4.0316**	0.0402	−0.0881
	(0.0367)	(0.0706)	(0.0350)	(0.0355)	(0.1222)	(0.2150)	(0.1215)	(0.1192)	(0.3812)	(1.9465)	(0.2984)	(0.2434)
$\text{Age}_{j,t}$	−0.0049	−0.0076	−0.0043	−0.0058	−0.0087	0.0467	−0.0085	−0.0110	0.0247	0.1781	−0.0073	0.0336
	(0.0055)	(0.0134)	(0.0055)	(0.0052)	(0.0133)	(0.0494)	(0.0142)	(0.0143)	(0.0439)	(0.2128)	(0.0395)	(0.0456)
Expense $\text{Ratio}_{j,t}$	0.1906***	0.2231	0.1895***	0.1927***	0.5130***	0.5067	0.4924***	0.5114***	−0.2879	−1.7480	−0.1891	−0.4075
	(0.0418)	(0.1898)	(0.0494)	(0.0442)	(0.1323)	(0.6003)	(0.1399)	(0.1364)	(0.7338)	(2.8841)	(0.6555)	(0.5664)
Load_{j}	−0.0251		−0.0140	−0.0294	−0.0883		−0.0379	−0.0707	0.5405		0.9993	0.8821
	(0.0716)		(0.0738)	(0.0713)	(0.1642)		(0.1782)	(0.1835)	(0.8741)		(0.9208)	(0.9604)
Turnover $\text{Ratio}_{j,t}$	0.0000	0.0000	−0.0001	0.0000	−0.0004*	−0.0002	−0.0003	−0.0002	0.0001	0.0000	−0.0029***	0.0023
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0010)	(0.0017)	(0.0010)	(0.0014)
$\ln(\text{MCAP})_{i,t}$	−0.0704***	−0.0784***	−0.0747***	−0.3773***	−0.1996***	−0.2207***	−0.2102***	−1.2474***	−0.7076*	−0.8446**	−0.8098**	−7.9211**
	(0.0169)	(0.0160)	(0.0168)	(0.1024)	(0.0492)	(0.0552)	(0.0518)	(0.3590)	(0.3843)	(0.3845)	(0.3893)	(3.1936)
$\text{Volatility}_{i,t}$	0.1159***	0.1113**	0.1228**	0.0610	0.2009**	0.2056*	0.2416**	0.1014	1.0020	0.5197	0.5807	0.2459
	(0.0415)	(0.0445)	(0.0442)	(0.0563)	(0.0935)	(0.1012)	(0.1052)	(0.1039)	(0.7215)	(0.7568)	(0.7376)	(0.7677)
February_{t}	−0.2402*	−0.2309*	−0.2449*	−0.2310*	−0.1160	−0.0896	−0.1466	−0.0942	1.1016	1.3068	0.9882	1.4494
	(0.1214)	(0.1210)	(0.1254)	(0.1216)	(0.2003)	(0.1999)	(0.1956)	(0.1969)	(0.8832)	(0.9039)	(0.8404)	(0.9053)
March_{t}	0.0527	0.0549	0.0537	0.0589	0.3600	0.3902	0.3525	0.3652	2.4466**	2.5087**	2.5430**	2.5387**
	(0.0912)	(0.0884)	(0.0938)	(0.0906)	(0.2612)	(0.2550)	(0.2515)	(0.2561)	(1.1045)	(1.0615)	(1.0945)	(1.0786)
December_{t}	0.1372	0.1396	0.1404	0.1273	−0.0250	−0.0501	0.0096	−0.0886	0.9593	0.7745	1.0506	0.5607
	(0.0870)	(0.0861)	(0.0825)	(0.0870)	(0.2634)	(0.2658)	(0.2620)	(0.2604)	(1.4249)	(1.3900)	(1.4066)	(1.3234)
Intercept	0.2959	1.4229	0.3885	6.7413***	3.5623*	7.3608*	3.3629*	24.9814***	22.0277*	93.1473*	18.0265	170.8189**
	(0.5560)	(1.3986)	(0.5460)	(2.3981)	(1.9671)	(4.2253)	(1.8406)	(7.8454)	(12.6781)	(45.2484)	(11.1124)	(69.6509)

TABLE 5 (Continued)

Carhart TR	(1) 1 week	(2) 1 week	(3) 1 week	(4) 1 week	(5) 1 month	(6) 1 month	(7) 1 month	(8) 1 month	(9) 1 year	(10) 1 year	(11) 1 year	(12) 1 year
Fund fixed effects	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO
Year fixed effects	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO
Stock fixed effects	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
Adj. R^2	0.38	0.46	0.41	0.74	0.47	0.61	0.56	1.30	1.46	1.76	1.72	3.91
N	93,110	93,110	93,110	93,110	92,201	92,201	92,201	92,201	81,471	81,471	81,471	81,471

Note: This table reports the results of multivariate panel regressions explaining cumulative trade returns (TR) calculated for executed buys and sells at window lengths of 5 (1 week), 20 (1 month), and 250 (1 year) trading days starting at time t + 1. Multiple buy or sell transactions of the same fund in the same stock on the same day are aggregated into one trade by calculating the trading imbalance at the fund-stock-day levels, which is the difference between the sum of all buy and sell transactions using the traded euro volume. A positive (negative) trading imbalance therefore indicates a buy (sell). For sells, calculated post-trade returns are multiplied by −1. The trade returns are based on out-of-sample stock alphas obtained from the Carhart 4-factor model (%). Therefore, a stock's daily factor loadings are estimated from rolling window regressions with a window length of 60 trading days, which are used to calculate t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective windows, these benchmark returns are subtracted from the corresponding cumulative stock return. As explanatory variables, the regressions include a dummy variable with a value of 1 to classify executed buys (sells) as liquidity-providing if the subsequent 5 days expected stock excess return during t + 1 to t + 5 is positive (negative), following the methodology described in Ignashkina et al. (2022). Liquidity-demanding trades are therefore indicated by a dummy value of zero, where the 5 days expected stock excess return of executed buys (sells) is negative (positive). To examine the possible impact of price pressure on trade returns, the regressions incorporate a fund's aggregated trading imbalance in a traded stock calculated over the corresponding trade return evaluation windows using the respective euro trading volumes during those days. To account for the fact that the impact on security prices of smaller stocks may be larger, the aggregated trading imbalance is scaled by the market capitalization of the stock (%). In the case of sells, the corresponding aggregated trading imbalances are then multiplied by −1. In order to measure the effect of the importance of the trade on subsequent trade returns, the regressions include the size of the trade scaled by the total net assets of the fund (%). Additional fund-level control variables are the natural logarithm of total euro trading volume (trading activity), the natural logarithm of fund total net assets, age in years, annualized expense ratio (%), annual turnover (%), and a dummy variable that is 1 for load funds. For stock characteristics, the regressions contain the natural logarithm of market capitalization and stock volatility (%), which is the return standard deviation calculated over the preceding 30 trading days. To identify whether a trade was made in February, March, or December, the regressions also include respective dummy variables that equal 1 when applicable. Standard errors in parentheses are clustered at the fund, stock, and day levels. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

Examining the results for our variable capturing potential price pressure effects when funds trade the same stocks in the same direction on subsequent days, we find only insignificant coefficients for the 1 week and 1 year returns and significant negative coefficients for the 1 month return. As we would expect a positive relationship, it is evident that price pressure does not seem to play an important role in the observed short-term trading performance.

We also document notable results with respect to several fund characteristics. First, daily fund trading activity based on the total euro trading volume is significantly and negatively related to trading performance for weekly and monthly returns. Second, fund TNA has significant positive coefficients when using 1 week trade returns, but becomes insignificant with fund fixed effects, suggesting a cross-sectional effect. This implies that larger funds employ managers with better short-term trading skills. However, when evaluating returns over longer periods, fund size and trading performance do not seem to be related. Third, examining the expense ratio, we document a positive correlation with 1 week and 1 month trade returns, but again, the coefficients are insignificant with fund-fixed effects. Thus, funds that charge higher operating expenses and management fees appear to be able to deliver superior short-term trading performance before costs. For instance, using the coefficient of 0.5130 from Column 5 and assuming an increase in the annual expense ratio based on the standard deviation of 0.54% from Table 1, the average Carhart adjusted 1 month trade return would increase by 28 bps, equivalent to an annualized return of 3.41% and potentially sufficient to offset the higher costs. Nevertheless, akin to the relationship observed with fund size, the expense ratio does not appear to correlate with the long-term performance measure using 1 year trade returns.

3.5 | Analyzing buy and sell trade returns: the differential impact of trade size, liquidity provision, price pressure, and fund characteristics

In our final analysis, we aim to gain a deeper understanding of whether trade returns of executed buys and sells exhibit differential relationships with the explanatory variables introduced in the previous section. As highlighted in Section 3.1, where we have explored the average trading performance across various time horizons, there is discernible evidence of an asymmetry between the risk-adjusted returns of buys and sells, particularly in the long run. A similar observation may apply to the factors that influenced these returns when both buys and sells are included in the regression. Therefore, to scrutinize the isolated effects for buys and sells, this section repeats the analysis shown in Equation (8) but distinguishes between buy and sell trades. Table 6 illustrates the results of trade returns for buys, while Table 7 presents those for sells.

The findings in Table 5 suggest that important determinants of trade returns in Finnish mutual funds include trade size, liquidity provision, trading activity, fund size, and expense ratio. The evidence for buy trades in Table 6 largely aligns with the aggregate results. However, we observe that, rather than showing a significantly positive relationship with 1 week trade returns, fund size exhibits a negative correlation with 1 year trade returns. Moreover, the significance of the coefficients on fund trading activity disappears and is less pronounced for trade size.

Upon examining the results for sell trades presented in Table 7, we observe that while fund trading activity does not affect the returns of buy trades, it has a significant negative impact on the returns of sell trades. Thus, the significant correlation noted in Table 5 seems to be driven by the selling side. Similarly, while fund size is insignificant or even negatively related to buy trade returns, it consistently shows positive and significant coefficients for sell trades across all horizons considered. In contrast, trade size and expense ratio, which are significantly positive for buys at 1 week or 1 month horizons, become mostly insignificant for sells. These results imply that while liquidity provision contributes significantly to both buy and sell trade returns, there are several determinants that affect buys and sells differently.

In sum, our analysis provides evidence that higher expenses are associated with better performance, serving as a signal whether fund managers possess superior trading skills relative to others. However, this result is driven by the buying side and only holds for the short term. Conversely, managers of larger funds appear to be better sellers, but their buying performance actually worsens in the long run. Despite the differences in the influence of the explanatory variables discussed above, the liquidity provision variable remains highly significant for both buy and sell trades, confirming our earlier finding that liquidity provision constitutes a major source of the documented short-term trading performance.

4 | CONCLUSION

Utilizing a proprietary dataset of daily transactions, this study analyzes the trading performance of domestic equity mutual funds in the Finnish market. The findings reveal that, on average, fund managers yield significant short-term trading

TABLE 6 Panel regression explaining Carhart-adjusted trade returns of buys.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Carhart TR	**1 week**	**1 week**	**1 week**	**1 week**	**1 month**	**1 month**	**1 month**	**1 month**	**1 year**	**1 year**	**1 year**	**1 year**
Trade $Size_{j,i,t}/TNA_{j,t}$	0.1477*	0.1398*	0.1381*	0.1690**	0.1959	0.2883	0.1822	0.2732*	−0.1670	−0.3882	−0.2877	0.7865
	(0.0727)	(0.0798)	(0.0723)	(0.0703)	(0.1529)	(0.1790)	(0.1390)	(0.1348)	(0.8751)	(0.7562)	(0.7589)	(0.6993)
Liquidity $Provision_{j,i,t}$	0.3763***	0.3875***	0.3901***	0.3652***	0.2382	0.2315	0.2885*	0.1987	0.9861*	1.1989**	1.2191**	0.6184
	(0.0894)	(0.0874)	(0.0873)	(0.0861)	(0.1667)	(0.1626)	(0.1553)	(0.1519)	(0.5756)	(0.5418)	(0.5050)	(0.4887)
$TIB_{j,i,[t+1;t+T]}/MCAP_{i,t}$	−0.6422	−0.6467	−0.6563	−0.8058	−3.8087*	−3.9105**	−3.7312*	−4.0715*	−10.3596	−11.5517*	−9.9105*	−7.1864*
	(1.1044)	(1.1150)	(1.0977)	(1.1652)	(1.9082)	(1.8953)	(1.9522)	(2.0283)	(6.0880)	(5.9819)	(5.7508)	(3.8514)
ln(Trading $Activity)_{j,t}$	0.0088	0.0341	0.0104	0.0163	−0.0121	0.0371	−0.0040	0.0219	−0.1253	−0.0114	−0.1358	0.2490
	(0.0330)	(0.0304)	(0.0300)	(0.0330)	(0.0653)	(0.0642)	(0.0587)	(0.0695)	(0.3424)	(0.3673)	(0.2883)	(0.2368)
$\ln(TNA)_{j,t}$	0.0051	−0.3475***	0.0040	0.0527	−0.1415	−1.0959**	−0.1035	0.0598	−2.2035*	−16.1643***	−1.2545**	−0.0379
	(0.0546)	(0.1244)	(0.0489)	(0.0544)	(0.1936)	(0.4323)	(0.1350)	(0.1535)	(1.1489)	(3.2564)	(0.5881)	(0.6385)
$Age_{j,t}$	−0.0088**	0.0435	−0.0056	−0.0126***	−0.0187	0.1375	−0.0064	−0.0317**	0.0276	1.0051	0.0572	−0.0652
	(0.0039)	(0.0361)	(0.0036)	(0.0042)	(0.0121)	(0.1239)	(0.0072)	(0.0144)	(0.0837)	(1.2471)	(0.0449)	(0.1238)
Expense $Ratio_{j,t}$	0.3046***	1.1771**	0.2527***	0.3279***	0.8957***	3.8065**	0.6409***	0.9544***	0.0704	4.5097	−0.5780	0.4339
	(0.0771)	(0.4732)	(0.0763)	(0.0731)	(0.2541)	(1.4969)	(0.2119)	(0.2214)	(1.5099)	(5.1872)	(1.0828)	(0.5855)
$Load_j$	−0.1412*		−0.0873	−0.1269	−0.5091**		−0.2280*	−0.4333*	−1.3626		−0.0424	−0.2265
	(0.0801)		(0.0772)	(0.0844)	(0.1888)		(0.1308)	(0.2283)	(0.9623)		(0.6486)	(0.9131)
Turnover $Ratio_{j,t}$	0.0001	0.0006**	0.0002	0.0003*	0.0000	0.0014*	0.0005	0.0007	−0.0014	0.0011	−0.0041*	0.0060
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0005)	(0.0008)	(0.0006)	(0.0005)	(0.0045)	(0.0033)	(0.0021)	(0.0035)
$\ln(MCAP)_{i,t}$	−0.1267**	−0.1512***	−0.1286***	−1.4358***	−0.4333***	−0.5052***	−0.4442***	−4.7754***	−3.2896**	−3.9612**	−3.5301**	−46.7428***
	(0.0466)	(0.0433)	(0.0460)	(0.1582)	(0.1502)	(0.1472)	(0.1531)	(0.5558)	(1.5304)	(1.4714)	(1.5762)	(5.1921)
$Volatility_{i,t}$	0.0770	0.0662	0.1056	−0.1091	0.1356	0.1090	0.2406	−0.3436	4.0991**	2.5384	3.5266	−0.2153
	(0.0640)	(0.0624)	(0.0694)	(0.0932)	(0.2380)	(0.2550)	(0.2741)	(0.2707)	(1.8797)	(2.0462)	(2.1817)	(1.2484)
$February_t$	0.2324	0.2595	0.2135	0.2425	0.4236	0.4480	0.3631	0.4617	0.8209	1.4775	0.2898	1.4005
	(0.2967)	(0.2956)	(0.2996)	(0.3025)	(0.5975)	(0.5890)	(0.6009)	(0.6000)	(1.7194)	(1.4446)	(1.3938)	(1.2305)
$March_t$	0.0794	0.0602	0.0733	0.0741	−0.5658	−0.6671	−0.5593	−0.6160	1.5230	1.3604	1.7563	0.6001
	(0.2122)	(0.2042)	(0.2094)	(0.2166)	(0.4591)	(0.4504)	(0.4538)	(0.4675)	(1.8641)	(1.5038)	(1.6859)	(1.5674)
$December_t$	0.2660	0.2394	0.3035	0.2116	0.0615	−0.0802	0.1914	−0.1184	0.8171	0.2732	1.7682	−0.9587
	(0.2072)	(0.2090)	(0.2075)	(0.2039)	(0.6723)	(0.6788)	(0.6281)	(0.7148)	(2.3039)	(2.1497)	(2.1457)	(1.4755)
Intercept	2.0251*	6.6459***	1.9649*	29.0441***	11.2073***	23.0543***	10.2830***	99.6170***	102.2216***	353.8357***	91.2867***	984.0830***
	(1.0377)	(2.1736)	(1.0005)	(3.3683)	(3.4398)	(7.6769)	(2.9233)	(11.6383)	(29.3942)	(64.8640)	(24.7313)	(109.9416)

(Continues)

TABLE 6 (Continued)

Carhart TR	(1) 1 week	(2) 1 week	(3) 1 week	(4) 1 week	(5) 1 month	(6) 1 month	(7) 1 month	(8) 1 month	(9) 1 year	(10) 1 year	(11) 1 year	(12) 1 year
Fund fixed effects	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO
Year fixed effects	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO
Stock fixed effects	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
Adj. R^2	0.50	0.76	0.68	2.35	1.00	1.61	1.99	5.80	5.85	8.58	8.55	40.83
N	49,694	49,694	49,694	49,694	49,576	49,576	49,576	49,576	44,709	44,709	44,709	44,709

Note: This table reports the results of multivariate panel regressions explaining cumulative trade returns (TR) calculated for executed buys at window lengths of 5 (1 week), 20 (1 month), and 250 (1 year) trading days starting at time t + 1. Multiple buy or sell transactions of the same fund in the same stock on the same day are aggregated into one trade by calculating the trading imbalance at fund-stock-day level, which is the difference between the sum of all buy and sell transactions using the traded euro volume. A positive (negative) trading imbalance therefore indicates a buy (sell). The buy trade returns are based on out-of-sample stock alphas obtained from the Carhart 4-factor model (%). Therefore, a stock's daily factor loadings are estimated from rolling window regressions with a window length of 60 trading days, which are used to calculate t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective windows, these benchmark returns are subtracted from the corresponding cumulative stock return. As explanatory variables, the regressions include a dummy variable with a value of 1 to classify executed buys as liquidity-providing if the subsequent 5 days expected stock excess return during t + 1 to t + 5 is positive, following the methodology described in Ignashkina et al. (2022). Liquidity-demanding trades are therefore indicated by a dummy value of zero, where the 5 days expected stock excess return of executed buys is negative. To examine the possible impact of price pressure on trade returns, the regressions incorporate a fund's aggregated trading imbalance in a traded stock calculated over the corresponding trade return evaluation windows using the respective euro trading volumes during those days. To account for the fact that the impact on security prices of smaller stocks may be larger, the aggregated trading imbalance is scaled by the market capitalization of the stock (%). In order to measure the effect of the importance of the trade on subsequent trade returns, the regressions include the size of the trade scaled by the total net assets of the fund (%). Additional fund-level control variables are the natural logarithm of total euro trading volume (trading activity), the natural logarithm of fund total net assets, age in years, annualized expense ratio (%), annual turnover (%), and a dummy variable that is 1 for load funds. For stock characteristics, the regressions contain the natural logarithm of market capitalization and stock volatility (%), which is the return standard deviation calculated over the preceding 30 trading days. To identify whether a buy trade was made in February, March, or December, the regressions also include respective dummy variables that equal 1 when applicable. Standard errors in parentheses are clustered at the fund, stock, and day levels. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

TABLE 7 Panel regression explaining Carhart-adjusted trade returns of sells.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Carhart TR	**1 week**	**1 week**	**1 week**	**1 week**	**1 month**	**1 month**	**1 month**	**1 month**	**1 year**	**1 year**	**1 year**	**1 year**
Trade $Size_{j,i,t}$/ $TNA_{j,t}$	0.0758	0.0477	0.0744	0.0565	0.1981*	0.0363	0.2005**	0.1402	0.9785	0.9546	1.0338**	0.1021
	(0.0512)	(0.0461)	(0.0463)	(0.0478)	(0.0974)	(0.1014)	(0.0843)	(0.1042)	(0.5838)	(0.6385)	(0.4676)	(0.7334)
Liquidity $Provision_{j,i,t}$	0.3158***	0.3124***	0.3141***	0.3064***	0.2117	0.2190	0.2237	0.1503	0.8861**	0.5889	0.8855*	0.3665
	(0.0958)	(0.0976)	(0.0963)	(0.0946)	(0.1729)	(0.1662)	(0.1711)	(0.1617)	(0.4278)	(0.4673)	(0.4475)	(0.3913)
$TIB_{j,i,[t+1;t+T]}$/ $MCAP_{i,t}$	−1.5336	−1.5885	−1.6126	−1.4593	−2.5677**	−2.6438**	−2.6289**	−2.3359**	−9.7286	−10.1589	−10.2854	−6.4005
	(0.9769)	(0.9855)	(0.9879)	(0.9927)	(1.2345)	(1.2239)	(1.1776)	(1.1208)	(6.3705)	(6.3734)	(6.1394)	(4.5994)
ln(Trading $Activity)_{j,t}$	−0.1522***	−0.1343***	−0.1569***	−0.1484***	−0.3175***	−0.2512***	−0.3136***	−0.2965***	−0.3232	−0.3728*	−0.2395	−0.3860**
	(0.0324)	(0.0319)	(0.0317)	(0.0324)	(0.0880)	(0.0750)	(0.0794)	(0.0851)	(0.2315)	(0.2030)	(0.1897)	(0.1872)
$\ln(TNA)_{j,t}$	0.1844***	0.3948***	0.1665***	0.1257**	0.3598**	0.7770*	0.2715**	0.1647	2.3348***	11.3159***	1.7440***	−0.0240
	(0.0539)	(0.1377)	(0.0447)	(0.0517)	(0.1490)	(0.3788)	(0.1290)	(0.1357)	(0.7488)	(2.4841)	(0.5979)	(0.5641)
$Age_{j,t}$	−0.0045	−0.0521	−0.0025	0.0027	−0.0066	−0.0219	0.0010	0.0130	−0.0521	−0.3174	−0.0340	0.2184**
	(0.0116)	(0.0349)	(0.0102)	(0.0106)	(0.0305)	(0.1046)	(0.0268)	(0.0245)	(0.1242)	(1.1404)	(0.0530)	(0.1049)
Expense $Ratio_{j,t}$	0.0444	−0.7942*	0.0739	0.0187	0.0473	−3.0389**	0.2269	−0.0380	0.9117	−5.5666	1.4552**	0.2247
	(0.0828)	(0.4191)	(0.0770)	(0.0891)	(0.2190)	(1.2386)	(0.1513)	(0.2166)	(1.0236)	(5.3855)	(0.5662)	(0.8353)
$Load_j$	0.0646		0.0299	0.0566	0.2443		−0.0132	0.2492	−0.3741		−1.3227	0.0118
	(0.1377)		(0.1230)	(0.1388)	(0.3726)		(0.2836)	(0.3162)	(1.5300)		(1.1867)	(1.0763)
Turnover $Ratio_{j,t}$	−0.0003	−0.0008***	−0.0005**	−0.0004*	−0.0012	−0.0025**	−0.0013	−0.0013*	0.0011	−0.0006	0.0005	−0.0011
	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0010)	(0.0012)	(0.0008)	(0.0007)	(0.0056)	(0.0037)	(0.0016)	(0.0042)
$\ln(MCAP)_{i,t}$	0.0055	0.0005	−0.0063	0.8391***	0.1152	0.1111	0.0822	2.9090***	2.6432	3.0870*	2.6043	41.2316***
	(0.0428)	(0.0431)	(0.0435)	(0.1731)	(0.1411)	(0.1455)	(0.1434)	(0.6484)	(1.7061)	(1.6753)	(1.7943)	(5.1458)
$Volatility_{i,t}$	0.1588**	0.1622*	0.1524*	0.1668**	0.2918*	0.3230**	0.2945*	0.4305**	−2.7500	−1.9895	−2.6613	−0.3826
	(0.0748)	(0.0795)	(0.0809)	(0.0774)	(0.1513)	(0.1350)	(0.1433)	(0.1996)	(2.5366)	(2.6939)	(2.6433)	(1.7133)
$February_t$	−0.7266***	−0.7065***	−0.7069***	−0.7708***	−0.7122	−0.6287	−0.6917	−0.9124*	0.2991	0.1408	0.5577	−1.5671
	(0.2515)	(0.2447)	(0.2455)	(0.2508)	(0.5177)	(0.5089)	(0.5004)	(0.5213)	(1.5002)	(1.3752)	(1.4150)	(1.1175)
$March_t$	0.0167	0.0288	0.0185	−0.0420	1.1712**	1.2265**	1.0970**	0.9362**	1.5455	1.3803	1.4551	−0.7009
	(0.1884)	(0.1914)	(0.1879)	(0.1941)	(0.4407)	(0.4400)	(0.4513)	(0.4498)	(1.9565)	(1.7215)	(1.8579)	(1.5243)
$December_t$	−0.0227	0.0566	−0.0185	0.0078	−0.1209	0.0839	−0.0455	−0.1165	1.1793	1.8295	1.0739	2.2076*
	(0.1991)	(0.1964)	(0.1972)	(0.1976)	(0.4239)	(0.4257)	(0.4140)	(0.4271)	(1.5757)	(1.3608)	(1.4458)	(1.1186)
Intercept	−1.6235*	−3.5436	−0.9916	−18.3547***	−4.9726	−8.1909	−2.8849	−61.4828***	−87.8919***	−250.0231***	−77.8516***	−875.9038***
	(0.8783)	(2.6556)	(0.8233)	(3.9206)	(3.2510)	(7.2473)	(3.0808)	(14.0696)	(27.2327)	(44.1367)	(24.7918)	(108.8674)

(Continues)

TABLE 7 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Carhart TR	**1 week**	**1 week**	**1 week**	**1 week**	**1 month**	**1 month**	**1 month**	**1 month**	**1 year**	**1 year**	**1 year**	**1 year**
Fund fixed effects	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO
Year fixed effects	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO
Stock fixed effects	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
Adj. R^2	0.74	1.03	0.87	2.11	0.83	1.47	1.49	7.86	4.50	6.10	6.79	38.76
N	43,416	43,416	43,416	43,416	42,625	42,625	42,625	42,625	36,762	36,762	36,762	36,762

Note: This table reports the results of multivariate panel regressions explaining cumulative trade returns (TR) calculated for executed sells at window lengths of 5 (1 week), 20 (1 month), and 250 (1 year) trading days starting at time t + 1. Multiple buy or sell transactions of the same fund in the same stock on the same day are aggregated into one trade by calculating the trading imbalance at fund-stock-day level, which is the difference between the sum of all buy and sell transactions using the traded euro volume. A positive (negative) trading imbalance therefore indicates a buy (sell). Calculated post-trade sell returns are multiplied by −1. The sell trade returns are based on out-of-sample stock alphas obtained from the Carhart 4-factor model (%). Therefore, a stock's daily factor loadings are estimated from rolling window regressions with a window length of 60 trading days, which are used to calculate t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective windows, these benchmark returns are subtracted from the corresponding cumulative stock return. As explanatory variables, the regressions include a dummy variable with a value of 1 to classify executed sells as liquidity-providing if the subsequent 5 days expected stock excess return during t + 1 to t + 5 is negative, following the methodology described in Ignashkina et al. (2022). Liquidity-demanding trades are therefore indicated by a dummy value of zero, where the 5 days expected stock excess return of executed sells is positive. To examine the possible impact of price pressure on trade returns, the regressions incorporate a fund's aggregated trading imbalance in a traded stock calculated over the corresponding trade return evaluation windows using the respective euro trading volumes during those days. To account for the fact that the impact on security prices of smaller stocks may be larger, the aggregated trading imbalance is scaled by the market capitalization of the stock (%). The corresponding aggregated trading imbalances are then multiplied by −1. In order to measure the effect of the importance of the trade on subsequent trade returns, the regressions include the size of the trade scaled by the total net assets of the fund (%). Additional fund-level control variables are the natural logarithm of total euro trading volume (trading activity), the natural logarithm of fund total net assets, age in years, annualized expense ratio (%), annual turnover (%), and a dummy variable that is 1 for load funds. For stock characteristics, the regressions contain the natural logarithm of market capitalization and stock volatility (%), which is the return standard deviation calculated over the preceding 30 trading days. To identify whether a sell trade was made in February, March, or December, the regressions also include respective dummy variables that equal 1 when applicable. Standard errors in parentheses are clustered at the fund, stock, and day levels. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively.

performance, characterized by positive risk-adjusted abnormal trade returns that persist for up to 1 month for both buys and sells. Contrary to the conventional expectation of an asymmetry favoring buys over sells, our research demonstrates that the abnormal trade returns of stocks following a sell are even more robust when assessed over periods longer than 1 month. Comparing the 1 week (0.24%) and 1 year (0.66%) Carhart performance for executed buys and sells, it is noteworthy that a substantial 36% of the 1 year return is generated during the first week. This emphasizes the significant role of the short term when evaluating mutual fund trading, a dimension that cannot be accurately analyzed when relying on quarterly or even monthly data.

In examining whether there is variation in short-term trading performance across funds through sortings based on 1 week horizons, it is striking that almost all funds seem capable of delivering significant short-term performance, with the poorest quartile of funds continuing to exhibit positive abnormal returns of up to 1 month. In contrast, only the best-performing quartile of short-term trading funds appears capable of generating superior performance over both the short and long run. Addressing the question of whether this short-term trading performance is rooted in skill or luck, we observe strong persistence in the funds' annual averages of abnormal returns, rebounding even after a challenging year. Once again, only the best-performing managers consistently generate abnormal returns over the long run.

This study explores potential sources responsible for the consistent short-term performance documented in the Finnish mutual fund industry. Existing literature suggests that price pressure due to buying and selling the same stocks on adjacent days, as well as the liquidity provision role of mutual funds, could affect their returns. We rule out price pressure as the primary reason for the observed short-term performance. However, we find that liquidity-providing trades contribute significantly, with 1 week trade returns improving fund performance by 35 bps. Given that foreign funds trade on momentum (Grinblatt & Keloharju, 2000), Finnish domestic equity funds are likely to be contrarian, capitalizing on providing liquidity to the market.

Additionally, this study examines whether trading performance is related to trade size and various fund characteristics. The evidence indicates that fund managers adeptly allocate more capital to their trades when expecting better short-term performance. Nevertheless, the significance weakens when considering buys and sells separately. Regarding fund characteristics, we note that while pricier funds provide a better buying performance in the short term, larger funds exhibit more sophistication in selling.

In summary, this article presents compelling evidence of short-term trading skills among mutual funds. However, we acknowledge that ultimately, investors may not fully benefit from this performance, considering factors such as transaction costs, management fees, and the timing of closing out opened positions, which could erode the performance advantage. The conflicting evidence in the literature, showing that average mutual funds do not consistently outperform their benchmark index, and our result of a diminishing performance markup when evaluating risk-adjusted stock returns of trades over longer time horizons, at least points in that direction. Nonetheless, our results contribute to the general understanding of how mutual funds generate their returns, assisting investors in selecting the best-performing funds by focusing on their trading strategies rather than relying solely on reported past performance.

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ENDNOTES

[i] We provide a detailed discussion on the comparison of our data and other transaction-level data in Section 2.2.

[ii] Trading performance can be measured either as realized profits, computed for example according to the first-in, first-out (FIFO) principle, or by computing the future returns of executed buy and sell transactions over different time horizons using the calendar time method. Realized profit measures such as FIFO capture true holding periods but are ex post measures that cannot be used in real time to predict manager skills. In this article, we use the calendar time method, which measures a fund manager's general stock-picking ability on any time-horizon of the researcher's choice, rather than the timing of closing out existing stock positions. The calendar time method has the advantage of established methods for risk adjustment, and it also provides the researcher with the opportunity to separately evaluate the performance of executed buys and sells. Thus, to avoid confusion, terms such as "trading performance" or "trade returns" are used throughout this study to refer to an assessment using the calendar time method.

[iii] Notably, we multiply returns of sales by −1, whereby positive values indicate declining stock prices.

[iv] The sample ends in 2014 due to a long process of updating the Euroclear data and the long processing time of this very comprehensive and large data. We believe that the data, covering 20 years of all trades in all stocks in the market and for all major fund families, are highly representative of the short-term trading performance of mutual funds. There have been no significant changes in the regulatory environment or the mutual fund market in Finland since 2014, and this is the first article to have access to these transaction-level data for Finnish mutual funds. See Table A1 in Appendix A for a comparison of the Finnish mutual fund market from 2008–2014 to 2015–2023.

[v] Odd numbers, for instance, are changes in holdings that do not correspond to common trading volumes such as 100, 200, 500, or 1000. We also do not count matches due to holdings changes of zero.

[vi] For funds incepted after January 1, 1995, there was a tendency for excessive buying to be concentrated at the beginning of a fund's life cycle. Since the motivation behind these trades is strongly influenced by the start of operations, we exclude the first 3 months of all newly incepted funds. Furthermore, we neglect trades that occur on non-trading days or with transaction prices of zero.

[vii] FIN-FSA, Financial Supervisory Authority (2014).

[viii] The closing prices of the Finnish markka prior to the introduction of the euro on January 1, 1999 have been converted into euro by dividing them by the official exchange rate of 5.94573.

[ix] Please note that the daily portfolio holdings and TNA do not include the fund's cash position, to which we did not have access.

[x] ANcerno data is provided by Abel Noser Solutions, a leading transaction cost analysis service provider. Therefore, the sampled funds are larger, more active, and more cost-conscious than an ordinary fund. Moreover, it is likely that institutions send only a subset or a non-random selection of their most profitable trades to ANcerno.

[xi] In Appendix A, we evaluate the trading performance using the FIFO, last-in, last-out (LIFO), and weighted average methods. The results presented in Tables A2 to A7 are largely consistent with the calendar time approach.

[xii] We require at least 30 observations within this window to ensure stable regression coefficients.

[xiii] Until the introduction of the euro, the risk-free interest rate is the Finnish Interbank Interest Rate. Since January 4, 1999, it has been replaced by the equivalent EONIA interest rate.

[xiv] In unreported results, we divide the daily (euro) volume of shares traded on the fund market by the daily (euro) volume of shares traded on the Finnish stock market.

[xv] We have not excluded Nokia from the sample, as the exclusion leads to even stronger results.

[xvi] Instead of using equal weights, we also compute trade size-weighted averages to account for the economic importance of each trade. The results remain essentially unchanged and are available upon request.

[xvii] In unreported results, we investigate trading performance at the aggregate level, such as by consolidating multiple trades made by different funds at the stock level. The findings remain consistent.

[xviii] Please note that there are slightly more observations for buy trades than for sell trades, which could introduce a bias toward a positive and significant mean. This imbalance should be considered when interpreting the results.

[xix] To mitigate the influence of liquidity provision and price pressure, we replicate the analysis of Table 2 following the approach of Edelen, Ince, and Kadlec (2016) by shifting our estimate of trade return by 3 months (not reported). As the results in Table 2 already suggest, the short-term performance disappears in a reasonable way.

[xx] For literature documenting an influence of characteristics on reported fund returns, see, for example, Indro et al. (1999), Chen et al. (2004), Pollet and Wilson (2008), and Yan (2008) for an analysis of diseconomies of scale associated with fund size, and Ippolito (1989), Carhart (1997), Dellva and Olson (1998), Wermers (2000), Gil-Bazo and Ruiz-Verdú (2009), and Vidal et al. (2015) for an analysis of a fund's expenses.

[xxi] To classify trades that supply or demand liquidity, Da, Gao, and Jagannathan (2011) suggest comparing the direction of the trade with the corresponding market order imbalance, that is, the difference between the total number of all buyer-initiated trades and the total number of all seller-initiated trades. Since Chordia and Subrahmanyam (2004) show that stock-level market order imbalance is well suited to explain contemporaneous stock returns, stock prices tend to increase or decrease depending on whether there is more buying or selling pressure. In unreported results, we have therefore also classified buys (sells) as liquidity-providing if the corresponding same-day stock return is negative (positive). The results remained economically unchanged.

[xxii] According to the price pressure hypothesis, net buying after a purchase is expected to positively influence the corresponding trade return. Conversely, in the case of a sale, subsequent net selling is anticipated to have a positive effect on the trade return. Since net selling inherently implies a negative trading imbalance, we would observe a negative coefficient for the relationship between trade returns and trading imbalances if only sells were used in the regression. Consequently, when pooling buys and sells in the regression, the theoretical coefficients for buys and sells would offset each other. Therefore, we multiply the trading imbalance for sells by −1.

[xxiii] We observe a strong correlation between shares outstanding, market trading volume, and market capitalization of a stock. Consequently, we choose not to include all three variables in the regression to avoid multicollinearity.

[xxiv] Given that annual reports of Finnish companies are typically released in February or March, the corresponding dummy variables serve to capture variations in trading performance attributed to earnings surprises. Additionally, our December dummy aims to account for possible

abnormal returns arising from turn-of-the-year or January effects in security returns. See, for instance, Rozeff and Kinney (1976), Keim (1983), Blume and Stambaugh (1983), Roll (1983), Ritter (1988), and, for the Finnish market, Grinblatt and Keloharju (2004).

[xxv] The results for the remaining time horizons are available upon request.

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APPENDIX A

TABLE A1 Aggregated balance sheets of Finnish investment funds.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of funds	499	488	510	518	527	515	490	493	501	532	552	535	560	564	564	576
Total assets (€M)	42,113	55,039	63,818	57,101	70,064	78,949	89,265	101,645	111,497	125,023	116,665	129,766	138,154	165,081	140,237	156,835
Securities-based assets	39,895	52,826	60,426	53,484	64,669	72,648	82,726	94,606	103,549	115,108	107,194	121,417	129,324	155,333	130,677	147,884
Debt securities	24,131	26,021	25,280	25,686	28,870	30,823	34,440	35,821	37,714	39,040	37,385	40,533	40,309	44,786	36,905	42,430
Shares	8857	17,197	22,522	16,529	20,458	25,788	29,266	33,904	38,290	43,930	40,573	47,868	53,677	70,073	58,858	67,092
Investment fund shares	6907	9608	12,624	11,269	15,340	16,036	19,019	24,881	27,545	32,138	29,236	33,016	35,338	40,473	34,914	38,362
Deposits	2053	2002	2155	2576	3887	4539	4060	4031	4892	6045	5437	6390	6687	7493	6814	5879
Other assets	165	212	1237	1042	1508	1763	2479	3008	3055	3870	4034	1959	2142	2255	2747	3072
Total liabilities	42,113	55,039	63,818	57,101	70,064	78,949	89,265	101,645	111,497	125,023	116,665	129,766	138,154	165,081	140,237	156,835
Fund-share liability	41,568	54,595	62,227	55,716	66,734	75,304	86,054	98,522	107,631	120,363	111,489	126,341	133,983	160,298	134,216	149,716
Equity funds	10,744	19,675	25,384	19,185	23,758	29,530	33,198	38,436	42,116	48,306	42,557	48,501	54,101	69,601	56,890	67,109
Bond funds	14,064	17,294	20,321	19,118	33,020	36,176	42,041	46,390	49,992	53,590	49,707	58,226	58,361	64,636	52,413	56,633
Mixed funds	2924	4077	4836	4573	5198	4530	5321	7735	8606	10,532	10,641	12,435	13,566	16,826	14,772	16,904
Real estate funds	96	135	156	125	139	400	962	1722	2752	3731	4770	6411	7083	8296	9280	8041
Hedge funds	1588	1692	1308	1367	1430	1258	1132	793	607	766	827	523	653	766	682	714
Money market funds	12,153	11,723	10,223	11,347	3189	3409	3401	3445	3559	3438	2987	244	219	174	180	315
Other liabilities	546	444	1591	1385	3330	3646	3211	3124	3866	4660	5177	3426	4171	4782	6022	7119

Note: This table reports the key balance sheet items in million Euro for Finland's mutual fund market during the years 2008–2023, as of year-end. The liabilities items show a breakdown into asset classes of securities held. Source: Bank of Finland.

TABLE A2 Average FIFO round-trip returns for different holding period groups.

Holding period	Raw returns		Market-adjusted		CAPM		Fama and French 3F		Carhart 4F	
(trading days)	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*
1–5	4.90***	1367	4.03***	1367	4.47***	1148	4.35***	1148	4.34**	1148
6–10	5.74***	1653	4.56***	1651	5.26***	1469	5.05***	1469	4.97***	1469
11–15	3.85***	1792	2.74***	1790	2.87***	1639	2.87***	1639	2.83***	1639
16–20	5.60***	1840	3.70***	1840	4.09***	1705	3.90***	1705	3.99***	1705
21–40	7.00***	7682	4.16**	7677	3.97***	7193	3.97***	7193	4.04***	7193
41–60	6.13***	7171	2.38**	7164	2.98***	6760	2.91**	6760	2.85***	6760
61–120	8.47***	17,785	2.45**	17,762	2.65**	16,875	2.18*	16,875	2.17*	16,875
121–250	12.17***	26,239	1.50	26,197	2.45*	25,323	1.20	25,323	1.38	25,323
251–500	21.23***	23,008	2.09	22,977	5.90**	22,667	2.86	22,667	1.26	22,667
501–750	41.32***	9798	10.14*	9787	14.68***	9706	7.77**	9706	4.80	9706
751–10,000	74.98***	7594	33.85**	7583	41.46***	7515	27.90**	7515	21.19**	7515
All	19.49***	105,929	5.30***	105,795	7.53***	102,000	4.79***	102,000	3.71***	102,000

Note: This table reports the means of mutual funds' round-trip returns calculated using the first-in-first-out (FIFO) principle. The returns obtained are divided into different groups according to the holding period of the round-trip, which is defined in trading days. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. To calculate round-trip returns, the euro-denominated value of the stocks sold is compared with the corresponding buy value using the transaction prices. Multiple sell transactions of the same fund for the same stock on the same day are aggregated into a single round-trip by calculating the aggregated buy and sell values using the respective transactions prices and volumes. In the event that the previously bought stocks that are matched to a sell are from different points in time, the holding period equals a weighted average using the corresponding number of shares. Existing shareholdings at the beginning of January 1995 are valued at closing prices. Unsold stocks from buy transactions made within the sample period are treated as theoretically sold by using the closing price at the end of the sample period. Unsold stocks originating from the opening balance at the beginning of the sample period are not sold at the end of the sample period. To calculate market-adjusted round-trip returns, the cumulative market returns over the same holding period are subtracted from the raw round-trip returns. To calculate abnormal round-trip returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate a stock's $t+1$ risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective round-trip windows, these benchmark returns are subtracted from the corresponding raw round-trip returns. ***, **, and * denote significance of a two-tailed t-test with clustered standard errors at the fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

TABLE A3 Buy value-weighted average of FIFO round-trip returns for different holding period groups.

Holding period	Raw returns		Market-adjusted		CAPM		Fama and French 3F		Carhart 4F	
(trading days)	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*
1–5	2.82***	1367	2.04***	1367	2.06***	1148	1.95***	1148	1.99***	1148
6–10	2.55**	1653	1.60**	1651	2.11***	1469	1.96***	1469	2.08***	1469
11–15	3.15***	1792	2.40***	1790	2.30**	1639	2.31***	1639	2.21**	1639
16–20	2.31***	1840	1.09*	1840	1.37**	1705	1.50**	1705	1.47**	1705
21–40	1.31	7682	−0.17	7677	0.03	7193	0.51	7193	0.51	7193
41–60	2.32*	7171	0.16	7164	0.42	6760	1.17	6760	1.00	6760
61–120	2.66*	17,785	−1.56	17,762	−1.68**	16,875	−1.04	16,875	−1.27**	16,875
121–250	2.99**	26,239	−4.48***	26,197	−4.51***	25,323	−3.64***	25,323	−3.74***	25,323
251–500	7.13**	23,008	−10.46***	22,977	−8.55**	22,667	−8.18**	22,667	−9.24***	22,667
501–750	19.05***	9798	−6.99**	9787	−4.69	9706	−6.53	9706	−8.26**	9706
751–10,000	42.79	7594	3.48	7583	−10.59*	7515	−19.08**	7515	−12.06*	7515
All	6.90***	105,929	−4.07***	105,795	−4.22***	102,000	−4.29**	102,000	−4.37***	102,000

Note: This table reports the buy value weighted means of mutual funds' round-trip returns calculated using the first-in-first-out (FIFO) principle. The returns obtained are divided into different groups according to the holding period of the round-trip, which is defined in trading days. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. To calculate round-trip returns, the euro-denominated value of the stocks sold is compared with the corresponding buy value using the transaction prices. Multiple sell transactions of the same fund for the same stock on the same day are aggregated into a single round-trip by calculating the aggregated buy and sell values using the respective transactions prices and volumes. In the event that the previously bought stocks that are matched to a sell are from different points in time, the holding period equals a weighted average using the corresponding number of shares. Existing shareholdings at the beginning of January 1995 are valued at closing prices. Unsold stocks from buy transactions made within the sample period are treated as theoretically sold by using the closing price at the end of the sample period. Unsold stocks originating from the opening balance at the beginning of the sample period are not sold at the end of the sample period. To calculate market-adjusted round-trip returns, the cumulative market returns over the same holding period are subtracted from the raw round-trip returns. To calculate abnormal round-trip returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate a stock's $t+1$ risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective round-trip windows, these benchmark returns are subtracted from the corresponding raw round-trip returns. ***, **, and * denote significance of a two-tailed t-test considering the weighting of the observations and using clustered standard errors at the fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

TABLE A4 Average LIFO round-trip returns for different holding period groups.

Holding period	Raw returns		Market-adjusted		CAPM		Fama and French 3F		Carhart 4F	
(trading days)	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*
1–5	2.25***	15,003	1.83***	15,003	1.76***	14,572	1.67***	14,572	1.63***	14,572
6–10	2.92***	8936	2.23***	8934	2.23***	8704	2.11***	8704	2.06***	8704
11–15	3.35***	6201	2.06***	6200	2.20***	6050	2.12***	6050	2.09***	6050
16–20	3.31***	5154	2.34***	5154	2.26***	5062	2.09***	5062	2.08***	5062
21–40	4.86***	14,174	2.87***	14,173	2.83***	13,807	2.61***	13,807	2.46***	13,807
41–60	5.84***	8468	2.75***	8463	3.07***	8179	2.63***	8179	2.43***	8179
61–120	8.57***	14,724	3.29***	14,716	3.94***	14,211	3.42***	14,211	3.26***	14,211
121–250	11.57***	13,748	1.83	13,728	3.15**	13,187	1.70	13,187	1.51	13,187
251–500	20.19***	9863	−0.83	9835	3.08	9525	−0.39	9525	−0.83	9525
501–750	26.37***	4135	−8.38	4113	1.82	4035	−3.75	4035	−6.46	4035
751–10,000	60.54***	5505	8.47	5459	15.15	5328	6.80	5328	0.59	5328
All	10.79***	105,911	2.02*	105,778	3.40***	102,660	2.07*	102,660	1.50	102,660

Note: This table reports the means of mutual funds' round-trip returns calculated using the last-in-first-out (LIFO) principle. The returns obtained are divided into different groups according to the holding period of the round-trip, which is defined in trading days. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. To calculate round-trip returns, the euro-denominated value of the stocks sold is compared with the corresponding buy value using the transaction prices. Multiple sell transactions of the same fund for the same stock on the same day are aggregated into a single round-trip by calculating the aggregated buy and sell values using the respective transactions prices and volumes. In the event that the previously bought stocks that are matched to a sell are from different points in time, the holding period equals a weighted average using the corresponding number of shares. Existing shareholdings at the beginning of January 1995 are valued at closing prices. Unsold stocks from buy transactions made within the sample period are treated as theoretically sold by using the closing price at the end of the sample period. Unsold stocks originating from the opening balance at the beginning of the sample period are not sold at the end of the sample period. To calculate market-adjusted round-trip returns, the cumulative market returns over the same holding period are subtracted from the raw round-trip returns. To calculate abnormal round-trip returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate a stock's $t+1$ risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective round-trip windows, these benchmark returns are subtracted from the corresponding raw round-trip returns. ***, **, and * denote significance of a two-tailed t-test with clustered standard errors at the fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

TABLE A5 Buy value-weighted average of LIFO round-trip returns for different holding period groups.

Holding period	Raw returns		Market-adjusted		CAPM		Fama and French 3F		Carhart 4F	
(trading days)	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*
1–5	1.84***	15,003	1.37***	15,003	1.36***	14,572	1.28***	14,572	1.24***	14,572
6–10	2.10***	8936	1.43***	8934	1.52***	8704	1.47***	8704	1.43***	8704
11–15	1.84***	6201	1.02**	6200	1.01**	6050	1.12***	6050	1.09***	6050
16–20	1.88***	5154	1.29***	5154	1.25***	5062	1.26**	5062	1.24***	5062
21–40	2.44***	14,174	1.13**	14,173	1.02**	13,807	0.98*	13,807	0.85*	13,807
41–60	3.22***	8468	0.69	8463	0.78	8179	0.83*	8179	0.51	8179
61–120	2.70***	14,724	−0.70	14,716	−0.83	14,211	−0.36	14,211	−0.66	14,211
121–250	4.15**	13,748	−3.75***	13,728	−3.16***	13,187	−2.49**	13,187	−2.88***	13,187
251–500	8.57***	9863	−12.81***	9835	−9.30***	9525	−9.97***	9525	−8.77***	9525
501–750	14.15***	4135	−25.63***	4113	−23.65**	4035	−24.99***	4035	−20.22***	4035
751–10,000	34.09**	5505	−34.54**	5459	−46.98***	5328	−51.65***	5328	−43.50***	5328
All	6.53***	105,911	−5.32**	105,778	−6.00**	102,660	−6.39**	102,660	−5.50**	102,660

Note: This table reports the buy value-weighted means of mutual funds' round-trip returns calculated using the last-in-first-out (LIFO) principle. The returns obtained are divided into different groups according to the holding period of the round-trip, which is defined in trading days. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. To calculate round-trip returns, the euro-denominated value of the stocks sold is compared with the corresponding buy value using the transaction prices. Multiple sell transactions of the same fund for the same stock on the same day are aggregated into a single round-trip by calculating the aggregated buy and sell values using the respective transactions prices and volumes. In the event that the previously bought stocks that are matched to a sell are from different points in time, the holding period equals a weighted average using the corresponding number of shares. Existing shareholdings at the beginning of January 1995 are valued at closing prices. Unsold stocks from buy transactions made within the sample period are treated as theoretically sold by using the closing price at the end of the sample period. Unsold stocks originating from the opening balance at the beginning of the sample period are not sold at the end of the sample period. To calculate market-adjusted round-trip returns, the cumulative market returns over the same holding period are subtracted from the raw round-trip returns. To calculate abnormal round-trip returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate a stock's $t+1$ risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective round-trip windows, these benchmark returns are subtracted from the corresponding raw round-trip returns. ***, **, and * denote significance of a two-tailed t-test considering the weighting of the observations and using clustered standard errors at the fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

TABLE A6 Average of weighted average round-trip returns for different holding period groups.

Holding period	Raw returns		Market-adjusted		CAPM		Fama and French 3F		Carhart 4F	
(trading days)	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*
1–5	5.19***	1218	4.34***	1218	4.92***	986	4.86***	986	4.86***	986
6–10	5.27***	1546	4.02***	1545	4.67***	1350	4.56***	1350	4.55***	1350
11–15	3.55***	1646	2.22***	1645	2.57***	1475	2.48***	1475	2.45***	1475
16–20	4.35***	1717	2.38**	1717	2.43***	1556	2.24***	1556	2.33***	1556
21–40	3.85***	8103	1.38	8099	1.73**	7591	1.74*	7591	1.75**	7591
41–60	2.74***	7509	−0.84	7504	−0.11	7079	−0.29	7079	−0.23	7079
61–120	6.13***	18,452	−0.31	18,437	0.32	17,645	−0.23	17,645	−0.34	17,645
121–250	7.27***	27,250	−2.54**	27,220	−1.40	26,824	−2.99**	26,824	−3.15***	26,824
251–500	12.05***	24,746	−7.13***	24,704	−3.79	24,634	−6.85***	24,634	−8.02***	24,634
501–750	22.46***	8862	−7.44**	8839	0.08	8833	−6.93*	8833	−10.69***	8833
751–10,000	35.17**	4889	−7.93	4875	5.20	4866	−7.61	4866	−13.09*	4866
All	10.00***	105,938	−3.13***	105,803	−0.66	102,839	−3.13**	102,839	−4.05***	102,839

Note: This table reports the means of mutual funds' round-trip returns calculated using the weighted average method. The returns obtained are divided into different groups according to the holding period of the round-trip, which is defined in trading days. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. To calculate round-trip returns, the euro-denominated value of the stocks sold is compared with the corresponding buy value using the weighted average transaction price of the stocks currently held in the inventory. Multiple sell transactions of the same fund for the same stock on the same day are aggregated into a single round-trip by calculating the aggregated buy and sell values using the respective transactions prices and volumes. In the event that the previously bought stocks that are matched to a sell are from different points in time, the holding period equals a weighted average using the corresponding number of shares. Existing shareholdings at the beginning of January 1995 are valued at closing prices. Unsold stocks from buy transactions made within the sample period are treated as theoretically sold by using the closing price at the end of the sample period. To calculate market-adjusted round-trip returns, the cumulative market returns over the same holding period are subtracted from the raw round-trip returns. To calculate abnormal round-trip returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate a stock's t + 1 risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective round-trip windows, these benchmark returns are subtracted from the corresponding raw round-trip returns. ***, **, and * denote significance of a two-tailed *t*-test with clustered standard errors at the fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.

TABLE A7 Buy value-weighted average of weighted average round-trip returns for different holding period groups.

Holding period	Raw returns		Market-adjusted		CAPM		Fama and French 3F		Carhart 4F	
(trading days)	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*	Mean	*N*
1–5	3.31***	1218	2.75***	1218	3.02***	986	3.10***	986	3.16***	986
6–10	3.37***	1546	1.96***	1545	2.34***	1350	2.15***	1350	2.40***	1350
11–15	2.11**	1646	2.02***	1645	2.41***	1475	2.50***	1475	2.07***	1475
16–20	3.43***	1717	1.80***	1717	1.48***	1556	1.35**	1556	1.40**	1556
21–40	1.03	8103	−0.51	8099	−0.12	7591	0.31	7591	0.18	7591
41–60	0.39	7509	−1.40*	7504	−0.96	7079	−0.38	7079	−0.52	7079
61–120	3.02***	18,452	−1.61*	18,437	−1.53*	17,645	−1.21	17,645	−1.55**	17,645
121–250	3.13**	27,250	−5.25***	27,220	−5.05***	26,824	−5.19***	26,824	−5.47***	26,824
251–500	7.07***	24,746	−13.71***	24,704	−11.33***	24,634	−11.53***	24,634	−11.67***	24,634
501–750	16.74***	8862	−16.02***	8839	−13.26**	8833	−16.57***	8833	−17.19***	8833
751–10,000	40.75*	4889	−23.72**	4875	−39.55*	4866	−56.36*	4866	−45.18*	4866
All	6.36***	105,938	−7.36***	105,803	−7.10***	102,839	−8.01***	102,839	−7.81***	102,839

Note: This table reports the buy value-weighted means of mutual funds' round-trip returns calculated using the weighted average method. The returns obtained are divided into different groups according to the holding period of the round-trip, which is defined in trading days. The sample consists of 29 actively managed Finnish domestic equity funds and 191 Finnish stocks in the period from January 1995 to June 2014. To calculate round-trip returns, the euro-denominated value of the stocks sold is compared with the corresponding buy value using the weighted average transaction price of the stocks currently held in the inventory. Multiple sell transactions of the same fund for the same stock on the same day are aggregated into a single round-trip by calculating the aggregated buy and sell values using the respective transactions prices and volumes. In the event that the previously bought stocks that are matched to a sell are from different points in time, the holding period equals a weighted average using the corresponding number of shares. Existing shareholdings at the beginning of January 1995 are valued at closing prices. Unsold stocks from buy transactions made within the sample period are treated as theoretically sold by using the closing price at the end of the sample period. To calculate market-adjusted round-trip returns, the cumulative market returns over the same holding period are subtracted from the raw round-trip returns. To calculate abnormal round-trip returns based on the CAPM, Fama and French 3-factor, and Carhart 4-factor model, a stock's daily factor loadings are obtained from rolling window regressions with a window length of 60 trading days, which are used to calculate a stock's $t+1$ risk factor returns. After accumulating the risk-free rate and risk factor returns over the respective round-trip windows, these benchmark returns are subtracted from the corresponding raw round-trip returns. ***, **, and * denote significance of a two tailed t test considering the weighting of the observations and using clustered standard errors at the fund, stock, and day level, where the mean is unequal to zero at the 1%, 5%, and 10% level, respectively. Returns in %.