Cash Holdings and Mutual Fund Performance

Online Appendix

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Abstract

This online appendix shows robustness to alternative definitions of abnormal cash holdings, studies the relation between abnormal cash and future performance of index and closed-end funds, and presents a model of costly stock trading.

1. Robustness to Alternative Definitions of Abnormal Cash

Table 1 summarizes key empirical results of the paper using four alternative abnormal cash definitions provided in the Table caption. Regardless of the definition considered, the findings of the paper prove to be robust, strongly suggesting that they are not sensitive to the particular regression specification used to define abnormal cash. High abnormal cash funds significantly outperform their low abnormal cash peers. The difference in the Ferson-Schadt alphas of the two groups reaches between 1.56% and 2.04% per year. This difference in performance is partly attributable to the superior stock selection and market-timing abilities of high abnormal cash funds. For example, the difference in characteristic selectivity measures of high and low abnormal cash funds ranges between 0.17% and 0.22% quarterly depending on which alternative definition of abnormal cash is used. Results also confirm that high abnormal cash fund managers control their future costs well. Finally, Fama-MacBeth regressions of future fund performance on lagged abnormal cash and other variables show that abnormal cash relates significantly and positively to future fund performance.

2. Abnormal Cash Holdings of Index Funds

To further explore whether high abnormal cash holdings signify superior stock selection abilities, it is interesting to compare the performance of actively managed equity funds with that of passive index funds. The objective of equity index funds is to track rather than outperform an equity benchmark such as S&P 500 index, and thus stock selection skills have little relevance for such funds. The absence of a relation between abnormal cash of index funds and their future performance can be viewed as indirect evidence supporting the hypothesis that abnormal cash of actively managed funds proxies for stock-selection skills.

I follow the same procedure used for actively managed funds to calculate abnormal cash of index funds and obtain the time series of raw and risk-adjusted returns of each excess cash group.[1] Table 2 shows that returns of index funds are similar across different abnormal cash quintiles. The difference in returns between high and low abnormal cash index funds is not statistically significant and, depending on the performance measure, ranges between 0% and 0.05% monthly.

3. Abnormal Cash Holdings of Closed-End Funds

To determine whether the positive link between abnormal cash and mutual fund performance is related to differences in the managerial ability to meet outflow shocks, I explore whether high abnormal cash *closed-end* funds outperform their low abnormal cash peers. Unlike their open-end counterparts, closed-end funds rarely issue or retire shares, and shares are usually not redeemable until fund liquidation. Managers of closed-end funds are thus free from concerns related to fund flows, and any motives for carrying cash balances are not tied to uncertainty about or costs of fund flows.

3.1. Data

To study the relation between the abnormal cash holdings of closed-end funds and future fund performance, I obtain from CRSP the list of 608 closed-end funds that were in operation at some point between 1994 and 2008 (those with share code 14).[2] Using the Compustat files, I retrieve

[1] After imposing the same restrictions used for the actively managed funds, my sample contains 266 index funds. Appendix A of the paper provides details on identifying index funds.

[2] Data prior to 1994 are not widely available in the Edgar, which leads me to focus on the 1994-2008 period.

Central Index Keys (CIKs) for 572 of these funds. Closed-end funds may report their portfolio composition in several filings with the Securities and Exchange Commission (SEC): in N-30B, N-30D, and N-CSRS periodic reports mailed to fund shareholders, and in N-Q quarterly schedules of portfolio holdings. Out of the sample with valid CIKs, 537 funds have at least one such report on file with the SEC. I download all such filings of these funds using SEC's Edgar FTP server and hand-collect the data on fund objective, cash holdings, expenses, and net asset values. Unfortunately, only a minority of the closed-end funds in the sample have an equity investment objective, while most others invest mainly in municipal or corporate bonds. After restricting the sample to diversified domestic equity funds, I arrive at the final sample of 54 funds or 833 fund-quarter observations.[3]

3.2. Summary Statistics

Table 3 reports summary statistics for the sample. Data are more restrictive for closed-end than for open-end funds, and information on only a limited set of fund characteristics is available. Closed-end funds hold on average considerably lower net assets in cash (1.79%) than do their open-end peers (3.78% during 1994-2008), suggesting that fund flow concerns play an important role in determining cash holdings of open-end funds. Closed-end funds have on average lower assets under management ($557 million) and a lower fund market beta than do open-end funds.[4] A median closed-end fund has been in operation for 15 years and its shares trade at a 17.5% discount to the per share net asset value.

3.3. Determinants of Closed-End Fund Cash Holdings

To calculate the abnormal cash holdings of closed-end funds, I begin by exploring the determinants of their cash positions. Following the methodology used in analyzing open-end funds, in each cross-section I regress the cash-to-net asset values of closed-end funds on a number of fund characteristics. Regression (1) of Table 4 shows that larger funds hold considerably less cash and that fund size plays the single most important role in explaining fund cash holdings: The average R^2 of this regression exceeds 24% whereas the comparable number for open-end funds is just 0.2%. After controlling for size, cash holdings of closed-end funds relate positively to expenses and fund age (regressions 3 and 4), which is consistent with what Table 2 of the paper shows to be the case for open-end funds. Somewhat surprisingly, regression (5) shows a negative relation between cash holdings and fund discount. I define abnormal cash of closed-end funds as the residual from the cross-sectional regression (6) that uses all available fund characteristics as explanatory variables and explains the largest fraction of cross-sectional variation in cash positions. The average number of observations in each cross-section is just 22, and it is prudent to interpret the lack of a relation between abnormal cash and future performance of closed-end funds (see Table 5) with care.

3.4. Abnormal Cash Holdings and Closed-End Fund Performance

Table 5 shows that there is no statistically significant difference in performance between high and low abnormal cash closed-end funds, consistent with the hypothesis that fund flows play an

[3]Cash holdings in the first and third calendar quarters are available for very few funds, and I restrict analysis to using only data from the second and fourth calendar quarters.

[4]Holdings data are not readily available for closed-end funds, and I measure the fund beta rather than the average beta of fund shareholdings as was done for the open-end funds. Beta is the loading from the market model regressions using one year of monthly data.

important role in the stronger performance of high abnormal cash open-end funds relative to their low abnormal cash peers.[5]

4. Model of Costly Stock Trading

I consider a framework of transacting in shares of a stock in a setting with fixed and variable costs. The model suggests that, relative to a manager who either invests all sales proceeds immediately or who transacts more frequently than is optimal, a cost-minimizing manager will tend to carry a higher cash balance. The framework can therefore justify the positive link between abnormal cash and performance: Managers may carry more abnormal cash as a result of their efforts to minimize transaction costs and consequently they outperform their low abnormal cash peers.

A manager buying or selling n_i shares of stock i at price p_i per share incurs a total cost of

$$F_i + V_i(n_i p_i)^2,$$

where F_i and V_i are fixed and variable costs, respectively.

Suppose that the manager can transact only at discrete points in time, and for simplicity assume that the price is not directly affected by the manager's decisions (V_i may capture price pressure). The manager's objective is to minimize the total cost associated with transacting in stock i:

$$N_i F_i + \sum_{r=1}^{N} V_i \left(n_i^r p_i\right)^2,$$

where N_i is the number of trades the manager makes to either acquire or dispose of stock i, and n_i^r is the number of shares of stock i the manager buys or sells during the rth transaction.[6]

Given that the manager will make N_i transactions in stock i and that the total variable cost increases with the dollar value of shares bought or sold in a given transaction, the number of shares n_i^r that minimizes the total cost is n_i/N_i.[7] Therefore, the manager's problem can be rewritten as

$$\min_{N_i} Cost_i\left(N_i\right) = \min_{N_i} N_i F_i + N_i V_i \left(\frac{n_i}{N_i} p_i\right)^2 = \min_{N_i} N_i F_i + \frac{1}{N_i} V_i \left(n_i p_i\right)^2.$$

The number of transactions that minimizes the total cost is

$$N_i^* = \begin{cases} \sqrt{V_i/F_i}\left(n_i p_i\right) & \text{if } \sqrt{V_i/F_i}\left(n_i p_i\right) \text{ is an integer,} \\ \underset{N_i \in \left\{\left\lfloor\sqrt{V_i/F_i}(n_i p_i)\right\rfloor, \left\lfloor\sqrt{V_i/F_i}(n_i p_i)\right\rfloor + 1\right\}}{\arg\min} Cost_i\left(N_i\right) & \text{otherwise,} \end{cases}$$

where $\lfloor x \rfloor$ denotes the integer part of x. Thus the optimal number of transactions N_i^* increases in variable cost V_i and decreases in fixed cost F_i.

[5] It is prudent to note that the sample of closed-end funds is small, covering just 54 funds, and any conclusions drawn from it should be interpreted with caution. The lack of a relation between closed-end funds' abnormal cash and future performance may also be viewed as contradicting the idea that abnormal cash proxies for stock-selection abilities because stock-picking skills are arguably equally important for both closed- and open-end funds. The small sample size again suggests that this conclusion should be interpreted with care.

[6] This set-up implies that the manager does not face any costs of delaying his transactions, but I assume that the manager prefers to conduct his transactions as soon as possible. A manager may prefer to do so, for example, when he receives a signal about future performance of a stock.

[7] This can be readily seen by solving the problem $\min_{\{n_i^r\}} N_i F_i + \sum_{r=1}^{N_i} V_i \left(n_i^r p_i\right)^2$ s.t. $\sum_{r=1}^{N_i} n_i^r = n_i$. The derivative of the associated Lagrangian with respect to the jth choice variable n_i^j is $2V_i n_i^j p_i = \lambda$, where λ is the Lagrange multiplier. This suggests that for every j and k, $n_i^j/n_i^k = 1$, or $n_i^j = n_i^k = n_i/N_i$.

Consider now a manager who would like to sell all of his shares of stock S and invest the proceeds in stock B. If $\sqrt{V_S/F_S} < \sqrt{V_B/F_B}$, as for example might be the case if stock B is less liquid than S is, then $N_S^* < N_B^*$. In other words, the manager will take a longer time to purchase the desired amount of the illiquid stock B than to sell his holdings in the liquid stock S. As a result, the cumulative change in cash unrelated to transaction costs will be non-negative at any point. By contrast, a non-optimizing manager who either invests all sales proceeds immediately or who transacts in the illiquid stock more frequently than is optimal will cause a change in cash that is smaller than the change in cash of a fund run by a cost-minimizing manager.

Additionally, if the manager can use fund cash reserves only to cover fixed and variable costs but not to finance stock purchases directly, then he will use the proceeds from the sale of stock S to cover the purchase of stock B. Consequently, a cost-minimizing manager will carry a higher or similar cash balance than a manager who invests the sales proceeds more quickly will, even when $\sqrt{V_S/F_S} \geq \sqrt{V_B/F_B}$.

Figure 1 shows cumulative changes in cash holdings under two scenarios: when the manager buys a stock that is less liquid than the one that he sells (Panel A), and when he finances the purchase of stock B by proceeds from the sale of stock S (Panel B). In either case, at any point in time the cumulative change in cash unrelated to transaction costs is non-negative. In comparison, a corresponding change in cash of a fund run by a manager who invests all sales proceeds immediately will be non-positive.

The framework outlined above implies that managers who are better able to control their transaction costs may carry higher abnormal cash balances. It additionally suggests that managers who are transitioning to a less liquid portfolio may also carry more abnormal cash. In untabulated results, I confirm that the average future liquidity of fund shareholdings declines (loading on both Pastor and Stambaugh (2003) and Amihud (2002) illiquidity factors rise) with abnormal cash, suggesting that high abnormal cash funds are transitioning to a less liquid equity portfolio. The negative relation between abnormal cash and future fund costs summarized in Table 11 of the paper provides further empirical support of the model's implications.

In light of this evidence, the positive relation between abnormal cash and fund performance can be attributed in part to funds carrying high abnormal cash as a result of minimizing the total costs of transacting in stocks. Cost-minimizing managers carry more abnormal cash and generate better results than do managers who make sub-optimal decisions by reinvesting the proceeds from share sales immediately or by otherwise transacting inefficiently.

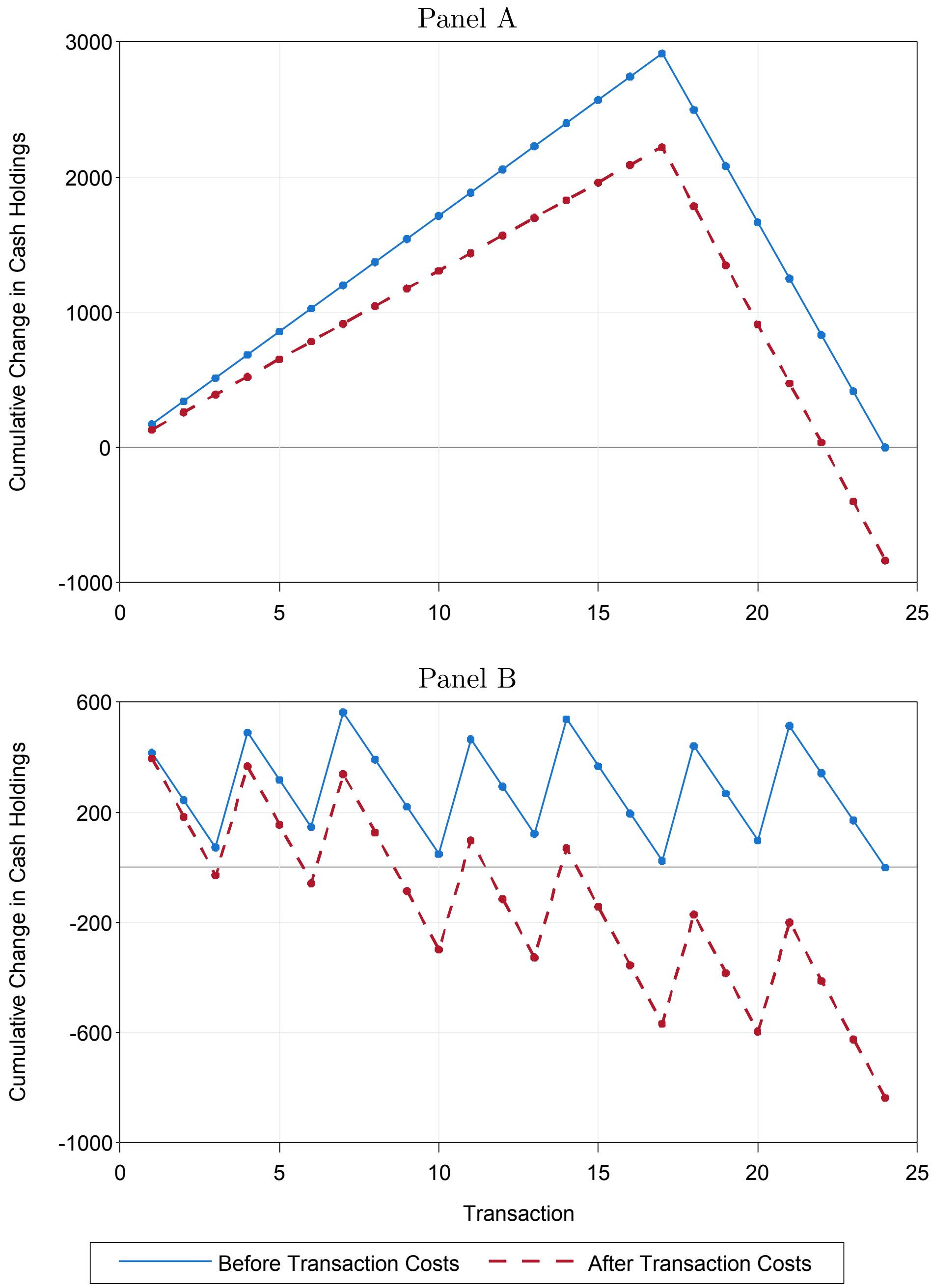

Figure 1. Effects of costly stock trading on cumulative change in cash. This figure plots cumulative changes in cash implied by the model developed in Appendix D. The figure in Panel A is plotted assuming that $n_S = 100$ shares of stock S are being sold at price $p_S = 100$ with variable cost $V_S = 0.00006$ and fixed cost $F_S = 10$, and $n_B = 1000$ shares of stock B are being bought at price $p_B = 10$ with variable cost $V_B = 0.00003$ and fixed cost $F_S = 10$. In Panel B, $V_S = 0.00003$ and $V_B = 0.00006$ and it is assumed that purchase of stock B can be financed only by the proceeds from the sale of stock S, so that cash reserves can be used only to cover transaction costs.

Table 1. Robustness to Alternative Definitions of Abnormal Cash

A. Future Fund Performance

	Market Alphas				Ferson-Schadt Alphas			
	(AC1)	(AC2)	(AC3)	(AC4)	(AC1)	(AC2)	(AC3)	(AC4)
Low	-0.21	-0.21	-0.22	-0.19	-0.16	-0.17	-0.22	-0.19
Quintile 2	-0.15	-0.18	-0.15	-0.15	-0.12	-0.14	-0.11	-0.11
Quintile 3	-0.07	-0.10	-0.07	-0.04	-0.05	-0.10	-0.06	-0.06
Quintile 4	-0.06	-0.03	-0.05	-0.05	-0.07	-0.03	-0.05	-0.07
High	-0.01	-0.04	-0.03	-0.04	-0.03	-0.05	-0.05	-0.03
High-Low	0.20	0.17	0.19	0.15	0.13	0.13	0.17	0.16
	[3.90]	[3.38]	[3.90]	[3.72]	[2.64]	[2.33]	[3.28]	[2.68]

B. Stock-Selection Abilities

	CS Measure of DGTW				Style-Adjusted Returns on Purchases			
Low	-0.09	-0.16	-0.11	-0.11	-0.03	-0.07	-0.02	-0.01
Quintile 2	0.03	0.00	0.05	0.07	0.03	0.04	0.01	0.11
Quintile 3	0.07	0.07	0.05	0.06	0.07	0.20	0.28	0.18
Quintile 4	0.09	0.05	0.04	0.05	0.09	0.09	0.08	0.07
High	0.08	0.07	0.06	0.07	0.55	0.31	0.28	0.25
High-Low	0.17	0.22	0.17	0.18	0.58	0.38	0.30	0.27
	[1.65]	[2.54]	[2.01]	[2.11]	[3.76]	[2.26]	[1.83]	[1.81]

C. Market-Timing Abilities

	CT Measure of DGTW				Holdings-Based Coefficients			
Low	-0.08	-0.03	-0.04	-0.07	-0.72	-0.85	-0.69	-0.43
Quintile 2	0.01	-0.06	-0.07	-0.02	-0.01	-0.22	-0.42	-0.36
Quintile 3	-0.03	-0.04	0.00	-0.02	0.05	-0.23	-0.02	-0.44
Quintile 4	0.03	0.05	0.01	0.00	-0.10	0.01	0.26	0.33
High	0.02	0.05	0.06	0.07	-0.05	0.14	0.00	0.11
High-Low	0.10	0.08	0.11	0.14	0.96	1.20	1.04	0.51
	[1.39]	[1.14]	[1.61]	[2.22]	[2.06]	[2.32]	[1.86]	[1.61]

D. Future Expenses and Turnover

	Execution Costs				Turnover ratio			
Low	0.69	0.69	0.73	0.70	69.4	73.4	68.8	67.4
Quintile 2	0.65	0.64	0.60	0.60	68.6	67.7	66.8	65.9
Quintile 3	0.71	0.65	0.64	0.64	64.0	66.8	64.1	65.8
Quintile 4	0.62	0.59	0.58	0.60	61.5	61.1	64.0	61.6
High	0.61	0.59	0.60	0.60	59.3	59.0	58.9	60.7
High-Low	-0.08	-0.10	-0.13	-0.10	-10.1	-14.4	-9.88	-6.71
	[-3.63]	[-3.83]	[-5.50]	[-2.84]	[-3.28]	[-4.36]	[-2.88]	[-1.93]

Notes: Table continues on the next page.

Table 1. Robustness to Alternative Definitions of Abnormal Cash, Continued

E. Evidence from Fama-MacBeth Regressions

	(AC1)		(AC2)		(AC3)		(AC4)	
Variable	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Abnormal cash, percent of TNA	0.06	0.03	0.06	0.03	0.03	0.03	0.03	0.03
	[3.75]	[2.11]	[3.73]	[2.15]	[2.79]	[2.31]	[2.70]	[2.23]
Return gap, percent		0.94		0.94		0.98		0.98
		[2.94]		[2.94]		[2.95]		[2.95]
Log of total net assets		-0.02		-0.02		-0.03		-0.02
		[-0.53]		[-0.53]		[-0.67]		[-0.58]
Expense ratio, percent		-0.84		-0.81		-0.76		-0.75
		[-3.18]		[-3.05]		[-2.80]		[-2.77]
Fund flow, last 1 month		-1.20		-1.25		-1.01		-1.02
		[-1.60]		[-1.66]		[-1.20]		[-1.22]
12-month fund return runup		2.93		2.93		2.91		2.92
		[1.18]		[1.18]		[1.16]		[1.16]
Market beta		-1.29		-1.30		-1.46		-1.47
		[-0.92]		[-0.92]		[-1.04]		[-1.05]
Value (HML) beta		1.00		1.00		1.10		1.11
		[0.69]		[0.69]		[0.75]		[0.76]
Size (SMB) beta		4.02		4.02		4.05		4.06
		[2.85]		[2.85]		[2.89]		[2.90]
Momentum (UMD) beta		0.05		0.05		0.15		0.15
		[0.03]		[0.03]		[0.08]		[0.09]

Notes: This table reports the results of robustness tests from using four alternative definitions of abnormal cash (AC1 through AC4). AC1 is the residual from the cross-sectional regression of cash-to-total net assets ratio on the past month's fund flow and the market beta of a fund's stockholdings. To calculate AC2, fund expense ratio is included as an additional regressor. AC3 additionally includes most significant regressors from specification (7) of Table 2 of the paper: fund flows over the past six months, fund dividend yield, average book-to-market percentile of the fund's stockholdings, number of stocks in the portfolio, fund age, and volatility of a fund's cash holdings. Finally, AC4 adds other regressors that are significant at the 5% level in specification (7) of Table 2 of the paper: log of total net assets, 12-month return runup, front load fee, and aggressive growth dummy. Future fund performance in Panel A is calculated as in Panel A of Table 4 of the paper. The stock selection abilities summarized in Panel B are computed as in Table 6 of the paper. Market-timing abilities in Panel C are calculated as in Table 9 of the paper. Panel D shows future expenses and portfolio turnover (in percent per year), computed as in Table 11 of the paper. Finally, Panel E summarizes the results of Fama-MacBeth regressions estimated following the same methodology as in Table 5 of the paper. The sample period is 1992-2009.

Table 2. Abnormal Cash and Future Performance of Index Funds

Performance measure	Low	Quint 2	Quint 3	Quint 4	High	High-Low	R^2
Excess	0.46	0.58	0.47	0.46	0.46	-0.00	
return	[1.40]	[1.66]	[1.48]	[1.47]	[1.45]	[-0.08]	
Market model	0.01	0.13	0.03	0.03	0.03	0.01	3.9
alpha	[0.17]	[0.95]	[0.54]	[0.57]	[0.43]	[0.22]	
Fama-French	-0.03	0.09	-0.01	0.01	0.01	0.04	8.2
3-factor alpha	[-0.44]	[0.61]	[-0.14]	[0.17]	[0.27]	[0.70]	
Carhart	-0.01	0.10	0.01	0.03	0.03	0.04	7.7
4-factor alpha	[-0.13]	[0.72]	[0.15]	[0.62]	[0.72]	[0.70]	
Carhart + liquidity	-0.02	0.12	0.01	0.02	0.03	0.05	7.5
5-factor alpha	[-0.34]	[0.85]	[0.22]	[0.50]	[0.57]	[0.81]	
Ferson-Schadt	-0.00	0.06	-0.06	0.02	-0.00	-0.00	10.3
conditional alpha	[-0.02]	[0.44]	[-0.90]	[0.34]	[-0.05]	[-0.02]	

Notes: This table reports average raw and risk-adjusted net-of-fees returns, in percent per month, and the corresponding t-statistics for each of the abnormal cash quintiles of index funds as well as for the differences between quintiles of high and low abnormal cash. Funds are classified as index following the procedure outlined in Appendix A of the paper. Abnormal cash is calculated as the residual from regressing cash-to-total net assets ratio of index funds on the same explanatory variables that are used in cross-sectional regression (7) in Table 2 of the paper. At the beginning of month $t + 4$, a total net assets-weighted investment is made in the funds that were assigned to a particular abnormal cash group as of the end of month t, and the position is held for the following 12 months. The 5-factor model uses Pastor-Stambaugh liquidity factor. R^2 is the adjusted R^2 from regressions using as a dependent variable the difference in returns between high and low abnormal cash funds. Imposing the same restrictions that are used for the actively managed funds limits the sample to 266 index funds. The sample period is 1992-2009.

Table 3. Summary Statistics: Closed-End Funds

Variable	Mean	Median	Stdev	10th Pctl	90th Pctl	Corr w Cash
Cash, percent of total net assets	1.79	0.06	4.86	0.00	5.24	1.00
Total net assets, $ million	557	358	602	64.5	1,354	-0.25
Market beta of fund	0.79	0.79	0.48	0.19	1.38	-0.10
12-month fund return runup, percent	9.54	9.12	14.52	-7.76	26.90	-0.03
Expense ratio, percent	1.65	1.02	2.09	0.41	3.34	0.23
Fund age, years	23.90	15.12	23.46	4.16	68.87	-0.07
Fund discount, percent	20.96	17.50	22.31	-1.86	49.64	-0.01

Notes: This table reports summary statistics for closed-end fund characteristics. The market beta is calculated from the market model regression using realized fund returns over the past 12 months. The discount is computed by comparing net asset value per share with market share price. Statistics are calculated semiannually in June and December cross-sections and then averaged. The sample period is 1994-2008.

Table 4. Determinants of Closed-End Fund Cash Holdings

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Total net assets, $ million	-0.023	-0.023	-0.025	-0.024	-0.027	-0.025
	[-3.74]	[-3.82]	[-3.62]	[-3.45]	[-4.09]	[-3.17]
Market beta of fund		-0.010		-0.006		-0.004
		[-1.13]		[-0.59]		[-0.41]
12-month fund return runup, percent		0.028		0.035		0.028
		[0.49]		[0.70]		[0.56]
Expense ratio, percent			0.816	0.888		0.707
			[2.12]	[2.23]		[1.56]
Fund age, decades			0.006	0.005		0.004
			[4.15]	[3.54]		[2.70]
Fund discount, percent					-0.036	-0.027
					[-3.60]	[-1.86]
Adjusted R^2, percent	24.2	25.9	30.7	28.7	28.5	31.5

Notes: This table reports the results of the cross-sectional regressions of closed-end fund cash holdings as a percentage of total net assets on fund characteristics. The market beta is calculated from the market model regression using realized fund returns over the past 12 months. The fund discount is calculated as the difference between net asset value per share and market price per share, scaled by net asset value per share. Reported are average slope coefficients, corresponding Newey-West (1987) *t*-statistics (in square brackets), and adjusted R^2 values. The sample period is 1994-2008.

Table 5. Abnormal Cash and Future Performance of Closed-End Funds

Performance measure	Low	Quint 2	Quint 3	Quint 4	High	High-Low	R^2
Excess	0.29	0.27	0.36	0.32	0.23	-0.06	
return	[0.19]	[0.36]	[1.10]	[1.31]	[0.41]	[0.36]	
Market model	0.02	-0.01	0.08	0.04	-0.07	-0.09	0.021
alpha	[-0.68]	[-0.49]	[0.66]	[1.22]	[-0.79]	[0.22]	
Fama-French	-0.29	-0.20	-0.09	-0.10	-0.27	0.02	0.065
3-factor alpha	[-1.67]	[-1.80]	[-0.16]	[0.36]	[-1.95]	[0.59]	
Carhart	-0.13	-0.11	-0.07	-0.04	-0.12	0.01	0.059
4-factor alpha	[-1.02]	[-1.15]	[0.19]	[0.66]	[-1.25]	[0.32]	
Carhart + liquidity	-0.12	-0.09	-0.02	-0.06	-0.15	-0.04	0.066
5-factor alpha	[-1.07]	[-1.12]	[0.14]	[0.84]	[-1.21]	[0.40]	
Ferson-Schadt	0.08	0.00	-0.03	0.02	0.10	0.02	0.074
conditional alpha	[0.02]	[-0.58]	[-0.01]	[1.22]	[0.05]	[0.01]	

Notes: This table reports average raw and risk-adjusted net-of-fees returns, in percent per month, and the corresponding t-statistics for each of the abnormal cash quintiles of closed-end funds as well as for the difference between quintiles of high and low abnormal cash. Abnormal cash is computed as the residual from cross-sectional regressions of cash-to-net asset value of closed-end funds on a fund's size, lagged market beta, past 12-month return, expense ratio, age, and discount (regression (6) in Table 4). At the beginning of month $t+4$, a total net assets-weighted investment is made in the funds that were assigned to a particular abnormal cash group as of the end of month t, and the position is held for the following 12 months. The 5-factor model uses Pastor-Stambaugh liquidity factor. R^2 is the adjusted R^2 from regressions using the difference in returns between high and low abnormal cash funds as a dependent variable. The sample period is 1994-2008.