Do mutual fund managers adjust cost structure in response to financial shocks?

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Abstract

Many mutual funds pay for the privilege to list on no-transaction fee (NTF) supermarkets, eliminating transaction costs for the shareholder, but evidence suggests this cost is directly related to expense ratios. This study investigates NTF participation of 44,556 unique mutual funds over the global financial meltdown period of 2005–2009 and confirms that NTF participation leads to higher expense ratios. The evidence also shows that continued participation in the NTF program during this period of negative financial shocks is based on the fund's ability to offset the cost of participation by maintaining a high expense ratio or increasing the expense ratio. © 2011 Academy of Financial Services. All rights reserved.

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1. Introduction

Before 1971, mutual funds charged for their services using either an asset-based model or a performance-based model, but in 1971 the Securities and Exchange Commission (SEC) placed restrictions on performance fees. As confirmed by Golec (2003) and Golec and Starks (2004), this change led most mutual fund companies to operate based solely on asset-based fees. According to John Bogle, retired Chairman of The Vanguard Group, the asset-based model resulted in a transition from the stewardship of shareholder investments to salesman-

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ship and asset gathering (Bogle, 2005). As a result, increasing the asset base of a fund or increasing the published expense ratio yields greater revenue to fund managers.

1.1. Mutual fund supermarkets and no-transaction fee directories

To increase their appeal to investors and thereby build their asset base, many funds have developed arrangements with brokerage houses to sell their funds to investors through a "supermarket." These supermarkets are brokers (i.e., Charles Schwab) who hold shares of the mutual funds for investors within omnibus accounts. Investors are able to buy and sell shares of many different funds through one account instead of directly transacting with each separate mutual fund company. As noted by Ciccotello, Miles, and Walsh (2006), accessing mutual funds through a supermarket is a more efficient way to trade funds. Accountholders may choose from a wide variety of funds from different fund families. In addition, record-keeping is easier with only one account to monitor. Of course, the broker benefits through the trading fees that arise from the buying and selling activities of their clients.

To further expand their appeal in the supermarket setting, mutual funds may also choose to list on a "no-transaction-fee" (NTF) fund directory. In this case, the broker does not charge the fund investor for trading particular mutual funds. Instead, the fund agrees to pay annual fees to the broker to forego trading fees.[1] Because of this arrangement, the fund increases its asset base; the broker maintains its fee income; and the individual investor gets the convenience of a large selection of mutual funds without worrying about trading fees. On the surface, it is a win-win-win situation.

Ultimately, as one would expect, all fund expenses are eventually borne by the investor, but many investors may perceive NTF funds as relatively inexpensive because of lack of brokerage or transaction fees. Instead, the evidence suggests that NTF funds are in fact more expensive for a buy-and-hold investor because they charge relatively high annual expense ratios. As a result, naive investors do not fully recognize that they are paying transaction fees or commissions through higher expense ratios. The expense is "hidden" because mutual fund returns are reported net of expense ratios, and no invoice for fees is presented to the shareholder before deduction from their accounts. As noted by Barber, Odean, and Zheng (2005), investors are "more sensitive to salient, in-your-face fees, like front-end loads and commissions, than operating expenses." In addition, NTF participation is discretionary, and fund managers may eliminate this expense during periods of market distress to maintain fund revenue. Removal from the program does not necessarily result in lower annual expense ratios for investors. For this reason, investors and financial planners should monitor changes in NTF participation and pay close attention to expense ratios, especially when considering access-related fees.

1.2. Purpose of study

This study examines the expense ratios of 44,556 mutual funds across the sample period of 2005 through 2009. Like LaPlante (2001), we find that NTF funds post higher expense ratios than their nonparticipating counterparts. Although participation in an NTF program increases expense ratios, the relation is much more complex than first assumed. For example,

fund management makes the decision about participation in these programs and has the discretion to remove funds or adjust expense ratios to account for changing market conditions. Continuing to participate in an NTF program is driven by the fund's ability to offset the expense of the program through increasing the asset base or the expense ratio. While removal from the NTF program may lead to a decline in expense ratios, continued participation in the program typically leads to relatively higher expense ratios.

2. Background and previous literature

2.1. General evidence on expense ratios and returns

Malhotra and McLeod (1997) conduct an empirical study of mutual fund expenses and find that expense ratios are very predictable and stable, possibly even fixed. They contend that, when selecting funds, investors should carefully examine expense ratios by concentrating investments in funds with low expenses. As a result of their study, they find that the key determinants in fund expenses are fund size, age, turnover ratio, cash ratio, and the existence of a 12b-1 fee.[2] Similar to Fortin and Michelson (2001a), Malhotra and McLeod (1997) find lower expense ratios among larger funds, and they also find lower expense ratios for more mature mutual funds.

Droms and Walker (1995, 2001), Shukla (2004), and Ippolito (1993) find that fund expenses may be offset through the benefit of fund manager research. For example, Droms and Walker (1995, 2001) find greater risk among funds with higher expense ratios, and they suggest that higher expenses push managers to increase risk in an attempt to increase returns. Shukla (2004) and Ippolito (1993) support the claim that managers who generate higher excess returns should be able to charge higher fees from the stockholders and do so. Dowen and Mann (2004), Jensen (1968), Sharpe (1966), and Bogle (2005) disagree.

Dowen and Mann (2004) find no relation between expense ratios and returns for equity funds but instead find that returns are negatively related to expense ratios for bond funds. Bogle (2005) goes further to claim that a low expense ratio is the single most important reason a fund is successful. After all, investor return is what remains after the financial intermediaries have taken their share from the gross market return. For example, Bogle (2005) cites the 1985–2004 period when the average annual return on the market was 13.2%. Meanwhile, the average mutual fund earned only 10.4%.

With the large number of mutual funds available and the ease of purchase of such funds, Haslem (2004) advocates pressure on mutual fund management to disclose all costs; however, he attributes part of this problem to the SEC regulation that placed restrictions on performance-based fees and a regulatory system that does not encourage transparent disclosure of all fees. As such, investors tend to ignore fees considered minor, and, as noted earlier, Barber, Odean, and Zheng (2005) find that investors do not avoid funds with high annual expense ratios, but they may avoid paying front-end loads or trading commissions at supermarket brokerages.[3]

2.3. Expense ratios and NTF supermarkets

As first noted by Livingston and O'Neal (1998) and extended by Fortin and Michelson (1998), trading costs or brokerage commission expenses are quite significant in relation to other mutual fund expenses. Unfortunately, Robertson (2005) and Kinder (2005) note that these and many other expenses associated with mutual funds are often hidden or poorly disclosed. In fact, Fortin and Michelson (1998) explicitly state that transaction fees are typically unobserved by most investors until after the purchase of a fund because of the fact that the investor must request a statement of additional information from the fund company. As a result, investors may request to only purchase funds listed on an NTF directory.

The NTF mutual fund service is a voluntary program where a financial institution, the NTF supermarket, serves as an intermediary between the investors and a mutual fund family. As noted by Ciccotello, Greene, and Walsh (2007), these supermarkets may cater to institutional clients such as financial advisors, while other retail supermarkets cater to direct retail investors. In July 1992 Charles Schwab and Co. introduced its NTF mutual fund service, Mutual Fund One-Source. The following is an excerpt from the March 30, 1994, Charles Schwab and Co. 10-K about Mutual Fund OneSource:

> "While Schwab does not receive transaction fees (commissions) on customer trades in the Mutual Fund OneSource participating mutual funds, it is compensated directly by the participating fund or their sponsors via fees received for providing record keeping and shareholder services. Such compensation is ongoing, based on daily balances of customer assets invested in the participating funds held at Schwab."[4]

Thus, NTF supermarkets, such as Charles Schwab and Co.'s Mutual Fund One-Source, collect commissions and other transaction related fees from the listed mutual fund or fund family, not directly from the investor. While NTF supermarkets help an investor avoid commissions and other transaction-related fees, investors will still be responsible for other asset-based expense ratios such as "Management Fees" or "Distribution Service (12b-1) Fees," which are included as part of the "Annual Expense Ratio."

Many have suggested that investors still pay the transaction fee, but they do so in the form of higher expense ratios. An article by Kiplinger.com columnist Stephen Goldberg (2010) outlines the theory quite well. In his example, the brokerage company (e.g., Charles Schwab, Fidelity, or TD Ameritrade) charges the fund company (e.g., American Century, Federated, or Scudder) 0.40% of assets per year to participate in the NTF program. This "revenue sharing" agreement is a cost of business for the fund company, which seeks access to the large market of investors only available through the on-line brokers. The result is that NTF funds, according to information in Goldberg's (2010) article, charge expense ratios that are 25 basis points higher than nonparticipants; however, the empirical evidence in the academic literature remains mixed.

Fortin and Michelson (2001b) examine the Schwab Retail OneSource program from 1991 through 1998 and find that there is a significant decrease in expenses ratios for funds electing to join Schwab's NTF program. Alternatively, LaPlante (2001) examines a sample of funds from the period 1994 to 1998 and concludes that funds participating in NTF programs have higher expense ratios than nonparticipating funds, suggesting that mutual fund investors may
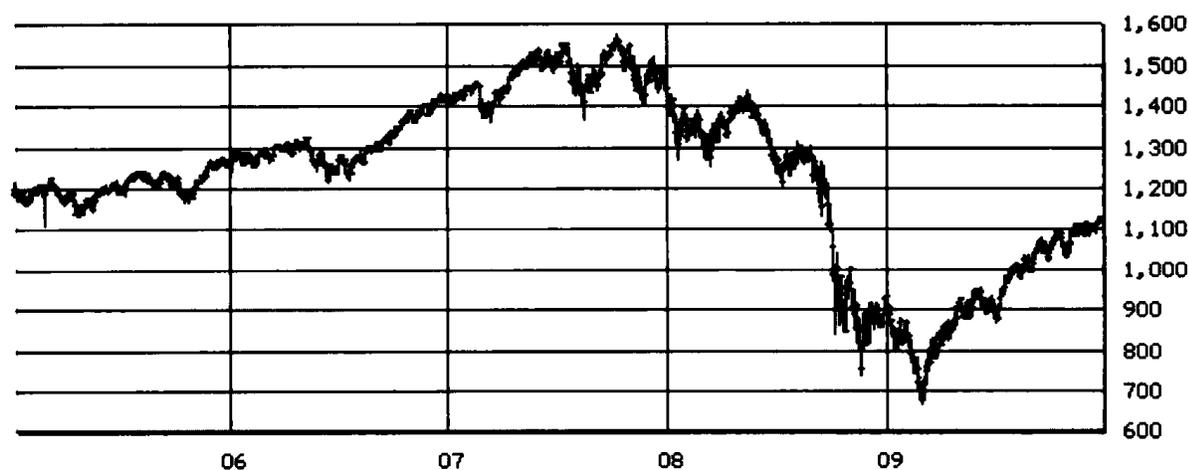
Fig. 1. S&P 500 Index (SPX). This figure presents the S&P 500 Index level (SPX) for the period January 1, 2005 through December 31, 2009.

overlook the higher expense ratios of NTF funds simply because they are avoiding transaction costs at the supermarket.

3. Data

3.1. Sample time period

We obtain the list of all mutual funds covered in Morningstar's Principia database for the years 2005 through 2009, providing a comprehensive view of the mutual fund market during the mortgage market meltdown, credit crisis, and subsequent global economic recession precipitated by the bankruptcy filing of Lehman Brothers on September 15, 2008.

As shown in Fig. 1, the S&P 500 was trading in a narrow range around the 1,200 mark for much of 2005. In late 2005 the index began a steady climb that extended to a high of 1,561.80 on October 12, 2007. Many investment banks began to show losses because of writedowns on subprime mortgage debt in the fourth quarter of 2007, and the S&P began to slip. By Friday, September 12, 2008, the S&P 500 closed at 1,252. Lehman Brothers filed for bankruptcy on Monday, September 15, 2008, and the S&P 500 shed more than 300 points, falling to 899.22 by October 10, 2008. It fell further over the next few months to a low of 683.38 on March 6, 2009. The S&P 500 began the slow path to recovery in April, 2009 and ended our sample period at 1,126 on December 31, 2009. Thus, this particular five-year period represents a period of market stability and growth (2005–2007), a sudden but extended downturn (2008–2009), and a gradual stabilization (2009).

Over this period mutual fund assets dropped as well for two reasons: (1) underlying valuations of securities declined sharply in 2008, and (2) investors reduced their exposure to the stock market by, in some cases, pulling money out of stock funds and, in other cases, limiting new money going into these funds. As a result, the corresponding revenue to the

fund family from these expense ratios was drastically reduced. The depth and length of the 2008–2009 recession resulted in the disappearance of many mutual funds, and mergers were common as funds struggled to grow and profit.

3.2. Sample description

Using the Morningstar Principia database, we obtain yearly data for 44,901 unique mutual funds from 2005 through 2009. Information regarding the fund's name, registrant's name, category, objective, cash ratio, turnover ratio, expense ratio, assets, age, and inception date must be available through Morningstar to be included in the sample. In addition, because of the potential of unwinding funds, the sample is restricted to mutual funds with expense ratios, defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operation costs, and all other asset-based costs incurred by the fund, of less than 10%. Moreover, we exclude observations with net assets equal to zero. This leads to the elimination of 2,345 unique mutual funds over the sample period and provides us with a sample of 109,706 fund observation years for 44,556 unique mutual funds. Next, the brokerage availability of each mutual fund is examined each year to determine if the fund participates in at least one NTF supermarket, and a binary variable for each observation year is created to track NTF availability during the sample period.[5] Finally, building on Khorana (1996) and LaPlante (2001), we examine the Morningstar-provided fund category and objective to assign each mutual fund to one of seven fund types: Bonds, Large-Caps, Mid-Caps, Small-Caps, International, Balanced, and Specialty.

3.3. Summary statistics

Panel A of Table 1 provides summary statistics by fund type. While expense ratios average 134.85 basis points (BPS) for the full sample, there is evidence of substantial variation across the fund types. Bond funds post relatively low average expense ratios (106.08 BPS), while specialty funds tend to charge the highest average expense ratios (164.98 BPS). The differences do not end with expense ratios. Panel A of Table 1 also shows evidence of substantial variations across fund types for many of our variables of interest; thus, all multivariate analysis provided later in this study will control for fund type.

Panel B of Table 1 provides summary statistics by sample year, and the results show substantial changes in variables of interest across our sample time period. As shown, in 2005 funds in the sample averaged an expense ratio of 140.04 BPS, but expense ratios fell to an average of 132.78 BPS by 2009. Interestingly, corresponding to height of the liquidity crisis, and consistent with the notion of cash-hoarding by investors, the average cash ratio of mutual funds declines to only 2.51% in 2008. Finally, turning to our NTF binary variable, we observe that 70.79% of all funds were available through at least one NTF supermarket in 2005, but this percentage declined steadily over the next few years to a low of 39.42% in 2007. During the heart of the credit crisis the trend switched, and the percentage of NTF funds grew to represent 47.36% of all available funds by 2009.

Table 1   Summary statistics by fund type and observation year

	N	Expense ratio	Cash ratio	Turnover ratio	Net asset size	Fund age	NTF fund	Large family
Panel A: Full sample across fund types								
Bonds	30,413	106.08	6.14	112.88	19.51	130.09	54.48	94.47
Large-caps	25,944	133.51	2.60	79.82	19.69	109.25	49.09	90.81
Mid-caps	9,145	146.48	3.96	105.96	19.21	98.21	49.21	87.28
Small-caps	9,293	153.56	3.61	100.27	19.03	94.05	48.80	88.11
International	14,308	163.45	5.51	85.75	19.68	94.03	48.55	91.40
Balanced	13,129	134.49	8.68	59.66	18.97	80.50	46.56	95.44
Specialty	7,474	164.98	6.71	144.67	19.00	100.49	55.64	91.18
Total	109,706	134.85	5.16	95.67	19.41	106.80	50.64	91.96
		(57.53)	(23.43)	(166.87)	(1.87)	(96.26)	(49.99)	(27.19)
Panel B: Full sample across observation years								
2005	19,316	140.04	5.69	93.73	19.45	103.46	70.79	91.22
2006	20,473	136.45	5.94	88.99	19.55	105.28	56.98	91.49
2007	22,744	134.23	6.64	90.43	19.56	104.17	39.42	92.39
2008	23,634	131.89	2.51	97.09	19.10	107.85	42.79	92.36
2009	23,536	132.78	5.30	106.72	19.43	112.33	47.36	92.16
Total	109,706	134.85	5.16	95.67	19.41	106.80	50.64	91.96
		(57.53)	(23.43)	(166.87)	(1.87)	(96.26)	(49.99)	(27.19)

This table reports summary statistics for the full sample across fund types and observation year. Summary statistics for the full sample across fund types are provided in Panel A. Summary statistics for the full sample across observation years are provided in Panel B. *Expense Ratio*, measured in basis points (BPS), is defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund. The variable *NTF* is a binary variable equal to one if the fund is listed on at least one broker's NTF network, zero otherwise. The Morningstar *Turnover Ratio*, measured as a percentage, is the lesser of purchases or sales divided by average monthly net assets, and *Cash Ratio*, measured as a percentage, is defined by Morningstar as the percentage of Net Assets held in the form of cash. *Size* is the natural log of the fund's net assets, *Age* is the age of the fund in months, and *Large Family* is a binary variable equal to one if the fund is managed by a mutual fund company offering at least 20 different funds, zero otherwise. The standard deviations for the full sample values are presented in parentheses.

Panel A of Table 2 presents summary statistics for NTF funds across observation year while Panel B of Table 2 repeats the analysis for non-NTF funds. In each year considered, the NTF funds posted higher expense ratios and turnover ratios than their non-NTF counterparts. Panel C of Table 2 further highlights the difference between NTF and non-NTF funds by providing difference in means analysis for each variable of interest. As shown, the average difference in expense ratios between NTF and non-NTF funds is a statistically and economically significant 27.25 BPS across the sample period. Interestingly, the overall decline in expense ratios from 2005 to 2009 is consistent with LaPlante's (2001) findings, but, as shown in Table 2, the increase in the spread between non-NTF and NTF funds widens from 2005 to 2009. In fact, expense ratios actually increase for NTF funds and decrease over the sample period for non-NTF funds. Thus, similar to the results by Dukes, English, and Davis (2006) for marketing fees, the evidence presented here suggests that participation in

Table 2   Summary statistics by NTF brokerage availability across observation years

	N	Expense ratio	Cash ratio	Turnover ratio	Net asset size	Fund age	Large family
Panel A: NTF funds							
2005	13,656	144.68	6.65	95.42	19.59	112.70	92.58
2006	11,666	138.85	5.94	91.68	19.63	126.46	90.39
2007	8,966	155.94	7.18	97.36	19.52	103.16	91.79
2008	10,112	159.70	3.15	106.62	18.85	97.55	92.41
2009	11,160	146.15	5.30	112.43	19.66	144.26	95.02
Total	55,560	148.30	5.43	100.40	19.46	117.63	92.46
		(57.39)	(22.62)	(180.14)	(1.81)	(96.19)	(27.19)
Panel B: Non-NTF funds							
2005	5,636	128.79	5.77	89.63	19.12	81.07	87.93
2006	8,807	133.26	5.94	85.43	19.45	77.22	92.93
2007	13,778	120.10	6.28	85.92	19.58	104.83	92.79
2008	13,522	111.10	2.03	89.96	19.28	115.56	92.32
2009	12,403	120.76	5.31	101.59	19.22	83.60	89.58
Total	54,146	121.05	4.89	90.82	19.35	95.68	91.45
		(54.31)	(24.24)	(151.90)	(1.92)	(95.05)	(27.96)
Panel C: Difference in means (NTF–Non-NTF)							
NTF funds	55,560	148.30	5.43	100.40	19.46	117.63	92.46
Non-NTF funds	54,146	121.05	4.89	90.82	19.35	95.68	91.45
Difference		27.25***	0.54***	9.58***	0.11***	21.95***	1.01***

This table reports summary statistics for NTF funds (Panel A) and Non-NTF funds (Panel B) by observation year. Statistics are given for non-NTF and NTF funds for each year broken down by objective and totaled across objectives. Panel C provides difference of means analysis for each variable across NTF classification. *Expense Ratio*, measured in basis points (BPS), is defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund. The variable *Turnover Ratio*, measured as a percentage, is the lesser of purchases or sales divided by average monthly net assets, and *Cash Ratio*, measured as a percentage, is defined by Morningstar as the percentage of Net Assets held in the form of cash. *Size* is the natural log of the fund's net assets, *Age* is the age of the fund in months, and *Large Family* is a binary variable equal to one if the fund is managed by a mutual fund company offering at least 20 different funds, zero otherwise. Standard deviations are presented in parentheses. Statistical significance for the difference in means test is displayed by the use of one (10%), two (5%), or three (1%) asterisks.

an NTF program has a direct correlation with expense ratios. Panel C of Table 2 also shows that, on average, NTF funds hold more cash, have higher turnover, are larger, are older, and come from larger fund families.

3.4. Expense ratio means testing

In Table 3 we further examine the variation in expense ratios between NTF and non-NTF funds. Panel A presents the means for both NTF and non-NTF funds across fund type. As shown, and consistent with the evidence presented in Table 1, we find that NTF funds charge

Table 3   Expense ratio means tests across fund types and time for NTF and non-NTF funds

	Mean expense ratio (BPS)		Test for difference in means	
	NTF funds	Non-NTF funds	NTF–Non-NTF	*t* statistic
Panel A: Difference in means across fund type				
Bonds	116.46	93.66	22.80***	43.94
Large-caps	148.95	118.61	30.34***	45.83
Mid-caps	162.23	131.21	31.02***	29.48
Small-caps	168.22	139.56	28.66***	25.27
International	183.83	144.21	39.62***	43.24
Balanced	147.21	123.41	23.80***	26.04
Specialty	178.63	147.87	30.76***	22.13
Full sample	148.30	121.05	27.25***	80.74
Panel B: Difference in means across time				
2005	144.68	128.79	15.89***	17.00
2006	138.85	133.26	5.59***	6.86
2007	155.94	120.10	35.84***	47.96
2008	159.70	111.10	48.60***	73.06
2009	146.15	120.76	25.39***	35.28
Full sample	148.30	121.05	27.25***	80.74

This table presents mean tests for expense ratios, measured in basis points (BPS), for both NTF and Non-NTF funds across fund type (Panel A) and time (Panel B). Mean values for each fund type (year) are reported for both NTF and Non-NTF funds. *Expense Ratio*, measured in basis points (BPS), is defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund. The difference and *t* statistic testing the significance of the difference is reported in the right two columns, respectively. Statistical significance is displayed by the use of one (10%), two (5%), or three (1%) asterisks.

higher expense ratios for all fund types considered, and the difference for all fund types is both economically and statistically significant. In Panel B we repeat the analysis across observation years and the results are similar. For each sample year we find that NTF funds charge higher average expense ratios than their non-NTF counterparts.

4. Methods and results

In the previous section, the univariate analysis shows a direct correlation between expense ratios and a fund's NTF status, but the results presented in Panel C of Table 2 shows that several variables are higher for NTF funds than non-NTF funds. Examples include turnover ratios, cash ratios, fund age, net asset size, and family size of the fund. Thus, it is possible that the size of the expense ratio may be driven by one variable (turnover ratio), but only correlated to NTF status. As a result, in this section we seek to answer two questions: (1) Does NTF participation increase expense ratios after controlling for other variables known to impact expense ratios, and (2) what increases the likelihood of a fund's continued participation in the NTF program?

4.1. NTF participation and the expense ratio

Building on Ferris and Chance (1987), Malhotra and McLeod (1997), and LaPlante (2001), we use a time-series cross-sectional multivariate model using fund expense ratios as the dependent variable for 109,709 mutual fund year observations for 44,556 unique funds spread across five (2005–2009) unbalanced panels. The complete model controlling for the marginal impact of fund characteristics on expense ratios is as follows:

$$Expense\ Ratio_i = \alpha + \beta_1 NTF_i + \beta_2 Turnover_i + \beta_3 Cash\ Ratio_i + \beta_4 Size_i$$

$$+ \beta_5 Age_i + \beta_6 Large\ Family_i + \beta_j Fund\ Type_{j,i} + \varepsilon_i \qquad (1)$$

where *Expense Ratio* is the annual expense ratio measured in basis points. As defined by Morningstar, the expense ratio is the audited percentage of assets deducted each fiscal year for fund expense, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund. The variable *NTF* is a binary variable equal to one if the fund is listed on at least one broker's NTF network, zero otherwise. Consistent with Malhotra and McLeod (1997), we include the Morningstar *Turnover Ratio*, measured as the lesser of purchases or sales divided by average monthly net assets, and *Cash Ratio*, defined by Morningstar as the percentage of Net Assets held in the form of cash. *Size* is the natural log of the fund's net assets, *Age* is the age of the fund in months, and *Large Family* is a binary variable equal to one if the fund is managed by a mutual fund company offering at least 20 different funds, zero otherwise. Previous models also include qualifying variables for fund type; thus, we include the *Fund Type* binary variables based on the seven classifications of funds provided in Panel A of Table 1 in a second regression. Please note that all coefficients are referenced to the omitted Mid-Cap asset class.

Consistent with previous research, the results presented in Table 4 show that all of the coefficients are significant at the one percentage level for a model that excludes the fund type control variables. Not surprisingly, funds with higher turnover ratios charge higher expense ratios. The same is true for cash ratios, but we find evidence of economies of scale, in that larger and more established funds tend to charge lower expense ratios. While funds from large fund families tend to have lower expense ratios, inclusion of variables representing the various categories of funds results in a positive, but insignificant *Large Family* binary variable. Overall, returning to our question of interest from the beginning of this section, the multivariate analysis confirms that, even after controlling for fund characteristics, participation in an NTF program leads to higher expense ratios. The coefficient of 13.042 BPS on the full model indicates an increase that is both economically and statistically significant.

3.2. Funding of NTF participation

A *BusinessWeek* article by Anne Tergensen in 2000 entitled "Where Did My Mutual Fund Go?" suggests that merging or liquidating a fund enables fund families to bury small funds with poor returns that are unlikely to become profitable (Tergensen, 2000). Revisiting Panel A of Table 2 we find that we were able to identify 13,656 NTF funds in 2005. In Table 5 we

Table 4   Times-series cross-sectional multivariate regressions for expense ratios

	Dependent variable: Expense ratio (BPS)			
	Coefficient	*t* statistic	Coefficient	*t* statistic
Intercept	239.392***	109.010	243.912***	111.820
NTF (Binary)	12.322***	59.120	13.042***	62.960
Turnover (percentage)	0.004***	5.740	0.006***	8.440
Cash ratio (percentage)	0.007***	2.040	0.012***	3.130
Size (ln{net assets})	−5.301***	−46.780	−5.270***	−48.560
Age (months)	−0.070***	−36.440	−0.055***	−29.340
Large family (binary)	−2.175***	−2.940	0.775	1.100
Bonds (binary)			−36.655***	−43.840
Large-cap (binary)			−8.279***	−10.280
Small-cap (binary)			4.925***	4.960
International (binary)			16.749***	17.950
Balanced (binary)			−11.419***	−12.300
Specialty (binary)			8.498***	8.100
Observations	109,709		109,709	
Unique mutual funds	44,556		44,556	
R^2 (overall)	0.1119		0.2310	
Breusch and Pagan	67,985.37***		58,589.86***	

This table presents time-series cross-sectional multivariate regression results with random effects and robust standard errors for 109,706 fund observation years organized into unbalanced panels across time (2005–2009). The dependent variable, *Expense Ratio*, measured in basis points (BPS), is defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund. The variable *NTF* is a binary variable equal to one if the fund is listed on at least one broker's NTF network, zero otherwise. The Morningstar *Turnover Ratio*, measured as a percentage, is the lesser of purchases or sales divided by average monthly net assets, and *Cash Ratio*, measured as a percentage, is defined by Morningstar as the percentage of Net Assets held in the form of cash. *Size* is the natural log of the fund's net assets, *Age* is the age of the fund in months, and *Large Family* is a binary variable equal to one if the fund is managed by mutual fund company offering at least 20 different funds, zero otherwise. All asset-class dummy variable coefficients are referenced to the Mid-cap asset-class. The number of observations, number of unique mutual funds, panel model overall R^2, and Breusch and Pagan (1980) Lagrangian multiplier test for random effects is provided for each model. Statistical significance is displayed by the use of one (10%), two (5%), or three (1%) asterisks.

track these funds over the sample period to monitor their expense ratios, verify their continued participation in the NTF program, and determine if changes in their expense ratio over time is correlated to their NTF participation status.

As shown in Table 5, we report the mean expense ratios for NTF funds in 2005 that were observable in subsequent sample years (200X). We also provide a difference of means analysis within and across years for funds based on their continued participation in the NTF program in the subsequent sample years. For example, of the 13,656 NTF funds identified in 2005 (see Table 2), only 8,621 continued to participate in the NTF program in 2006 (*NTF 2005, NTF 2006*). Of the 5,035 NTF funds in 2005 that dropped off the NTF list by 2006, only 2,107 maintained Morningstar coverage in 2006 (*NTF 2005, Non-NTF 2006*). Thus, the total of 10,728 observable funds in 2006 indicates that 2,928 NTF funds in 2005 had ceased Morningstar coverage in 2006, presumably because of insolvency of the fund. As a result, the

Table 5   Expense ratio means tests

	Expense ratio (BPS)		Observations	Paired observations difference in means test	
	2005	200X		200X–2005	t statistic
(1) NTF 2005, Non-NTF 2006	142.04	137.70	2,107	−4.34***	(−5.02)
(2) NTF 2005, NTF 2006	142.49	139.83	8,621	−2.66***	(−14.15)
Difference [(2) - (1)]	0.45	2.13**	10,728	1.68**	(2.27)
(3) NTF 2005, Non-NTF 2007	120.05	115.31	4,312	−4.74***	(−18.11)
(4) NTF 2005, NTF 2007	161.57	165.64	4,324	4.07***	(13.51)
Difference [(4) - (3)]	41.52***	50.33***	8,636	8.71***	(6.69)
(5) NTF 2005, Non-NTF 2008	114.91	108.58	3,829	−6.33***	(−22.82)
(6) NTF 2005, NTF 2008	163.38	169.35	3,443	5.97***	(15.35)
Difference [(6) - (5)]	48.47***	60.77***	7,272	12.30***	(23.42)
(7) NTF 2005, Non-NTF 2009	120.52	119.16	289	−1.36	(−0.99)
(8) NTF 2005, NTF 2009	151.35	152.92	1,148	1.57**	(2.14)
Difference [(8) - (7)]	30.83***	33.76***	1,437	2.93***	(4.81)

This table reports expense ratio, measured in basis points (BPS), for NTF funds in 2005 which are observable during at least one other sample year (2006–2009). This results in a subsample of 13,656 mutual funds which were traded on at least one broker's NTF network in 2005 and are observed for 2006–2009 and classified as an NTF or Non-NTF in those subsequent years based on their participation in the NTF program. Please note that several funds drop from the subsample through time. For example, of the 13,656 NTF funds in 2005, only 10,728 were still in existence in 2006. For each year (2006–2007) this table presents differences in expense ratios and associated t test within fund NTF classification for a given pair of years as well as across fund classifications for a given year. Statistical significance is displayed by the use of one (10%), two (5%), or three (1%) asterisks.

number of observable funds declines in subsequent years as funds are renamed, merged, or delisted.[6]

Looking at the 2,107 funds that were NTF participants in 2005 but dropped from the program in 2006 (*NTF 2005, Non-NTF 2006*), we find that the average expense ratio fell a statistically and economically significant 4.34 BPS year over year. Turning to the 8,621 funds that remained in the program in 2006 (*NTF 2005, NTF 2006*), we find that these funds posted an average expense ratio decline of 2.66 BPS year over year. Again, this is statistically and economically significant. More telling is the difference in the gap between the groups year over year. As shown, the gap between continued participants and NTF dropouts increased by 1.68 BPS from 2005 to 2006. While this is statistically significant, economic significance is questionable.

As noted previously, much of the economic fallout associated with the liquidity crisis observed during our sample time period occurs in 2008. Continuing with Table 5, we now turn our attention to the results for 2008. Of the 13,656 NTF funds in 2005, only 7,272 are listed by Morningstar in 2008. Interestingly, the results show that the 3,443 NTF funds in 2005 that remained in the program in 2008 (*NTF 2005, NTF 2008*) have much larger expense ratios than their 3,829 dropout counterparts (*NTF 2005, Non-NTF 2008*) even in 2005. The difference of 48.47 basis points is statistically significant and economically staggering. Moreover, the dropouts show an average decline in expense ratios of 6.33 BPS from 2005

to 2008 while the funds remaining in the NTF program post an average expense ratio increase of 5.97 BPS. This leads to a widening of the range between continued participants and dropouts of 12.30 BPS over the 2005 to 2008 period. The results for 2009 are similar, but the growth of the gap in expense ratios between continued participants and dropouts is only 2.93 BPS.

3.3. Likelihood of continued NTF participation

As noted previously, funds must make a conscious decision to stay in or drop out of the NTF program; thus, we use a Probit model to estimate the likelihood that a NTF-listed fund in 2005 will continue to participate in the NTF program in subsequent years. The model is as follows:

$$NTF_{2005-200X} = \propto + \beta_1 Expense\ Ratio\ 2005_i + \beta_2 \%\Delta Expense\ Ratio_i$$

$$+ \beta_2 \Delta Turnover\ Ratio\ 2005_i + \beta_3 \%\Delta Turnover\ Ratio_i$$

$$\beta_3 Turnover\ Ratio\ 2005: + \beta_4 \%\Delta TR:$$

$$+ \beta_4 Size\ 2005 + \beta_5 \Delta Size_i + \beta_5\ Cash\ Ratio\ 2005$$

$$\beta_5 Size\ 2005 + \beta_6 \%\Delta Size: + \beta_7\ Cash\ Ratio\ 2005$$

$$+ \beta_5 \%\Delta Cash\ Ratio_i + \beta_6\ Large\ Family\ 2005_i + \varepsilon_i,$$

$$\beta_8 \%\Delta CR: + \beta_9\ Large\ Family \tag{2}$$

where $NTF_{2005-200X}$ is a binary variable equal to one for a fund listed on the NTF market in both 2005 and a subsequent observation year (200X). Given the dramatic difference between levels of expense ratios of participants and eventual dropouts in 2005 observed in Table 5, we include the 2005 levels for all variables in the model as well as the change in each variable from 2005 to the observation year of interest. As defined previously, Expense Ratio 2005, measured as a percentage, is defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund in 2005. $\%\Delta$ Expense Ratio is the percentage change in the expense ratio from 2005 to 200X. The Morningstar Turnover Ratio 2005, measured as a percentage, is the lesser of purchases or sales divided by average monthly net assets in 2005. $\%\Delta$ Turnover is the percentage change in turnover ratios from 2005 to 200X. Size 2005 is the natural log of the fund's net assets in 2005. $\%\Delta$ Size is the percentage change in Log of Net Assets from 2005 to 200X. Cash Ratio 2005, measured in BPS, is defined by Morningstar as the percentage of Net Assets held in the form of cash. $\%\Delta$ Cash Ratio is the percentage change in cash from 2005 to 200X. Large Family 2005 is a binary variable equal to one if the fund is managed by a mutual fund company offering at least 20 different funds in 2005, zero otherwise.

As shown in Table 6, several factors appear to influence the likelihood of a fund remaining in the NTF program, but these factors vary from year to year. While the results for the 2005–2006 time period suggest that the percentage change in turnover is relevant, subse-

Table 6 Probit model predicting likelihood of remaining in the NTF program

	2005–2006		2005–2007		2005–2008		2005–2009	
	Estimate (p-value)	Marginal effects	Estimate (t statistic)	Marginal effects	Estimate (t statistic)	Marginal effects	Estimate (t statistic)	Marginal effects
Constant	3.3534*** (0.0000)		-1.8504*** (0.0000)		-1.0893*** (0.0000)		-1.4605*** (0.0080)	
Expense Ratio 2005 (%)	-0.0303 (0.3150)	-0.0083	1.0526*** (0.0000)	0.4198	1.3991*** (0.0000)	0.5567	0.6033*** (0.0000)	0.1620
%Δ Expense Ratio	-0.0004 (0.6240)	-0.0001	0.0090*** (0.0040)	0.0036	0.0138*** (0.0030)	0.0055	0.070*** (0.0080)	0.0048
Turnover Ratio 2005	-0.0001 (0.7650)	-0.0001	0.0003*** (0.0010)	0.0002	0.0003*** (0.0020)	0.0002	0.0005*** (0.0090)	0.0002
%Δ Turnover	0.0004*** (0.0050)	0.0001	0.0001 (0.4440)	0.0001	0.0001 (0.3360)	0.0001	0.0005 (0.1380)	0.0001
Size 2005	-0.0853*** (0.0000)	-0.0023	-0.0176* (0.0710)	-0.0070	-0.0501*** (0.0000)	-0.0199	0.0613** (0.0240)	0.0165
%Δ Size	-0.0059 (0.3340)	0.0017	-0.0194*** (0.0000)	-0.0077	0.0015 (0.7930)	0.0005	-0.0089 (0.3750)	-0.0024
Cash Ratio 2005	-0.6820*** (0.0000)	-0.186	0.3967** (0.0390)	0.1582	0.2063 (0.4310)	0.0821	0.5837 (0.2390)	0.1567
%Δ Cash Ratio	0.0001 (0.6330)	0.0001	0.0001 (0.8180)	0.0001	-0.0001 (0.3940)	0.0001	0.0001 (0.5430)	0.0001
Large Family 2005	-0.7631*** (0.0000)	-0.1503	0.0114 (0.8620)	0.0046	0.0622 (0.3940)	0.0260	0.1267 (0.2920)	0.0353
Number of observations	10,728.00		8,636.00		7,272.00		1,437.00	
Wald χ²	315.94***		939.49***		943.08***		78.70***	
Pseudo R²	0.0351		0.1343		0.2233		0.1245	

This table presents Probit analysis results for funds which were NTF funds in 2005 and were still in existence in in 2006, 2007, 2008, or 2009. Thus, all funds examined in this analysis were NTF funds in 2005 and the dependent variable is coded as one if they are NTFs in a subsequent year (200X), zero otherwise. *Expense Ratio 2005*, measured as a percentage, is defined by Morningstar as the audited percentage of assets deducted each fiscal year for fund expenses, including 12b-1 fees, management fees, administrative fees, operating costs, and all other asset-based costs incurred by the fund in 2005. *%Δ Expense Ratio* is the percentage change in the expense ratio from 2005 to 200X. The Morningstar *Turnover Ratio 2005*, measured as a percentage, is the lesser of purchases or sales divided by average monthly net assets in 2005. *%Δ Turnover* is the percentage change in turnover ratios from 2005 to 200X. *Size 2005* is the natural log of the fund's net assets in 2005. *%Δ Size* is the percentage change in Log of Net Assets from 2005 to 200X. *Cash Ratio 2005*, measured in basis points (BPS), is defined by Morningstar as the percentage of Net Assets held in the form of cash. *%Δ Cash Ratio* is the percentage change in cash from 2005 to 200X. *Large Family 2005* is a binary variable equal to one if the fund is managed by a mutual fund company offering at least 20 different funds in 2005, zero otherwise. Coefficients are presented with the Wald χ² p-statistics in parenthesis below each coefficient. Statistical significance is displayed by the use of one (10%), two (5%), or three (1%) asterisks. Marginal effects are listed for each variable.

quent years show no effect in the change in turnover on continued NTF participation. The level of the fund's cash ratio shows a mitigating effect of continued participation in 2006 before becoming a contributing effect in 2007. The coefficients are insignificant in the 2008 and 2009 models. Similarly, the likelihood of participation in 2006 is reduced if the fund is part of a large fund family, but there is no evidence of an effect in subsequent sample years for family size.

Overall, the results provide evidence that four variables consistently influence the likelihood of continued participation in the NTF program: Size 2005, Turnover Ratio 2005, Expense Ratio 2005, and %Δ Expense Ratio. First, as shown by the coefficients on Size 2005, larger funds at the beginning of the sample period are less likely to continue participation in subsequent years. We conjecture that this finding is consistent with the notion that large funds are less likely to utilize the NTF program as a form of asset gathering. Interestingly, following the significant slide in 2008, larger funds are more likely to continue participation in the NTF program in 2009, perhaps as a way to quickly regain their asset base.

Next, we find that the level of the turnover ratio in 2005 is directly related to the likelihood of a fund's continued participation in the NTF program for 2007 and beyond. This finding is consistent with Malhotra and McLeod (1997), and it suggests that funds with significant turnover, or churning, may market themselves to investors through the NTF program. Finally, the two primary variables of interest are the expense ratios in 2005 and the change in the expense ratios from 2005 to subsequent years. As shown, both are positive, statistically significant, and economically significant for 2007, 2008, and 2009. From the marginal effects, we find that for every 100 basis points charged through an expense ratio in 2005, there is a 42%, 56%, and 16% increase in the likelihood of remaining in the program in 2007, 2008, and 2009, respectively. This finding is consistent with the evidence presented in Table 5 suggesting that future NTF participation is correlated to initially higher expense ratios.

Looking at the change in expense ratios we find similar results. A 1% change in expense ratios from 2005 to 2007 leads to a 0.36% increase in the likelihood of NTF participation in 2007. The results for 2008 and 2009 are higher at 0.55% and 0.48%, respectively. Again, this is for a one percentage increase in the fund's expense ratio, or a change in expense ratios from 100 basis points to 101 basis points. As shown in Table 2, the average NTF fund increased expense ratios from 144.68 basis points in 2005 to 159.70 basis points in 2008. This 15.02 basis point change represents an increase of 10.38% over the three year period. Returning to the marginal effects provided in Table 6, this represents an 8.26% increase in the likelihood of remaining in the NTF program. Again, this is both economically and statistically significant.[7]

4. Conclusion

We examine the expense ratios of mutual funds for the period 2005–2009 with a focus on investor access to shares. Mutual funds may entice investors to purchase their shares by offering funds for sale through supermarket brokerages without transaction costs. In return, funds pay brokers for the privilege of being included on these NTF lists. Consistent with

prior research, we find strong evidence that NTF funds charge higher expense ratios than non-NTF funds.

During our five-year period, the financial market was rocked by a significant financial shock that precipitated a credit and liquidity crisis, and we examine changes in NTF participation over this tumultuous five year period. Overall, our results show a widening gap in expense ratios for NTF funds versus non-NTF funds. In addition, we find that continued participation during such a shock depends on the ability of the fund to offset the costs of participation by having a relatively high initial expense ratio and increasing this expense ratio. Simply put, while removal from the NTF program leads to a decline in expense ratios, continued participation in the program typically leads to even higher expense ratios.

Ultimately, as one would expect, all fund costs are borne by the investor. Because the cost of NTF participation is considered when setting expense ratios, investors who rarely purchase a specific mutual fund (e.g., an IRA rollover, trust account, or inactive account) may find it more cost-effective to avoid NTF funds and pay a lower annual expense ratio. Investors who make bi-monthly or monthly purchases of a specific mutual fund (e.g., contributing to an IRA, 401k, or 403b), may find it more economical to avoid brokerage commissions in exchange for a relatively modest increase in fees. In general, investors and financial planners should pay close attention to expense ratios and all access-related fees and should monitor changes in participation in NTF programs.

Notes

1. On the Wells Fargo mutual fund site, they state, "Certain mutual funds are available without paying a transaction fee to Wells Fargo Investments. Mutual funds available without transaction fees may change at any time without notice. Therefore, any mutual funds purchased without a transaction fee may be subject to a transaction fee for subsequent purchases or upon liquidation. Other fees and expenses apply to a continued investment in mutual funds and described in the mutual fund's current prospectus."
2. It should be noted that Morningstar includes 12b-1 fees in the reported expense ratio.
3. Ferris and Chance (1987) look at investor sensitivity to expenses by studying the effects of the newly instituted 12b-1 fees on mutual fund expenses. They conclude that these additional costs were overlooked by investors, in part, because they were new. Despite disclosure by the funds, these expenses are "fine print" items, and most investors fail to take note of them when making their mutual fund choices.
4. Charles Schwab and Co. 10-K filed with the Securities and Exchange Commission (SEC) on March 30, 1994.
5. The list of Morningstar brokerage codes is available from the authors.
6. The authors acknowledge that the discussion and results of this section are subject to survivorship bias. However, unlike a typical performance study, the impact of survivorship bias on the results presented in this section is not clear. For more information about the importance of survivorship bias, particularly in mutual fund performance studies, see Brown, Goetzmann, Ibbotson, and Ross (1992) as well as

Carhart (1997). Brown, Goetzmann, Ibbotson, and Ross (1992) demonstrate that survivorship bias may impact performance measurement of mutual funds, particularly in cases where the riskiness of funds is not homogenous. Carhart (1997), using a sample free of survivorship bias, finds that "common factors in stock returns and persistent differences in mutual fund expenses and transaction costs explain almost all of the predictability in mutual fund returns." Thus, accounting for survivorship bias, an issue identified by Brown, Goetzmann, Ibbotson, and Ross (1992) as having implications beyond performance measurement studies, performance of mutual funds is heavily influenced by fees and expenses.

While the directionality of the effect of survivorship bias on mutual fund expenses is not immediately clear, the associated reduction in sample size certainly impacts the strength of the t tests in Table 5. Likewise, it certainly increases the coefficient confidence intervals in Table 6, biasing against finding statistically significant results. Therefore, survivorship bias will weaken the findings, making test statistics (p-values) smaller (larger) and understating the findings.

7. Previous versions of this paper included the 12b-1 fee and geometric returns as determinants of the likelihood of remaining in the NTF program. We exclude both of these variables in this version of the article because of the new format of the model that includes both levels and changes. Given that our Morningstar-reported expense ratio includes the 12b-1 fee and we now include both the level and change in the expense ratio, adding a binary variable for addition of a 12b-1 fee leads to high variance inflation factors. In addition, while some funds may institute a 12b-1 fee to assist in marketing efforts during a difficult market period, our review of the data suggests that most leave these fees unchanged. The geometric return is not included because the high degree of correlation with the level and change in fund size over the sample period.

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