NBER WORKING PAPER SERIES

MUTUAL FUND PERFORMANCE AND THE INCENTIVE TO INVEST IN ACTIVE MANAGEMENT

Diane Del Guercio
Jonathan Reuter

Working Paper 17491
http://www.nber.org/papers/w17491

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
October 2011

We would like to thank John Campbell, Robin Greenwood, Ro Gutierrez, Edie Hotchkiss, Jeff Pontiff, Antoinette Schoar, Phil Strahan, Laurens Swinkels, Peter Tufano, Eric Zitzewitz, and seminar participants at Harvard University, the 2010 NBER Summer Institute Household Finance Workshop, and the 2011 Boston College Center for Asset Management Conference on Financial Markets for helpful discussions. Del Guercio would like to acknowledge support from the Finance and Securities Analysis Center at the University of Oregon. We thank Lauren Beaudette and Hai Tran for providing excellent research assistance and Deb Wetherbee at Financial Research Corporation for generously providing data on mutual fund distribution channels. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Mutual Fund Performance and the Incentive to Invest in Active Management
Diane Del Guercio and Jonathan Reuter
NBER Working Paper No. 17491
October 2011
JEL No. G14,G23

ABSTRACT

It is well known that within U.S. domestic equity mutual funds, actively managed funds significantly underperform index funds. However, this comparison ignores the fact that mutual funds targeted at different types of investors charge different fees, and use these fees to provide different bundles of services. To control for these differences, we compare the performance of actively managed funds and index funds within each of three broad market segments: retail funds sold directly to investors, retail funds sold through brokers, and institutional funds. We find that underperformance is strongest in the broker-sold segment and weakest in the direct-sold segment. In fact, we find that within the direct-sold segment, the risk-adjusted, after-fee returns of actively managed funds are statistically indistinguishable from those of index funds, consistent with the equilibrium condition in Grossman and Stiglitz (1980). To rationalize differences in performance, we test for differences in the flow-performance relation across the three segments. We find that fund flows respond most strongly to risk-adjusted returns in the direct-sold segment. We find a wide variety of evidence that direct-sold funds respond to investor preferences for risk-adjusted performance by investing more in active management. Our findings suggest that the underperformance of the average actively managed fund reflects its weaker incentives to generate alpha rather than an inability to generate alpha. We argue that our findings also help to explain the continued demand for actively managed funds.

Diane Del Guercio
Lundquist College of Business
1208 University of Oregon
Eugene, OR 97403-1208
dianedg@lcbmail.uoregon.edu

Jonathan Reuter
Carroll School of Management
Boston College
224B Fulton
140 Commonwealth Avenue
Chestnut Hill, MA 02467
and NBER
reuterj@bc.edu

In Grossman and Stiglitz's (1980) model of market efficiency, informed investors earn higher returns on their trades than uninformed investors, but the higher returns are perfectly offset by the cost of acquiring information. This model has led researchers, beginning with Ippolito (1989), to predict that actively managed funds will earn the same average after-fee returns as index funds.[1] In contrast, there is considerable evidence that actively managed mutual funds earn lower after-fee returns than index funds. For example, Malkiel (1995) and Gruber (1996) estimate that the average actively managed domestic equity fund underperforms the average index fund by 65 basis points per year.[2] Within our sample of domestic equity mutual funds, the estimated difference is 87 basis points per year. Despite this economically significant underperformance, demand for actively managed funds remains strong. Gruber (1996) highlighted this puzzle in his AFA presidential address, and it remains an area of active research.[3]

The underperformance is due to actively managed funds charging significantly higher fees than do index funds, but not earning significantly higher before-fee returns. A common interpretation for this stylized fact is that mutual fund investments in active management are unproductive—either because managers lack the ability to identify mispriced securities or because there are relatively few mispriced securities to trade. The implicit assumption is that mutual funds charging higher fees are investing more in active management, with the goal of generating alpha. In reality, mutual funds targeted at different types of investors charge different fees and provide different bundles of services. Retail funds sold through brokers use some of their fees to

[1] Testing whether actively managed funds earn positive alphas, as pioneered in Jensen (1968), is equivalent to testing whether actively managed funds outperform index funds only when index fund alphas equal zero. When index fund alphas can differ from zero (as argued in Elton, Gruber, Das, and Hlavka (1993) and Cremers, Petajisto, and Zitzewitz (2011)), it is better to directly compare the estimated alphas of the two types of funds.

[2] In his AFA presidential address, French (2008) estimates that an investor who switched from active to passive management would have earned an additional 67 basis points per year between 1980 and 2006.

[3] Gruber (1996), Savov (2009), Pastor and Stambaugh (2010), and Glode (2011) each seek to rationalize the continued demand for actively managed funds that generate, on average, a negative alpha.

pay for broker services, whereas retail funds sold directly to investors do not. Furthermore, mutual fund fee data do not reliably distinguish the cost of portfolio management from the cost of providing broker services. Even after accounting for explicit payments for broker services in the form of loads and 12b-1 fees, it is difficult to estimate what funds pay for inputs like skilled managers, analysts, and trading desks. Management fees, or revenue to the fund, are poor estimates of the cost of portfolio management because they include fund profits and can include additional payments for broker services.[4] To better control for differences in the hard-to-observe services that mutual funds provide—and the underlying differences in investor preferences—we group funds into three broad market segments: retail funds sold directly to investors (34.2% of the funds in our sample), retail funds sold through brokers (45.6% of funds), and institutional funds (20.1% of funds).

Comparing the performance of actively managed funds and index funds within each market segment allows us to shed new light on why actively managed funds underperform index funds. Because the relatively homogeneous direct-sold segment caters to do-it-yourself investors, it offers few services beyond portfolio management. Within this segment, we find that the risk-adjusted, after-fee returns of actively managed funds are statistically indistinguishable from those of index funds—the elusive equilibrium condition in Grossman and Stiglitz (1980). In contrast, we find that the underperformance of actively managed funds ranges from 112 basis points per year within the broker-sold segment to 66 basis points per year within the institutional segment. In other words, the well-documented underperformance of the average actively man-

[4] Although mutual fund investors pay more than $10 billion annually in 12b-1 distribution fees, it is widely recognized that 12b-1 fees underestimate the total cost of marketing and distribution. For example, it is common for mutual fund families to use management fees to cover distribution costs in a practice known as revenue-sharing (see, for example, footnote 13 in Elton, Gruber, and Busse (2004), footnote 8 in Bergstresser, Chalmers, and Tufano (2009), Zweig (2009), Pozen and Hamacher (2011) page 259, and the SEC roundtable on 12b-1 fees dated June 19, 2007).

aged fund is primarily driven by the large number of underperforming broker-sold funds. This implies that direct-sold actively managed funds are benefitting more than other funds from investments in active management. When we estimate pooled regressions that control for fund expenses, but allow average returns to differ across the actively managed funds and index funds available in each market segment, we find that direct-sold actively managed funds have significantly higher risk-adjusted, after-fee returns than other funds. This finding is robust to the inclusion of additional fund-level controls, and to sample restrictions based on fund age and ticker shown to eliminate incubation bias (Evans (2010)).

Next, we ask whether heterogeneity in performance is consistent with heterogeneity in implicit incentives derived from fund flow. When we test for across-segment differences in the sensitivity of monthly fund flows to lagged monthly returns, we find that flows in the direct-sold segment respond most strongly to risk-adjusted returns whereas flows in the broker-sold segment respond most strongly to raw returns. These differences help to rationalize the superior risk-adjusted performance of direct-sold actively managed funds because they imply that direct-sold funds face a stronger incentive to invest in alpha. Similarly, direct-sold funds face a weaker incentive to compete for investors by increasing beta, especially compared to broker-sold funds

To strengthen our case that direct-sold funds respond to the incentives provided by their alpha-sensitive clientele, we provide several independent pieces of evidence. We use the return gap measure of Kacperczyk, Sialm, and Zheng (2008) to show that direct-sold funds create significantly more value through their "unobserved actions," and the active share measure of Cremers and Petajisto (2009) to show that direct-sold funds are significantly less likely to be closet indexers. Furthermore, we find that direct-sold funds have lower estimated betas than broker-sold funds. Because the pricing of small-cap equity may be less efficient than the pricing of

large-cap equity, we test for and find that differences in risk-adjusted, after-fee returns are even larger when we focus on funds invested in small-cap equity.

We also test whether direct-sold families are systematically more likely to make performance-enhancing hiring and product offering decisions than families in other segments. Because Chevalier and Ellison (1999) and others show that portfolio managers from more selective undergraduate institutions earn higher risk-adjusted returns, we test for and find that direct-sold funds are more likely to employ managers who attended undergraduate institutions with top-quartile math SAT scores, and less likely to employ managers who attended undergraduate institutions with bottom-quartile math SAT scores. Because Massa (2003) and Siggelkow (2003) show that more focused mutual fund families earn higher risk-adjusted returns, we test for and find that direct-sold families are, on average, focused on fewer investment styles. Finally, we exploit the fact that some mutual fund families manage separate accounts for institutional investors to ask whether separate accounts managed by direct-sold mutual fund families outperform separate accounts managed by other firms. Although we are limited to return data from a single year, we find evidence that they do. Collectively, our findings suggest that direct-sold funds actively seek to provide the risk-adjusted performance that their target clientele demand.

Our paper is most closely related to Bergstresser, Chalmers, and Tufano (2009; hereafter BCT), who study differences between direct-sold and broker-sold funds over much of the same sample period. They show that direct-sold funds outperform broker-sold funds, even after adding back the 12b-1 fees charged by broker-sold funds. However, they do not study the relative performance of actively managed funds and index funds within the two market segments. They also do not study the differential impact of raw and risk-adjusted returns on fund flows across market segments, or the response of fund families to these implicit clientele incentives.

Our findings have several implications. Perhaps most importantly, they suggest that the underperformance of the average actively managed fund reflects a lack of incentives to invest in alpha rather than a lack of skill to generate alpha. When competition for investors focuses on risk-adjusted returns, actively managed funds underperform by far less than estimates from pooled regressions would suggest. To the extent that the average actively managed fund is not competing on risk-adjusted returns, its underperformance reveals little about the efficiency of U.S. equity markets. Given the across-segment differences in performance that we document, tests for manager skill should arguably focus on direct-sold funds. To the extent that future research is able to identify within-segment variation in the incentive to invest in active management, it would be interesting to test for within-segment variation in returns.

Our findings also provide new explanations for Gruber's (1996) puzzle of active management. On the one hand, if direct-sold actively managed funds earn the same risk-adjusted, after-fee returns as direct-sold index funds, then the continued demand for direct-sold actively managed funds becomes much less puzzling. This is especially true if actively managed funds offer additional benefits, such as the ability to outperform index funds in recessions, when the marginal utility of wealth is higher (Glode (2011)).[5] On the other hand, the underperformance of broker-sold funds may reflect their weaker incentive to invest in active management, and the continued demand for broker-sold actively managed funds may reflect broker incentives to not recommend index funds. We expand on these explanations in the conclusion.

In Section I, we describe the different market segments. In Section II, we document across-segment differences in the relative performance of actively managed and passively managed funds. In Section III, we document across-segment differences in the sensitivity of fund

[5] Our ability to test for performance differences across expansions and recessions is limited by the fact that we only observe one recession during our sample period, from March 2001 to November 2001.

flows to risk-adjusted, after-fee returns. (In the Appendix, we reconcile the findings of our flow-performance regressions with those in BCT.) In Section IV, we use a variety of performance metrics and additional data sources to document that direct-sold funds choose to invest more in active management. In Section V, we summarize our findings and discuss their implications for the puzzle of active management.

I. Three Segments in the Mutual Fund Industry: Direct-sold, Broker-sold, and Institutional

One important dimension on which funds differ is the exact bundle of services that investors receive in exchange for the fees they pay to the fund (expense ratio, including 12b-1 fees, plus any sales loads). For example, investors who wish to buy one of the largest funds, the Investment Company of America fund offered by the American Funds family, can only do so through a financial adviser, as the fund is not sold directly to investors. Because the fund is sold only as a packaged bundle of portfolio management services and financial advice services, the fees that American Funds charges its investors are ultimately used to compensate both portfolio managers and financial advisers. In contrast, the Vanguard Windsor fund is sold directly to investors through Vanguard's website or through an intermediary, such as Charles Schwab. The crucial distinction is that the fees that the investor pays directly to Vanguard are for portfolio management services only. If an investor wants to buy Vanguard mutual funds and receive advice on asset allocation or fund selection, the investor must pay separately for this advice.

More generally, retail mutual funds can be classified as providing either unbundled portfolio management services, or a packaged bundle of portfolio management and investment advice. Not surprisingly, the two types of funds are targeted at different types of investors. According to an Investment Company Institute survey, 51% of mutual fund shareholders indicate that they have an ongoing relationship with a financial adviser. Of these investors, 98% indicate

that they have had contact with their financial adviser in the prior 12 months, and that they have been receiving investment advice from this adviser for a median of 10 years. They reportedly use an adviser because they "need help with asset allocation decisions" and "want a financial professional to explain various investment options" and because it "gives them peace of mind about their investments." Thus, these surveys suggest that investors who use an adviser value the face-to-face contact and long-term relationship with their adviser. In contrast, the 18% of investors who do not purchase mutual funds through a financial adviser state that they "want to be in control of own investments" and already "have access to resources needed to invest on my own."[6] These differences suggest that competition for investors within the direct-sold segment may focus more squarely on performance than competition for investors within the broker-sold segment.

The third market segment consists of mutual funds that target institutional investors. James and Karceski (2006) provide a comprehensive analysis of funds that cater exclusively to institutional investors. Using fund prospectuses, they identify heterogeneity in the types of accounts within institutional funds (and share classes), such as 401(k) plan participants, foundations and endowments, customers of a bank trust or custodial account, or investors with more than $100,000 to invest in the fund. Because there is heterogeneity within this segment in terms of the services that the fund provides versus what is separately contracted for (e.g., payments to the bank trust officer), we expect it to resemble a hybrid of the other two segments.

A. Data on Distribution Channel

We use data from Financial Research Corporation (FRC) to identify mutual funds that

[6] These surveys are from "Ownership of Mutual Funds, Shareholder Sentiment, and Use of the Internet, 2010" Investment Company Institute's *Research Fundamentals* September 2010 page 14 and "Why Do Mutual Fund Investors Use Professional Financial Advisers? Investment Company Institute's *Research Fundamentals* April 2007 pages 5 and 6.

provide different bundles of services. These data were first used by BCT to distinguish direct-sold retail mutual funds from broker-sold retail mutual funds.[7] Like BCT, we focus on direct-sold versus broker-sold because these are the funds to which the majority of retail investors have access. However, to provide a more complete picture of the industry, we also include funds that FRC classifies as institutional. This allows us to document when mutual funds (or mutual fund investors) in the three main market segments exhibit similar behavior, and when they do not.

The FRC data, which covers 1992-2004, allow us to classify share classes as being direct-sold, broker-sold, or institutional.[8] We obtain data on total net assets (TNA), monthly returns, annual expenses, and other fund characteristics from the CRSP Survivor-Bias Free Mutual Fund Database. We merge the FRC and CRSP data at the share class level. When aggregating distribution (and other characteristics) to the fund level, we weight each share class in proportion to its TNA in the prior month. We classify a fund as being direct-sold, broker-sold, or institutional when at least 75% of its assets are sold through share classes focused on that segment. Using this filter, we are able to assign 75.7% of the nonspecialized domestic equity funds in CRSP to one of the three market segments. Collectively, these funds manage 91.1% of the assets invested in nonspecialized domestic equity.

We identify nonspecialized domestic equity funds as those for which the Standard & Poor's investment objective in CRSP is listed as aggressive growth (AGG), mid-cap growth (GMC), growth and income (GRI), growth (GRO), or small-cap growth (SCG). For 1996-2002,

[7] We refer interested readers to their paper for both a detailed description of the FRC data and an overview of mutual fund distribution.

[8] Although FRC provides information on whether a fund is sold through a captive salesforce that exclusively sells a single family's funds, or through a wholesale salesforce that sells the funds of multiple families, we follow BCT and combine both captive and wholesale saleforce into one broker-sold category. We are implicitly assuming that the advice services offered by wholesale brokers are not materially different from the advice services of captive brokers. See Christoffersen, Evans, and Musto (2011) for a detailed analysis of captive versus wholesale salesforce fund distribution, including the compensation arrangements between fund families and their salesforces.

we also possess data on Morningstar investment objectives, which capture variation in market capitalization and style (e.g., small-cap value versus large-cap growth). Because Morningstar investment objectives better match the investment objectives used by institutional investors, we use them to measure family-level investment style specialization. We also use them in robustness checks.

B. Summary Statistics

In Table 1, we provide evidence on the relative sizes of the direct-sold, broker-sold, and institutional market segments. Total assets under management in the domestic equity mutual funds in our sample increase from $288.9 billion in 1992 to $2,042.3 billion in 2004. During this period, the market share of direct-sold funds increases from 47.4% to 51.0%, while the market share of broker-sold funds decreases from 44.3% to 32.7%. The market share of index funds increases from 4.4% to 13.7%. However, this increase is driven by the direct-sold and institutional segments; within the broker-sold segment, the fraction of assets invested in index funds remains low.

We also provide evidence that the typical mutual fund family serves a single market segment. Following Del Guercio, Reuter, and Tkac (2010), we again aggregate from the share class level and calculate the fraction of assets that each family distributes through the direct-sold, broker-sold, and institutional segments. We then classify a family as being direct-sold, for example, if it distributes the largest fraction of assets through the direct-sold segment. Between 1992 and 2004, the average fraction of assets that direct-sold families sell through the direct-sold segment declines slightly from 97.9% to 96.1%. The decline in the fraction of assets distributed through the broker-sold segment is larger for broker-sold families (99.7% to 92.1%), but still quite mod-

est.[9] (In both segments, the median fraction distributed through the primary distribution segment remains constant at 100%.) The fact that many mutual fund families focus on either the direct-sold segment or the broker-sold segment reinforces the idea that families need to invest in different bundles of services to compete for different types of investors.[10] It also motivates us to test for differences in family-level behavior across market segments.

It is worth noting that the relatively small number of families that are classified as focusing on the institutional market segment reflects the fact that FRC, our data source, is primarily interested in distinguishing direct-sold from broker-sold (as opposed to distinguishing direct-sold or broker-sold from institutional). For example, the FRC data lead us to classify Fidelity and Vanguard as direct-sold families, despite the fact that these families manage billions of dollars in retirement assets. Our data show that these two families have 5.8% and 15.6% of family assets distributed in the institutional segment, which very likely understates their institutional assets. However, we are more confident that direct-sold is not misclassified as broker-sold, and vice-versa.[11]

We report fund-level summary statistics in Table 2. The unit of observation when calculating means and standard deviations is fund *i* in month *t*. We note several interesting differences across the three market segments. Among actively managed funds, the broker-sold segment offers a larger number, but on average smaller funds than the direct-sold segment. While there are far fewer index funds than actively managed funds in all segments, the average index fund has far more assets under management. The notable exception is broker-sold index funds,

[9] The fraction of families that simultaneously distribute *any* assets in both segments ranges from 1.3% in 1992 to 7.4% in 2004.

[10] Del Guercio, Reuter, and Tkac (2010) document that a family's primary distribution channel is highly persistent.

[11] Consistent with this, we are able to obtain distribution codes from the Investment Company Institute (ICI) for 2002. We find that only 3.4% of funds that FRC classifies as direct-sold are classified by ICI as broker-sold (or vice-versa). We thank Brian Reid for providing this data.

which manage relatively few assets.

The difference in average expense ratios of direct-sold and broker-sold actively managed funds (1.30 versus 1.59) is essentially equal to the difference in average 12b-1 fees (0.09 versus 0.40). However, this need not imply that funds in the two segments invest the same proportion of their non-12b-1 fees on active management, as some mutual funds use their management fees to pay for distribution. If this practice is more prevalent among broker-sold funds, the non-12b-1 fees of broker-sold funds will be weaker proxies for investments in active management. This possibility motivates us to compare the returns of actively managed and passively managed funds within each market segment.

Broker-sold index funds are more expensive than index funds in the other segments because they need to compensate brokers for providing financial advice. Therefore, some of the price dispersion studied by Elton, Gruber, and Busse (2004) and Hortacsu and Syverson (2004) is driven by differences in bundles of investor services. As James and Karceski (2006) and others find, institutional funds charge the lowest expense ratios. Portfolio turnover is significantly higher among direct-sold funds. This may reflect more active management, more volatile investor flows, or both.

When we focus on average monthly after-fee returns, we see that direct-sold actively managed funds appear to outperform broker-sold actively managed funds (92 basis points versus 80 basis points). On an annualized basis, the difference is 144 basis points, which is much bigger than the 31 basis point difference in 12b-1 fees. The fact that broker-sold funds underperform by more than the difference in 12b-1 fees is the key finding in BCT. Interestingly, direct-sold actively managed funds also appear to outperform all other categories, including the index funds in all three market segments. However, unlike the return regressions that we estimate be-

low, these averages do not control for differences in risk exposure or differences in the returns earned across asset classes and time.

II. There is no Puzzle of Active Management in the Direct-sold Segment

In this section, we argue that we can gain new insights into old puzzles by dividing the universe of mutual funds into truly comparable subsamples. In Table 3, we compare the performance of actively managed and passively-managed mutual funds that invest in U.S. equity. The dependent variable in each regression is fund i's four-factor alpha in month t, which we estimate using fund i's after-fee returns over the prior 24 months (and the factors available for download on Ken French's website).[12] The initial independent variable of interest is a dummy variable indicating whether fund i is an index fund. We include a separate fixed effect for each investment objective-month pair, to ensure that we are comparing index funds to actively managed funds operating in the same investment objective and month. We cluster standard errors on both month t and mutual fund family j. This two-way clustering allows the error term to be correlated across funds operating in the same month, and across funds operating in the same mutual fund family over time.

If actively managed funds earn the same risk-adjusted, after-fee returns as index funds, the estimated coefficient on the index fund dummy variable will be zero. However, within the full sample, we find that index funds outperform actively managed funds by 7.3 basis points per month (p-value of 0.049). This implies that the average actively managed fund underperforms the average index fund by 87 basis points annually. Notably this difference in annual performance is close to the 83 basis point average difference in expense ratios. Similar findings have been used to challenge both the value of active management and the rationality of mutual fund investors. First, because actively managed funds underperform by an amount that is equal to or

[12] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

greater than their difference in fees, higher fees appear not to increase risk-adjusted, before-fee returns (Malkiel (1995), Gil-Bazo and Ruiz-Verdu (2009)). Second, because it has long been known that actively managed funds underperform index funds, it is puzzling that the majority of mutual fund assets remain invested in actively managed funds (Gruber (1996)).

Both of these interpretations implicitly assume that the higher fees and lower returns of actively managed funds reflect failed investments in portfolio management. This is because, with the notable exception of BCT, prior studies have been unable to adequately control for the fact that the mutual funds available in different market segments are charging investors for different bundles of services.

In the next three columns of Table 3, we restrict the sample to direct-sold funds, broker-sold funds, and institutional funds, respectively. These regressions allow us to test whether actively managed funds underperform index funds when we hold constant the bundle of services that mutual fund investors receive. For example, in column (2), the index fund dummy variable measures the returns of direct-sold index funds relative to direct-sold actively managed funds with the same investment objectives in the same month. (The returns earned by mutual funds in other market segments play no part in this comparison.) Because both types of funds are targeted at the same type of retail investor, they are likely to offer the same bundle of non-portfolio management services. Consequently, within-segment differences in the fees charged by actively managed and index funds are likely to reflect differential investments in active management. Across-segment differences in fees are likely to reflect both differential investments in active management and differential investments in other investor services.

Mutual funds marketed directly to retail investors account for 34.3% of the observations in our full sample. Within this subsample, actively managed funds are estimated to underper-

form by 1.8 basis points per month. This difference is both much smaller than the 7.3 basis points per month within the full sample, and statistically indistinguishable from zero (p-value of 0.607). In other words, the evidence that direct-sold actively managed funds underperform direct-sold index funds is weak.

This finding is interesting for three reasons. First, it helps to rationalize continued demand for direct-sold actively managed funds. Second, even if we allow that actively managed funds underperform by 21.6 basis points per year, this is much smaller than the 87 basis points per year that we estimate in the full sample, and the 67 basis point per year cost that French (2008) attributes to active management. Third, the estimated difference in performance is much smaller than the 6.9 basis point difference in monthly returns implied by the higher average expense ratios of direct-sold actively managed funds. If we assume that these higher fees reflect the costs of investing in active management, then the fact that the average direct-sold actively managed fund earns risk-adjusted after-fee returns that are indistinguishable from those earned by direct-sold passively managed funds is broadly consistent with the model in Grossman and Stiglitz (1980). In other words, direct-sold actively managed funds appear to earn back most or all of their investments in active management.

Our findings are quite different when we focus on the broker-sold segment, which account for almost half (46.7%) of the observations in the full sample. Among funds which bundle investments in portfolio management with investments in broker services, index funds outperform by 9.3 basis points per month (p-value of 0.017). Interestingly, this is larger than the 5.7 basis point difference in monthly returns implied by the difference in average expense ratios.

When we focus on the relatively small sample of funds that FRC classifies as being targeted at institutional investors, the estimated difference in performance is slightly smaller than in

the full sample (5.5 basis points per month) but also statistically indistinguishable from zero (p-value of 0.263). While the lack of statistical significance suggests that institutional funds may also benefit from investments in active management, the estimated difference in risk-adjusted after-fee returns is almost exactly equal to the 5.3 basis point difference in fees.

The findings in columns (2), (3), and (4) reveal significant heterogeneity in the relative performance of actively and passively mutual funds targeted at different market segments.[13] In the remaining columns of Table 3, we pool all of the observations, but distinguish between actively and passively managed funds available in the different market segments. Excluding fund-level control variables, the estimated coefficients on the five dummy variables measure average risk-adjusted, after-fee performance relative to the average institutional actively managed fund (which is the omitted category). In column (5), we see that direct-sold actively managed funds outperform institutional actively managed funds by 6.0 basis points per month (p-value of 0.022), and outperform actively managed broker-sold funds by 8.9 basis points per month (p-value of 0.000). Moreover, the performance of direct-sold actively managed funds is statistically indistinguishable from that of the index funds available in all three segments. (Differences in the within-market segment returns of actively and passively managed funds in column (5) relative to columns (2), (3), and (4) reflect differences in the average returns earned within each investment objective each month.)

In column (6), we control for differences in lagged expense ratios. The estimated coefficient on the lagged expense ratios is negative and statistically significant (p-value of 0.011), implying that higher fees tend to reduce risk-adjusted, after-fee returns. Because index fund after-

[13] The evidence of heterogeneity is even stronger when we estimate a separate Fama MacBeth regression for each market segment. The estimated underperformance of actively managed funds relative to index funds is 0.3 basis points per month in the direct-sold segment (p-value of 0.931), 10.1 basis points per month in the broker-sold segment (o-value of 0.011), and 7.0 basis points per month in the institutional segment (p-value of 0.105).

fee returns benefit from the fact that index funds charge lower fees, the relative returns of index funds tend to shrink when we control for the level of fees. The notable exception is direct-sold actively managed funds, which earn significantly higher risk-adjusted, after-fee returns than other funds charging similar fees.[14] This is additional evidence that fees charged by direct-sold actively managed funds exert less drag on fund performance than fees charged by other actively managed funds.

Finally, in column (7), we add a full set of fund-level control variables. For example, we include the natural logarithm of fund *i*'s TNA in month *t-1* to control for the fact that the cross-sectional correlation between fund size and future returns tends to be negative (Chen, Hong, Huang, and Kubik (2004)). And, we include the standard deviation of net flows over the prior 12 months to control for the fact that more volatile investor flows may be associated with lower performance (Edelen (1999)). Other fund-level control variables include a dummy variable indicating whether fund *i* charges a sales load, fund *i*'s lagged 12b-1 fee, net flows into fund *i* over the prior 12 months, fund *i*'s age, and the natural logarithm of family's TNA in month *t-1*.

Conditioning of all of these characteristics, we find that direct-sold actively managed funds outperform institutional actively managed funds by 10.6 basis points per month, and outperform broker-sold actively managed funds by 8.0 basis points per month. Both differences are statistically significant at the 1-percent level. We even find weak evidence that direct-sold actively managed funds outperform index funds. The p-values of the hypothesis tests that direct-sold actively managed funds outperform direct-sold index funds, broker-sold index funds, and institutional index funds are 0.078, 0.089, and 0.154, respectively. In contrast, we find no performance differences between the other actively managed funds and any of the index funds.

[14] Our finding that direct-sold funds outperform other funds is robust to dropping institutional funds from the comparison group. It is also robust to including funds for which we lack FRC distribution data.

Our findings in Table 3 differ in two ways from those in BCT. BCT find that direct-sold funds outperform broker-sold funds, but do not study the performance of institutional funds. We find that direct-sold funds also earn higher risk-adjusted returns than institutional funds. More importantly, BCT do not explore the relative performance of actively managed funds and index funds within each market segment. When we do, we find little evidence that direct-sold actively managed funds underperform direct-sold index funds. Instead, we find that the well-known underperformance of actively managed funds relative to index funds is driven by the underperformance of broker-sold funds.

When we switch our focus from risk-adjusted returns to net returns, we continue to find that direct-sold actively managed funds outperform broker-sold actively managed funds. The unreported differences in monthly after-fee returns range from 6.6 basis points (p-value of 0.032) to 8.5 basis points (p-value of 0.012). These differences are slightly smaller than those reported in the bottom row of Table 3 because, as we document below, direct-sold funds have slightly less exposure to market risk than broker-sold funds. In the next section, we test whether the superior performance of direct-sold actively managed funds can be rationalized in terms of the incentives generated by mutual fund flows.

III. Flow-Performance in the Direct-Sold Segment Generates the Strongest Incentive to Invest in Active Management

Because mutual fund fee revenues increase with assets under management, mutual funds have a strong incentive to provide the services that attract new investor dollars. Therefore, one interpretation of the fact that actively managed funds in the direct-sold segment earn higher risk-adjusted returns than other actively managed funds is that investors in the direct-sold segment place the greatest weight on risk-adjusted performance. Under this interpretation, differences in investor preferences cause different mutual funds to invest different amounts in active manage-

ment. Of course, this begs the question of whether fund flows in the direct-sold segment are more responsive to risk-adjusted returns than fund flows in the other segments.

We test for differences in the flow-performance relation across the direct-sold, broker-sold, and institutional segments using data on actively managed domestic equity funds that covers January 1993 to December 2004.[15] Table 4 contains the regression results where the dependent variable is the monthly net percentage flow of fund *i* in month *t*. Focusing on monthly flows allows us to test for across-segment differences in investor sensitivity to short-term performance. In Panel A, we test for differential sensitivity to raw versus risk-adjusted performance measures. In Panel B, we allow for non-linearities in the sensitivity of flows to raw returns. The independent variables of interest are fund *i*'s monthly net return in month *t-1*, fund *i*'s monthly 4-factor alpha in *t-1*, and dummy variables that indicate whether fund *i*'s net return in month *t-1* was in the top 20% or the bottom 20% of funds with the same CRSP investment objective. We also include fund *i*'s monthly net flow in month *t-1* to capture the effect of longer-term performance. Other fund-level control variables include a dummy variable indicating whether fund *i* charges a sales load, fund *i*'s lagged expense ratio and 12b-1 fee, the natural logarithm of fund *i*'s TNA, the natural logarithm of its family's TNA, and fund *i*'s age. In our baseline regression, we include month-objective fixed effects to control for monthly shocks to aggregate demand within each investment objective each month.

Table 4 column (1) reports the results of a pooled regression relating net flows in month *t* to performance in month *t-1*. This regression ignores the fact that different mutual funds are

[15] We omit a review of the large literature on the fund flow-performance relation. However, papers that have specifically focused on the flow-performance relation within or across particular clienteles in the United States include Bergstresser, Chalmers, and Tufano (2009) (direct vs. broker-sold), Christoffersen, Evans, and Musto (2011) (captive broker vs. wholesale broker), James and Karceski (2006) (institutional and bank-sponsored), Chen, Yao, and Yu (2007) (insurance), and Del Guercio and Tkac (2002) (separate account). Using data from the United Kingdom, Keswani and Stolin (2009) find that investors in the *direct* channel are the most sensitive to risk-adjusted fund performance.

available in different market segments. Table 4 columns (2) through (4) report the results when we allow for differential sensitivity to lagged performance across the three segments. The coefficients are estimated in a single pooled regression in which each of the independent variables and month-objective fixed effects is interacted with a segment dummy variable. Thus, the coefficients in Table 4 columns (2) through (4) are identical to those obtained by estimating a separate regression for each of the three segments. To allow for the possibility that flows are correlated both within time period and within mutual fund family, we two-way cluster standard errors on family and month. For brevity, we do not report in the table the coefficients on the control variables.

In the full sample of funds we find the well-known result from the literature that both raw and risk-adjusted performance help to explain cross-sectional variation in fund flow (e.g., Gruber (1996); Sirri and Tufano (1998); Del Guercio and Tkac (2002)). However, pooling funds masks important heterogeneity across segments. In columns (2) through (4), we find that risk-adjusted returns primarily drive flows in the direct-sold segment. Specifically, while the estimated coefficients in all three segments are positive, the estimated coefficient in the direct-sold segment is largest (0.175 versus 0.021 and 0.053), significantly different from zero (p-value of 0.000), and significantly different from the coefficients in the other two segments (p-values of 0.001 and 0.032). The pattern is reversed when we focus on the sensitivity to lagged raw returns, which primarily drive flow in the broker-sold and institutional segments. These differences suggest that direct-sold funds compete more on risk-adjusted returns whereas other funds compete more on raw returns. Note that from the fund's perspective, it does not matter whether the lower sensitivity of flows in the broker-sold segment to risk-adjusted returns is driven by the preferences of brokers or their clients.

The estimates in Panel B confirm that flow in the direct-sold segment remains most sensitive to risk-adjusted performance, even when we control for abnormally high and low raw returns. The estimates also reveal that flow in the direct-sold segment is the most sensitive to extreme performance. For example, net flows into the top performing funds and out of the bottom performing funds in each investment objective are around three-times larger in the direct-sold segment than in the broker-sold segment. More generally, we can reject the hypothesis that the coefficients on the top 20% dummy variable in the direct-sold segment are equal to that of the other segments with a p-value of 0.005 or better. For the bottom 20% dummy variable, the p-values are 0.025 and 0.067.[16] The fact that direct-sold funds are penalized more for poor performance reinforces their incentive to invest in skill, and may also reduce their incentive to bear systematic risk.

Our results are largely consistent with other studies that have compared the sensitivity of flow to past performance across investor types. For example, Keswani and Stolin (2011) use disaggregated monthly flow data in the United Kingdom to test for sensitivity to risk-adjusted versus raw return performance across various distribution channels. Mirroring our findings for the U.S., they find that direct-sold investor flow is the most sensitive to risk-adjusted performance (4-factor alpha) relative to raw return and relative to other segments. Karceski and James (2006) document substantial heterogeneity within the sample of U.S. institutional mutual funds. In particular, they show that only the fund flow of "big" institutional funds (the 25% of their sample with investment minimums greater than $500,000) is sensitive to risk-adjusted performance. Because our institutional segment pools big and small institutional funds, it is perhaps not

[16] Although we only report one specification in Table 4, the flow-performance relations are qualitatively unchanged when we constrain the coefficients on the fund-level controls to be equal across channels, omit the fund-level controls, or omit lagged flows. In the Appendix, we report a specification where the included performance measures match BCT.

surprising that our estimated coefficient on 4-factor alphas in the institutional segment falls between the estimated coefficients in the direct-sold and broker-sold segments.

The study with which our findings would appear to differ is BCT. Since they use the same underlying FRC distribution channel data to study investor flows, it is important to reconcile our findings with theirs. BCT is interested in testing whether investors assisted by brokers are less likely to chase returns than do-it-yourself investors. They regress flows in calendar year t on raw returns in calendar year t and calendar year t-1, and find that the flow-performance relation is similar in both segments. They conclude that brokers fail to attenuate return chasing behavior. Our research question is different. We accept BCT's finding that both types of investors chase past returns, and are interested in testing whether investors assisted by brokers are less sensitive to recent risk-adjusted returns than do-it-yourself investors. Our research question prompts us to regress monthly flows on both raw and risk-adjusted monthly returns. Doing so, we clearly find that sensitivity to risk-adjusted performance is unique to the direct-sold segment. However, because a one-standard deviation increase in 4-factor alpha is smaller than a one-standard deviation increase in raw returns, we cannot reject BCT's finding that the overall tendency to chase past returns is similar in the two segments.

In the appendix, we estimate monthly flow regressions that more closely match the specification in BCT. When we control only for raw returns, our finding is similar to that in BCT. The sensitivity of flows to raw returns is similar in the direct-sold and broker-sold segments. When we simultaneously control for raw returns and 4-factor alphas, however, we find that sensitivity of flows to 4-factor alphas is limited to the direct-sold segment.

IV. Do Families in the Direct-sold Segment Invest More in Active Management?

The across-segment differences in fund flows generate two predictions. Because monthly flows into direct-sold funds are more sensitive to risk-adjusted returns, direct-sold funds have a

stronger incentive to generate alpha through investments in active management. At the same time, because monthly flows into funds in other segments are more sensitive to raw returns, funds outside the direct-sold segment have a stronger incentive to bear systematic risk, in the hopes of realizing higher raw returns. In this section, we test both predictions using a variety of data sources.

A. Are Direct-sold Funds More Actively Managed?

Because we use differences in risk-adjusted returns to motivate our analysis of fund flows, it is important that we test the prediction that direct-sold funds invest more in active management using other measures of mutual fund behavior. Nevertheless, we begin by verifying that across-segment differences in the risk-adjusted, after-fee monthly returns remain economically and statistically significant when we focus on actively managed funds. The specification in the first column of Panel A matches the specification in the last column of Table 3, except that we exclude index funds. Institutional actively managed funds are the omitted category. All of the regressions in Table 5 includes investment style-by-month fixed effects, so that performance is measured relative to other actively managed funds with the same investment style, in the same month; it also includes the full set of fund-level controls from Table 3 (unreported). Standard errors are clustered on both mutual fund family and month. Not surprisingly, we continue to find that direct-sold funds earn higher risk-adjusted, after-fee returns than broker-sold funds and institutional funds. The estimated differences are 8.0 and 10.7 basis points per month, respectively, and statistically significant at the 1-percent level.

In Panel B, we restrict the sample to actively managed small cap growth funds. To the extent that pricing of small cap stocks is less efficient than pricing of large cap stocks, the returns to investing in active management should be higher among small cap growth funds. Consistent

with this possibility, we find that direct-sold small-cap growth funds outperform their broker-sold peers by 16.1 basis points per month (p-value of 0.002). The difference in returns between direct-sold funds and institutional funds is a smaller but still economically significant 7.9 basis points (p-value 0.104). The fact that direct-sold funds earn relatively higher returns when investing in small stocks is our first new piece of evidence that direct-sold funds invest more in active management than funds in other market segments.

When we focus on measures of active management that were not studied by BCT, we find additional evidence that direct-sold funds invest more in active management—especially when we compare direct-sold funds to broker-sold funds. In column (2), we focus on the return gap measure of Kacperczyk, Sialm, and Zheng (2008), which is the difference between fund i's actual gross return and the gross return implied by the fund's lagged reported holdings. This measure captures unobservables such as the value added by skilled managers or favorable IPO allocations, or the value destroyed by poor trade executions or agency costs. Kacperczyk et al. report that fund return gaps are both persistent over time and predictive of future performance. We find that the majority of the difference in the returns of direct-sold and broker-sold funds can be explained by differences in return gaps. Within the full sample of actively managed funds, the difference in the return gaps of direct-sold and broker-sold funds is 7.0 basis points per month. Within the subsample of small cap growth funds, the difference is 12.4 basis points per month; we also find evidence that broker-sold funds underperform institutional funds.

In column (3), we focus on the active share measure of Cremers and Petajisto (2009), which is the fraction of fund *i*'s assets that would need to be traded to obtain a portfolio that mirrors fund *i*'s benchmark. Because Cremers and Petajisto find evidence that funds that have both high active share and high tracking error outperform their peers, the dependent variable in col-

umn (3) is a dummy variable that identifies funds with above-median measures of both active share and tracking error (where we allow the median value to vary across investment objective-year pairs).[17] Because active share and tracking error are positively correlated, the dependent variable equals one for 39.0 percent of the funds in the full sample, and 35.5 percent of the funds in the small cap growth fund sample.

We find strong evidence that direct-sold funds are more actively managed than broker-sold funds and institutional funds. Within the full sample, direct-sold funds are 8.0 percentage points (p-value 0.008) more likely to have above-median values of both active share and tracking error than broker-sold funds. Comparing direct-sold funds to institutional funds, the difference is 13.6 percentage points (p-value 0.000). Within the sample of small cap growth funds, the differences grow to 10.6 percentage points (p-value of 0.033) and 19.3 percentage points (p-value of 0.000). All of these differences are economically significant, suggesting that direct-sold actively managed funds are much less likely to closet-index than their peers in other market segments.

In unreported regressions, we restrict the sample to funds for which we observe Morningstar investment styles, a Morningstar rating, and a NASDAQ ticker. Although these filters eliminate more than 40% of our fund-month observations, they serve several useful purposes. When constructing style-by-month fixed effects, the nine Morningstar investment styles allow for finer comparison groups than the five Standard & Poor's investment styles available in CRSP. They also make it easier to identify the full set of funds that invest in small cap equity. More importantly, requiring that fund *i* has a Morningstar rating (which requires that it is at least three years old) and a ticker helps to insure that our findings are not being driven by incubation bias (Evans (2010)). Within the full sample of funds, differences in returns are similar to those

[17] We thank Cremers and Petajisto for making their active share and tracking error measures available for download at www.petajisto.net/data.html.

reported in Table 5. Within the sample of small cap funds, differences in returns are even larger than reported in Table 5 Panel B. Specifically, the difference in the 4-factor alphas of direct-sold and broker-sold funds increases from 16.1 to 20.7 basis points per month (p-value of 0.020), and the difference in return gaps increases from 12.4 to 27.2 basis points per month (p-value of 0.000).

Our findings in the first three columns of Table 5 strongly suggest that direct-sold funds are more actively managed than broker-sold funds. With respect to institutional funds, the evidence is mixed. Direct-sold funds are more likely to have above-median active share and tracking error, but estimated differences in return gaps are statistically indistinguishable from zero.

In the final column of Table 5, we test for differences in systematic risk. We measure sensitivity to systematic risk as the beta on the market portfolio in the standard one-factor model. We find that direct-sold funds have lower betas than broker-sold funds. The difference is 0.040 within the full sample (p-value of 0.071) and 0.106 within the sample of small-cap growth funds (p-value of 0.009). When we compare direct-sold funds to institutional funds, the difference of 0.089 within the sample of small-cap growth funds is statistically significant (p-value of 0.022), but the difference of 0.024 within the full sample is not (p-value of 0.269).[18] Because flows into broker-sold funds are the most sensitive to raw returns, and because higher betas are likely to generate higher raw returns, these across-segment differences in beta are broadly consistent with funds responding to the incentives implied by investor flows.

B. Do Direct-sold Funds Employ Managers from More Selective Colleges and Universities?

In this section, we exploit data on the educational backgrounds of mutual fund managers across a sample of actively managed domestic equity mutual funds in 2002. Our motivation is

[18] When we focus on betas estimated in a four-factor model instead, the estimated differences are qualitatively similar, but slightly smaller. One difference in results is that we find the difference between direct-sold and institutional is also statistically significant at conventional levels.

Chevalier and Ellison's (1999) finding that managers who attend undergraduate institutions with higher average student SAT scores earn higher risk-adjusted returns, a result confirmed in a sample of mutual fund managers in Christoffersen and Sarkissian (2009) and of hedge fund managers in Li, Zhang, and Zhou (2011). To the extent that managers from these schools have greater ability and/or professional networks (or better outside options), they should cost more for mutual fund families to hire and retain. At the same time, these managers should be the most attractive to actively managed mutual funds with performance-sensitive investors, like those in the direct-sold segment. These considerations lead us to predict that direct-sold funds will be the most likely to employ analysts and managers from schools with higher average SAT scores. The complication—at least when comparing retail funds—is that employing managers from more prestigious colleges and universities may be an effective marketing strategy (Massa, Reuter, and Zitzewitz (2010)).

We possess Morningstar data on the educational backgrounds of 939 actively managed domestic equity fund managers working in 2002.[19] The 939 different managers attended 285 different undergraduate institutions. Of the 276 schools located in the United States, we are able to obtain acceptance rates for 243, and the interquartile range of student math SAT scores for 251. Our source for these data is the U.S. Department of Education National Center for Education Statistics College Navigator website. Because these data reflect student characteristics in 2007, our maintained assumption is that acceptance rates and SAT scores have been relatively stable over time. We construct three dummy variable proxies for manager ability. The first dummy variable identifies if the manager has an undergraduate degree from one of the 25 colleges and universities with the lowest acceptance rates within our sample (ranging from 8.8 per-

[19] Cohen, Frazzini, and Malloy (2008) use these data to study connections between mutual fund managers and the board members of the firms in which they invest. We thank them for sharing their data for 2002.

cent for Harvard to 24.5 percent for Notre Dame). To capture the quantitative nature of portfolio management, the other two dummy variables indicate whether the manager's degree is from a school with a mid-point math SAT score in the top quartile (above 650) or the bottom quartile (below 560) of the schools in our sample.

Table 6 contains the test results. The unit of observation is actively managed domestic equity fund i in 2002. For funds with multiple named managers, we equal weight our proxies for skill. For example, the dependent variable in columns (1) and (2) is the fraction of managers who attended a top 25 undergraduate institution.[20] To the extent that larger families have the scale necessary to hire better managers, we report specifications that control for the natural log of family assets under management in our tests. We cluster standard errors on mutual fund family.

While we find that direct-sold funds are more likely to hire managers with degrees from the 25 most selective institutions relative to other funds, only the difference with institutional funds is significantly different from zero. However, we do find that direct-sold funds are significantly more likely to employ managers from top-quartile math-SAT schools (60.9 percent versus 51.8 percent; p-value of 0.071), and significantly less likely to employ managers from bottom-quartile math-SAT schools (8.7 percent versus 14.2 percent; p-value of 0.043) relative to broker-sold families. While we recognize that these school-level measures are noisy proxies for differences in manager ability, our findings are nevertheless consistent with funds in the direct-sold segment investing more in skilled portfolio managers. Inferences are unchanged after controlling for family size.

Educational data also allow us to explore whether average differences in market risk

[20] Because Massa, Reuter, and Zitzewitz (2010) document that a significant fraction of the actively managed mutual funds in 2002 are anonymously managed, we only observe manager educational data for a subset of the managers that each family employs. However, in 2002, direct-sold mutual funds are slightly less likely to be anonymously managed (9.2 percent versus 12.0), suggesting that selective disclosure is unlikely to drive the differences in undergraduate institutions.

across segments are related to average differences in manager education. When Chevalier and Ellison (1999) study the impact of MBA degrees on fund performance, they conclude that "the higher returns achieved by MBAs are entirely attributable to their greater holdings of systematic risk" (p. 877). Furthermore, Li et al. (2011) find no relation between hedge-fund alphas and whether the manager has an MBA degree. Because direct-sold fund flow responds to risk-adjusted returns, if managers with MBA degrees are more expensive to hire, direct-sold funds should be less likely to hire them. Indeed, we find that funds in the direct-sold segment are less likely to hire managers with MBAs (52.7 percent versus 63.0 percent; p-value of 0.01), and more likely to hire managers with an advanced degree other than an MBA, such as a PhD or JD (16.9 percent versus 10.2 percent; p-value of 0.02), relative to broker-sold families.

C. Are Families more Specialized by Investment Style in the Direct-sold Segment?

Mutual fund families must decide how many distinct investment styles to offer. Mutual fund investors who value "one-stop shopping" may prefer to invest with a large fund family that offers a variety of investment styles.[21] On the other hand, Siggelkow (2003), Massa (2003), and Ciccotello et al. (2006) show empirically that investors pay for this convenience with lower risk-adjusted returns. For example, Siggelkow (2003) compares the fund performance of families that specialize in few Morningstar investment styles versus those with broader offerings across many styles, and finds that the funds from more specialized families perform better on average. Siggelkow argues that different styles of investment (e.g., growth vs. value) draw on different research and execution techniques and investment practices. These incompatible cultures result in the deterioration in fund performance when families offer more styles of funds. Similarly, Massa (2003) argues that there are diseconomies of scope in the co-production of fund variety

[21] Investors might value one-stop shopping due to high personal search costs or due to an uncertain investment horizon and consequent desire to take advantage of the option to switch funds within a family at no explicit cost.

and fund performance, and that families must choose whether to target investors who value variety or investors who value performance.

Given the greater sensitivity of investors in the direct-sold segment to risk-adjusted returns, we expect families targeting investors in this segment to focus on a narrower range of investment styles. To test this prediction, we exploit data on Morningstar investment styles between 1996 and 2002. Specifically, we compare two measures of style specialization for direct-sold families versus other families: the number of Morningstar styles offered by the family and the percentage of actively managed assets in the family's investment specialty.[22] We report statistics in Table 7 for 2002, which matches our sample period in Tables 6 and 8, as well as for 1996-2002.

For each family, we define its investment specialty as the Morningstar category in which it manages the most assets, and compute the percentage of actively managed domestic equity assets in this specialty style. On average in 2002, direct-sold families have 84.4% of their actively managed assets invested in their investment specialty Morningstar category, versus 69.7% for institutional families and 71.0% for broker-sold families (differences with direct-sold are statistically significant at the 1-percent level). Further, direct-sold families offer funds in 2.2 different Morningstar style categories, versus 3.3 different categories for institutional families and 3.5 different categories for broker-sold families (differences with direct-sold are statistically significant at the 1-percent level). Recognizing that larger fund families tend to offer more styles and are less concentrated by style, Table 7 also reports comparisons of the family style focus measures after controlling for family size. We find that in both 2002 and the full sample period, direct-sold families are significantly more specialized by investment style than broker-sold and institu-

[22] An alternative summary measure is a Herfindahl index. We report the % of actively managed assets in the specialty style for ease of interpretation, but testing for differences in Herfindahl indices leads to the same inferences.

tional families. These differences are consistent with direct-sold families choosing to remain focused to better compete for investors in the direct-sold segment.

D. Do the Separate Accounts of Direct-sold Families also Outperform?

Many mutual fund families also manage separate account portfolios on behalf of clients such as defined benefit pension plans and endowments.[23] In this section, we test whether the heterogeneity in mutual fund performance extends to separate account performance. We consider two possibilities. First, if investments in active management are primarily made at the firm level, we would expect separate accounts managed by the mutual fund families that target performance-sensitive do-it-yourself investors to outperform separate accounts managed by other mutual fund families. This is because we would expect that the investments in higher quality portfolio managers, analysts, and traders necessary to compete for direct-sold mutual fund investors spill over to other investment products. Alternatively, if investments in active management are primarily made at the fund level, or if firms run their mutual fund and separate account segments as distinct businesses, then we would not expect to find evidence of performance spillovers (unless firms that serve less performance-sensitive mutual fund investors also serve less performance-sensitive separate account investors).

Our data on separate accounts come from Thomson Financial/Nelson Information's 2002

[23] This is a less-studied segment of the asset management industry because data on separate accounts are less readily available than data on mutual funds and hedge funds. Unlike the mutual fund segment where regulation mandates frequent and regular disclosure of audited performance and fund characteristics, data from the separate account segment is typically voluntarily self-reported and survey-based. The primary users of these datasets tend to be consultants and clients conducting manager searches. Cheng, Liu, and Qian (2006) and Del Guercio and Tkac (2002) discuss the potential biases and justifications for drawing inferences with this type of data. In short, they argue that asset management firms have an incentive to report accurate data to Nelson's, and that Nelson's policies prevent firms from strategically dropping in and out of the database. For a recent performance study on separate accounts see Busse, Goyal, and Wahal (2010).

Directory of Investment Managers, and are described in Cheng, Liu, and Qian (2006).[24] The directory contains self-reported firm-level and portfolio-level data from detailed annual surveys of over 1,800 asset management firms, which collectively manage over $20 trillion in worldwide assets. We analyze the performance of 1,690 separate account portfolios with a domestic equity investment objective, offered by 803 unique asset management firms, and report our results in Table 8. The dependent variable is the average annualized return over the previous three years. We are most interested in testing whether firms that market their funds through the direct-sold channel have higher risk-adjusted separate account performance than those of other firms. Thus, for each separate account we identify whether the asset management firm also offers mutual funds, and if so, whether the family primarily offers direct-sold, broker-sold, or institutional mutual funds. Of the 803 asset management firms, 151 manage both separate accounts and mutual funds; the other 652 specialize in serving institutional clientele with millions of dollars to invest.

Because we lack the high frequency return histories needed to estimate risk-adjusted returns, we follow Cheng, Liu, and Qian (2006) and rely on a set of dummy variables describing portfolio characteristics to control for risk differences. We control for risk by including dummy variables indicating whether the fund's investment style is either aggressive growth, growth, value, or growth & value (omitted category), whether the market capitalization of the portfolio is more or less than that of the S&P 500 Index, whether the P/E ratio is more or less than that of the S&P 500 index, and whether beta risk is more or less than the S&P 500 index. We also include controls for the level of portfolio turnover, the log of portfolio asset size, the fraction of investment research conducted internally (versus relying on sell-side research), and whether managers employ a quantitative portfolio strategy. Finally, we include dummy variables for whether re-

[24] We thank these authors for sharing their data. Their study provides detailed background information on the Nelson's dataset and summary statistics on the sample, which we omit here due to space constraints.

ported returns are net or gross of fees and commissions, and whether performance-based fees are offered to clients. Standard errors are clustered on asset management firm.

In Table 8, we compare the separate accounts managed by direct-sold mutual fund families (the omitted category) to three other sets of separate accounts. In columns (1) and (2), the sample includes all domestic equity separate accounts. In columns (3) and (4), the sample is restricted to separate accounts managed by asset management firms that also offer mutual funds, which is analogous to the comparison of direct-sold, broker-sold, and institutional mutual fund returns in Table 5. In columns (5) and (6), the sample is restricted further to separate accounts managed by direct-sold or broker-sold mutual fund families, which is analogous to the comparison of direct-sold and broker-sold mutual fund returns in BCT.

We find that the separate accounts of direct-sold families outperform the separate accounts managed by other firms. In specifications that include the full set of portfolio controls, the estimated differences are economically significant, ranging from 1.3 to 3.2 percentage points per year. However, the statistical significance of the differences varies. Compared to the separate accounts of firms that do not offer mutual funds, the difference is 1.3 percentage points per year, but not statistically significant at conventional levels (p-value of 0.220). The fact that we find the smallest differences between firms that target direct-sold mutual fund investors and pure separate account managers is consistent with evidence in Del Guercio and Tkac (2002) that separate account investors are relatively sophisticated. The evidence of underperformance is slightly stronger when we focus on the separate accounts of broker-sold families. They underperform by 1.7 to 2.1 percentage points per year, with p-values ranging from 0.074 to 0.151. Interestingly, the strongest evidence of underperformance—both economically and statistically—involves the separate accounts of firms that specialize in institutional mutual funds. Here, the underperfor-

mance ranges from 3.1 to 3.5 percentage points per year (with p-values of 0.016 and 0.007). In their study of institutional mutual funds, James and Karceski (2006) find that bank-sponsored institutional mutual funds, which are targeted at custodial accounts and trusts, underperform other institutional mutual funds. When, in unreported regressions, we split the institutional mutual fund family dummy variable into those that are bank-sponsored and those that are not, we find some evidence that the bank-sponsored institutional mutual fund families drive the underperformance of institutional mutual fund families. More generally, differences in performance between the separate accounts of institutional mutual fund families and pure separate account managers (statistically significant at the 6-percent level) may reflect the fact that institutional mutual fund investors are less sophisticated than separate account investors, generating a weaker incentive for institutional mutual fund managers to invest in active management.

Because we must rely on a series of dummy variables to control for differences in risk, we cannot rule out the possibility that differences in returns reflect differences in risk taking. Nevertheless, our findings are broadly consistent with investments in active management by direct-sold mutual funds benefitting those firm's separate accounts. The simplest explanation for any performance spillover would be that the people hired to manage mutual funds are also responsible for managing separate accounts. When we focus on firms that list both separate account manager names in Nelson's and mutual fund manager names in CRSP, we find that 74.5% of the names appear in both databases.

V. Conclusion

By grouping domestic equity mutual funds into three broad market segments, we are able to shed new light on the relative performance of actively and passively managed funds, and on the continued demand for actively managed funds. Within the full sample, we find the standard

result that actively managed funds underperform index funds. Within the direct-sold segment, however, we find little evidence of underperformance. The lack of economically or statistically significant differences in risk-adjusted, after-fee returns suggests that direct-sold actively managed funds are able to earn back their investments in active management, which is the equilibrium condition in Grossman and Stiglitz's (1980) model of informational efficiency. The lack of significant performance differences helps to rationalize the continued demand for direct-sold actively managed mutual funds.

To rationalize the superior performance of direct-sold actively managed funds, we test for differences in the sensitivity of fund flows to performance. Because we find that fund flows in the direct-sold segment are the most sensitive to risk-adjusted returns, we argue that direct-sold funds have the strongest incentive to invest in active management. To strengthen our case that direct-sold funds are responding to this incentive, we exploit additional measures of active management, data on manager education, data on the extent to which mutual fund families choose to manage assets within a narrow style, and data on the performance of the separate accounts managed by different mutual fund families. Overall, our findings are consistent with direct-sold funds competing most strongly on risk-adjusted returns.

These findings have several interesting implications. First, they suggest that the underperformance of the average actively managed fund reflects the lack of uniform incentives to invest in skilled managers rather than the lack of skilled managers. In other words, estimates based on the full cross-section of mutual funds may lead researchers to overstate both the efficiency of financial markets and the deadweight costs of active management. Second, because direct-sold funds have the strongest incentive to generate risk-adjusted returns, tests for manager skill will be most powerful when they focus on the direct-sold segment.

Finally, we conjecture that incentives play an important role in explaining both the significant underperformance of broker-sold actively managed funds, and the weak demand for broker-sold index funds. There are two potential explanations for the underperformance of broker-sold funds. One explanation is that broker-sold funds have the weakest incentive to invest in active management because their target investors are the least sophisticated. Our flow-performance results are consistent with this explanation, as are the findings in Gil-Bazo and Ruiz-Verdu (2009). Another explanation is that, because broker-sold funds bundle portfolio management with broker services, competition between broker-sold funds focuses on both raw performance and broker services. In other words, our finding that broker-sold actively managed funds significantly underperform broker-sold index funds may reflect the rational substitution of investments in broker networks for investments in skilled managers, analysts, and traders. Unfortunately, because we cannot directly measure investments in broker services, we cannot distinguish between these two (potentially complementary) explanations.

Regardless, given the extent to which broker-sold actively managed funds underperform broker-sold index funds, the optimal product from the perspective of an investor who values broker services would appear to be a broker-sold index fund. How do we reconcile this claim with the fact that the fraction of passively managed assets in the broker-sold segment ranges from 0.3% in 1996 to 2.1% in 2004? In short, brokers have little incentive to recommend index funds. If a broker recommends a low-cost index fund in the direct-sold segment, he receives no compensation. If a broker recommends a broker-sold index fund, there is a chance that the investor will use the recommendation to buy a lower-cost index fund elsewhere, in which case the broker again receives no compensation. Alternatively, if the broker recommends a portfolio of broker-sold index funds, there is a chance that the investor will feel that he is being given generic ad-

vice, and seek out a broker who is more confident in his ability to pick good actively managed funds. For these reasons, we conjecture that demand for financial advice is being transformed into demand for underperforming actively managed funds.

Finally, very recent trends in mutual fund distribution may have important implications for the nature of competition in this industry, and hence for the differences in performance that we find across segments. In particular, payment for advice is increasingly being unbundled and delivered via brokerage wrap accounts and independent Registered Investment Advisers (Pozen and Hamacher (2011)).[25] If payments to brokers for advice increasingly come directly from investors rather than via mutual fund families, the universe of (actively managed) funds that brokers are willing to recommend will likely expand, and competition between funds is likely to increasingly focus on performance.

VI. Appendix.

In Table 4, we find that flows into direct-sold funds respond primarily to risk-adjusted returns whereas flows into broker-sold funds respond primarily to raw returns. In Table A1, we estimate specifications that better match how BCT test for differences in flow-performance sensitivity across the broker-sold and direct-sold segments. When we focus only on raw returns, we cannot reject the hypothesis that the sensitivity of flows to (positive) raw returns is similar across the two segments. In other words, when we exclude measures of risk-adjusted returns, we can replicate BCT's main finding. However, when we extend their specification to include both raw and risk-adjusted returns, we find that flows into direct-sold funds respond to risk-adjusted returns, whereas flows into broker-sold funds do not. It is the differential sensitivity to risk-adjusted returns that generates a differential incentive to invest in active management.

[25] See Pozen and Hamacher (2011) Chapter 10. Also see, Damato, Karen. "Take a Load Off: Do-It-Yourself Investors Get More Fund Choices." *The Wall Street Journal* March 1, 2010, R1 and 2010 Investment Company Factbook, page 76.

REFERENCES

Bailey, Warren, Alok Kumar, and David Ng, 2011, Behavioral Biases and Mutual Fund Investors, *Journal of Financial Economics* 102, 1-27.

Bergstresser, Daniel, John M.R. Chalmers, and Peter Tufano, 2009, Assessing the costs and benefits of brokers in the mutual fund industry, *Review of Financial Studies* 22, 4129-4156.

Busse, Jeffrey A., Amit Goyal, and Sunil Wahal, 2010, Performance and persistence in institutional investment management, *Journal of Finance* 65, 765-790.

Chen, Joseph, Harrison Hong, Ming Huang, and Jeffrey Kubik, 2004, "Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization," *American Economic Review* 94, 1276–1302.

Chen, Xuanjuan, Tong Yao, and Tong Yu, 2007, Prudent man or agency problem? On the performance of insurance mutual funds, *Journal of Financial Intermediation* 16, 175-203.

Cheng, Yingmei, Mark H. Liu, and Jun Qian, 2006, Buy-side analysts, sell-side analysts, and investment decisions of money managers, *Journal of Financial and Quantitative Analysis* 41, *51-83.*

Chevalier, Judith A., and Glenn Ellison, 1999, Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance, *Journal of Finance* 54, 875-899.

Christoffersen, Susan, Richard Evans, and David Musto, 2011, What do consumers' fund flows maximize? Evidence from their brokers' incentives, Working paper, University of Toronto.

Christoffersen, Susan, and Sergei Sarkissian, 2009, City size and fund performance, *Journal of Financial Economics* 92, 252-275.

Ciccotello, Conrad S., James A. Miles, and Lori S. Walsh, 2006, Should investors choose funds from focused families? *Financial Services Review* 15, 247-264.

Cohen, Lauren, Andrea Frazzini, and Christopher Malloy, 2008, The small world of investing: Board connections and mutual fund returns, *Journal of Political Economy* 116, 951-979.

Cremers, Martijn, and Antti Petajisto, 2009, How active is your fund manager? A new measure that predicts performance, *Review of Financial Studies* 22, 3329-3365.

Cremers, Martijn, Antti Petajisto, and Eric Zitzewitz, 2011, Should Benchmarks Indices Have Alpha? Revisiting Performance Evaluation, working paper.

Del Guercio, Diane, and Paula A. Tkac, 2002, The determinants of the flow of funds of managed portfolios: Mutual funds vs. pension funds, *Journal of Financial and Quantitative Analysis* 37, *523-557.*

Del Guercio, Diane, Jonathan Reuter, and Paula A. Tkac, 2010, Demand for financial advice, broker incentives, and mutual funds market segmentation, working paper.

Edelen, Roger, 1999, Investor flows and the assessed performance of open-end mutual funds, *Journal of Financial Economics* 53, 439-466.

Elton, Edwin J., Martin J. Gruber, and Jeffrey Busse, 2004, Are investors rational? Choices among index funds, *Journal of Finance* 59, 261-288.

Elton, Edwin J., Martin J. Gruber, Sanjiv Das, and Matthew Hlavka, 1993, Efficiency with costly information: A reinterpretation of evidence from managed portfolios, *Review of Financial Studies* 6, 1-22.

Evans, Richard, 2010, Mutual fund incubation, *Journal of Finance* 65, 1581-1611.

French, Kenneth R., 2008, The cost of active investing, *Journal of Finance* 63, 1537-1573.

Gallaher, Steven, Ron Kaniel, and Laura Starks, 2007, Madison Avenue meets Wall Street, Working paper, University of Texas at Austin.

Gil-Bazo, Javier, and Pablo Ruiz-Verdu, 2009, The relation between price and performance in the mutual fund industry, *Journal of Finance* 64, 2153-2183.

Glode, Vincent, 2011, Why mutual funds 'underperform', *Journal of Financial Economics* 99, 546-559.

Goyal, Amit, and Sunil Wahal, 2008, The selection and termination of investment management firms by plan sponsors, *Journal of Finance* 63, 1805-1847.

Grossman, Sanford J., and Joseph E. Stiglitz, 1980, On the impossibility of informationally efficient markets, *American Economic Review* 70, 393-408.

Gruber, Martin J., 1996, Another puzzle: The growth in actively managed mutual funds, *Journal of Finance* 51, 783-810.

Hortacsu, Ali, and Chad Syverson, 2004, Product differentiation, search costs, and competition in the mutual fund industry: A case study of S&P 500 index funds, *Quarterly Journal of Economics* 119, 403-456.

Ippolito, Richard, 1989, Efficiency with Costly Information: A Study of Mutual Fund Performance, *Quarterly Journal of Economics* 104, 1-23.

James, Christopher and Jason Karceski, 2006, Investor monitoring and mutual fund performance, *Journal of Banking and Finance* 30, 2787-2808.

Kacperczyk, Marcin, Clemens Sialm, and Lu Zheng, 2008. Unobserved actions of mutual funds, *Review of Financial Studies* 21, 2379-2416.

Keswani, Aneel, and David Stolin, 2009, Mutual fund distribution channels and investor reaction to past performance, Working paper, Toulouse Business School.

Li, Haitao, Xiaoyan Zhang, and Rui Zhao, 2011, Investing in talents: Manager characteristics and hedge fund performances, *Journal of Financial and Quantitative Analysis* 46, 59-82.

Malkiel, Burton, 1995, Returns from investing in equity mutual funds, *Journal of Finance* 64, 549-572.

Massa, Massimo, 2003, How do family strategies affect fund performance? When performance-maximization is not the only game in town, *Journal of Financial Economics* 67, 249-305.

Massa, Massimo, Jonathan Reuter, and Eric Zitzewitz, 2010, When should firms share credit with employees? Evidence from anonymously managed mutual funds, *Journal of Financial Economics* 95, 400-424.

Pastor, Lubos, and Robert Stambaugh, 2010, On the size of the active management industry, NBER working paper.

Pozen, Robert, and Theresa Hamacher, 2011, The fund industry: how your money is managed, John Wiley & Sons, Hoboken, New Jersey.

Reuter, Jonathan, and Eric Zitzewitz, 2006, Do ads influence editors? Advertising and bias in the financial media, *Quarterly Journal of Economics* 119, 197-227.

Savov, Alexi, 2009, Free for a fee: The hidden cost of index fund investing, Working paper, University of Chicago.

Siggelkow, Nicolaj, 2003, Why focus? A study of intra-industry focus effects, *Journal of Industrial Economics* 51, 121-150.

Zweig, Jason, Will ‘12b-1’ fees ever stop bugging investors? *The Wall Street Journal,* December 19, 2009, B1.

Table 1. Distribution of Domestic Equity Mutual Fund Assets across Market Segments (1992 and 2004)

The table below uses distribution channel data at the share class level from Financial Research Corporation (FRC) and data on TNA from the CRSP Survivor-bias-free Mutual Funds database in 1992 and 2004. The first three columns report aggregate total net assets (TNA) in domestic equity mutual fund share classes from three major fund market segments: direct-sold, broker-sold, and institutional, with each segment divided into actively-managed funds and index funds. We exclude funds in CRSP that cannot be classified as direct-sold, broker-sold, or institutional, which collectively represent 9.9% of assets invested in domestic equity funds. We define domestic equity funds as those with a Standard and Poor's investment objective of aggressive growth (AGG), mid-cap growth (GMC), growth and income (GRI), growth (GRO), or small-cap growth (SCG). Market share within Segment is the percentage of aggregate TNA within the segment (direct-sold, broker-sold, or institutional) that is actively-managed versus passively-managed, and should be read across the row. Market share across segments is the percentage of aggregate actively-managed TNA across each segment (direct-sold, broker-sold, or institutional) or the percentage of aggregate passively-managed TNA in each segment, or the percentage of aggregate toTotal TNA in each segment, and should be read down the column. For each fund family, we define a family's primary segment as the segment with the largest percentage of family assets distributed through that segment. Number of Families is the number of families in the CRSP database that have at least one domestic equity mutual fund that are in that row's primary segment. For example, in 1992, 95 families have the direct-sold channel as their primary segment because this is segment through which they distribute the most TNA. Average % TNA in Primary Segment is the average across families of the % of family TNA that is distributed through the family's primary distribution segment.

	Aggregate TNA in Domestic Equity Mutual Funds			Market Share within Segment			Market Share Across Segments			Number of Families	Average % TNA in Primary Segment
	Active	Passive	Total	Active	Passive	Total	Active	Passive	Total		
1992											
Direct-sold	$134.1	$8.4	$142.5	94.1%	5.9%	100%	46.7%	64.7%	47.4%	95	97.9%
Broker-sold	$132.5	$0.4	$132.9	99.7%	0.3%	100%	46.1%	3.1%	44.3%	129	99.7%
Institutional	$9.6	$3.9	$13.5	71.1%	28.9%	100%	3.4%	30.2%	4.5%	25	99.1%
Total	$276.2	$12.7	$288.9	95.6%	4.4%	100%	100%	100%	100%	365	
2004											
Direct-sold	$916.8	$189.6	$1,106.3	82.9%	17.1%	100%	48.8%	65.8%	51.0%	193	96.1%
Broker-sold	$694.8	$14.6	$709.4	97.9%	2.1%	100%	36.9%	5.1%	32.7%	153	92.1%
Institutional	$151.6	$75.0	$226.6	66.9%	33.1%	100%	8.1%	26.1%	10.4%	76	83.9%
Total	$1,763.1	$279.2	$2,042.3	86.3%	13.7%	100%	100%	100%	100%	453	

Table 2. Fund-level Summary Statistics for Domestic Equity Mutual Funds (1992-2004)

This table provides the mean and standard deviation of fund-level variables from CRSP. The unit of observation is domestic equity mutual fund i in month t. The sample begins in January 1992 and ends in December 2004, and is restricted to those funds that distribute at least 75 percent of their assets throught either the direct-sold, broker-sold, or institutional market segment.

	Num funds Per Year	Fund size ($Millions)		Expense ratio (%)		12b-1 fee (%)		Turnover (%)		After-fee Monthly Return (%)	
	Mean	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Actively Managed Funds											
Direct-sold	421.9	1346.1	4897.1	1.30	0.75	0.09	0.17	142.7%	528.3%	0.92	6.00
Broker-sold	581.2	802.5	3194.7	1.59	1.33	0.40	0.27	90.8%	81.7%	0.80	5.55
Institutional	238.2	334.8	526.8	1.00	0.45	0.09	0.16	85.6%	68.1%	0.88	5.54
Index Funds											
Direct-sold	26.3	3637.8	12211.6	0.44	0.36	0.02	0.07	25.0%	57.6%	0.78	5.02
Broker-sold	16.5	353.0	514.7	0.86	0.45	0.31	0.29	24.4%	31.3%	0.64	4.82
Institutional	26.2	1543.0	4628.8	0.37	0.17	0.07	0.15	24.7%	36.8%	0.80	4.61

Table 3. Monthly Fund 4-Factor Alphas of Actively Managed and Index Funds Across Market Segments (1993-2004)

The table below reports coefficients from panel regressions of fund *i*'s monthly 4-factor alpha on fund and family characteristics in a sample of domestic equity funds operating between January 1993 and December 2004 for which we possess distribution channel data from FRC. Fund *i*'s four-factor alpha is estimated from net returns over the prior 24 months. The Index fund dummy variable equals one if fund *i* is passively managed, and the Active dummy variables equal one if fund *i* is actively managed. The Direct-sold dummy variable equals one if 75 percent or more of fund *i*'s TNA is distributed through the direct-sold channel. The Broker-sold dummy variable equals one if 75 percent or more of fund *i*'s TNA is distributed through the Broker-sold channel. The Institutional dummy variable equals one if 75 percent or more of fund *i*'s TNA is distributed through institutional channel. Column (1) contains all funds, while columns (2), (3), and (4) are restricted to funds in the direct-sold, broker-sold, and institutional segments respectively. Columns (5), (6), and (7) include funds from all segments. All regressions include CRSP Standard and Poor's investment category-by-month fixed effects. Column (7) also includes the following fund-level control variables: lagged expense ratio, lagged no-load fund dummy, lagged 12b-1 fee, lagged log of fund TNA, lagged log of family TNA, current turnover, current fund age measured in years, net flows into fund *i* between month *t-12* and *t-1*, and the standard deviation of net flows over this same period. Standard errors are clustered on both month and familyand are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable:	4-Factor Alpha (t)						
Sample:	All segments	Direct-sold	Broker-sold	Institutional	All segments		
Index fund dummy (t)	0.073**						
	(0.037)						
Active fund dummy (t)	*Omitted category*						
Direct-sold dummy (t) * Index fund (t)		0.018			0.082***	0.037	0.023
		(0.035)			(0.037)	(0.042)	(0.043)
Direct-sold dummy (t) * Active fund (t)		*Omitted category*			0.060**	0.083***	0.106***
					(0.026)	(0.026)	(0.028)
Broker-sold dummy (t) * Index fund (t)			0.093**		0.062*	0.053	0.020
			(0.039)		(0.036)	(0.037)	(0.042)
Broker-sold dummy (t)) * Active fund (t)			*Omitted category*		-0.029	0.017	0.026
					(0.027)	(0.027)	(0.022)
Institutional dummy (t)) * Index fund (t)				0.055	0.082*	0.033	0.027
				(0.049)	(0.044)	(0.050)	(0.050)
Institutional dummy (t)) * Active fund (t)				*Omitted category*	*Omitted category*	*Omitted category*	*Omitted category*

Expense ratio (t-12)						-0.087**	-0.103**
						(0.034)	(0.040)
No-load dummy (t-12)							-0.007
							(0.026)
12b-1 fee (t-12)							0.043
							(0.074)
Ln Fund TNA (t-1)							-0.026***
							(0.010)
Ln Family TNA (t-1)							0.009
							(0.007)
Turnover (t-12)							0.000*
							(0.000)
Fund age (t)							-0.001*
							(0.001)
Net flow (t-12, t-1)							0.001**
							(0.001)
Standard deviation net flow (t-12, t-1)							-0.005
							(0.009)
Investment objective*Month fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample size	143,662	49,340	67,153	27,169	143,662	143,662	143,662
R^2	0.1221	0.0952	0.1434	0.2268	0.1223	0.1230	0.1237

Table 4. Monthly Flow-Performance Sensitivity Across Market Segments, Actively Managed funds (1993-2004)

These panels report coefficients from panel regressions where the dependent variable is monthly net percentage fund flow, using the standard definition of flow, the growth in TNA less capital appreciation. The unit of observation is actively managed domestic equity fund *i* in month *t*. All regressions include the following fund-level control variables, the coefficients of which are not reported: lagged expense ratio, lagged no-load fund dummy, lagged 12b-1 fee, lagged log of fund TNA, lagged log of family TNA, and current fund age measured in years. The regression in column (1) contains investment objective-by-month fixed effects. The regressions in columns (2) through (4) include distribution market segment-by-investment objective-by-month fixed effects. Panel B adds dummy variables that indicate whether fund *i*'s net return in month *t-1* was in either the top or bottom 20% of funds within the same Standard and Poor's investment objective (but across segments), but otherwise is the same specification as Panel A. Observations where the absolute value of net flow is greater than 100% are deleted (less than 1% of the sample fit this definition.) Standard errors are clustered on both fund family and month and are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

Panel A. Base specification

	(1)	(2)	(3)	(4)
Dependent variable:	Net flow (t)		Net flow (t)	
Sample:	All segments	Direct-sold	Broker-sold	Institutional
Net flow (t-1)	0.195***	0.187***	0.223***	0.160***
	(0.027)	(0.049)	(0.027)	(0.019)
Net return (t-1)	0.078**	0.038	0.135***	0.069**
	(0.032)	(0.045)	(0.023)	(0.034)
4-factor Alpha (t-1)	0.101***	0.175***	0.021	0.053
	(0.030)	(0.049)	(0.020)	(0.038)
H_0: Coefficient on lagged net flows is equal to Direct-sold segment			0.514	0.601
H_0: Coefficient on lagged net return is equal to Direct-sold segment			0.029**	0.550
H_0: Coefficient on 4-factor alpha is equal to Direct-sold segment			0.001***	0.032***
Include fund-level controls?	Yes		Yes	
Include fund-level controls by segment?	No		Yes	
Include Investment-objective-by-month fixed effects?	Yes		Yes	
Include Investment-objective-by-month-by segment fixed effects?	No		Yes	
Sample size	141,401		141,401	
R^2	0.0667		0.0822	

Panel B. Specification that allows for non-linearities

	(1)	(2)	(3)	(4)
Dependent variable:	Net flow (t)		Net flow (t)	
Sample:	All segments	Direct-sold	Broker-sold	Institutional
Net flow (t-1)	0.195***	0.186***	0.223***	0.160***
	(0.027)	(0.049)	(0.027)	(0.019)
Net return (t-1)	0.024	-0.039	0.101***	0.046
	(0.039)	(0.052)	(0.030)	(0.039)
Net return (t-1) in Top 20%	0.519***	0.910***	0.278***	0.120
	(0.120)	(0.212)	(0.102)	(0.141)
Net return (t-1) in Bottom 20%	-0.323***	-0.542***	-0.182**	-0.190
	(0.089)	(0.146)	(0.089)	(0.130)
4-factor Alpha (t-1)	0.087***	0.153***	0.015	0.047
	(0.027)	(0.043)	(0.020)	(0.037)
H_0: Coefficient on lagged net flows is equal to Direct-sold segment			0.502	0.618
H_0: Coefficient on lagged net return is equal to Direct-sold segment			0.008***	0.141
H_0: Coefficient on Top 20% Dummy is equal to Direct-sold segment			0.005***	0.001***
H_0: Coefficient on Bottom 20% dummy is equal to Direct-sold segment			0.025**	0.067*
H_0: Coefficient on 4-factor alpha is equal to Direct-sold segment			0.001***	0.039**
Include fund-level controls?	Yes		Yes	
Include fund-level controls by segment?	No		Yes	
Include Investment-objective-by-month fixed effects?	Yes		Yes	
Include Investment-objective-by-month-by segment fixed effects?	No		Yes	
Sample size	141,401		141,401	
R^2	0.0674		0.0832	

Table 5. Monthly Fund Performance of Actively Managed Funds Across Market Segments (1993-2004)

The table below reports coefficients from panel regressions of fund *i*'s monthly performance on fund and family characteristics. The sample is restricted to non-specialty actively managed domestic equity funds operating between January 1993 and December 2004 for which we possess fund-level distribution channel data from FRC. The performance measure in column (1) is fund *i*'s four-factor alpha estimated from net returns over the prior 24 months, while in column (2) it is fund i's return gap measure (i.e., the difference between fund i's gross returns and the gross returns predicted based on its lagged holdings, as calculated in Kacperczyk, Sialm, and Zheng (2008)). The dependent variable in column (3) identifies those funds with above-median values of active share and tracking error as calculated in Cremers and Petajisto (2009), where we allow the median value to vary across investment objective-year pairs. The fact that data on active share and tracking error are only available in those months that mutual funds disclose their holdings explains the smaller number of observations in column (3). In column (4), we measure a fund's 1-factor beta as the beta on the market portfolio in the one-factor model. All regressions include investment objective-by-month fixed effects and the following fund-level control variables: lagged expense ratio, lagged no-load fund dummy, lagged 12b-1 fee, lagged log of fund TNA, lagged log of family TNA, current turnover, current fund age measured in years, net flows into fund *i* between month *t-12* and *t-1*, and the standard deviation of net flows over this same period. The distribution segment dummy variables are equal to one if 75 percent or more of fund *i*'s TNA is distributed through that segment. Panel B restricts the sample to actively managed small-cap growth funds, but is otherwise identical to Panel A. Standard errors are clustered on both fund family and month, and are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels..

Panel A. All Actively Managed Domestic Equity funds

	(1)	(2)	(3)	(4)
Dependent variable:	4-Factor Alpha	Return Gap	Above-Median Values of Active Share & Tracking Error?	1-Factor Beta
Direct-sold fund dummy (t)	0.107***	0.032	0.136***	-0.024
	(0.028)	(0.023)	(0.033)	(0.022)
Broker-sold fund dummy (t)	0.027	-0.038	0.056*	0.016
	(0.023)	(0.023)	(0.030)	(0.018)
Institutional fund dummy (t)	*Omitted category*	*Omitted category*	*Omitted category*	*Omitted category*
Investment Objective-by-Month fixed effects?	Yes	Yes	Yes	Yes
Fund-level control variables?	Yes	Yes	Yes	Yes
Sample size	136,884	109,030	25,579	136,884
R^2	0.1225	0.0234	0.1335	0.1070
Difference between direct-sold and broker-sold	0.080***	0.070***	0.080***	-0.040*
P-value from H_0: Direct-sold = broker-sold	0.0052	0.0080	0.0075	0.0711

Panel B. Sample Restricted to Actively Managed Small-cap Growth Funds

:	(1)	(2)	(3)	(4)
Dependent variable:	4-Factor Alpha	Return Gap	Above-Median Values of Active Share & Tracking Error?	4-Factor Beta
Direct-sold fund dummy (t)	0.079 (0.049)	0.021 (0.048)	0.193*** (0.041)	-0.089** (0.039)
Broker-sold fund dummy (t)	-0.082 (0.055)	-0.103* (0.059)	0.087* (0.048)	0.017 (0.038)
Institutional fund dummy (t)	*Omitted category*	*Omitted category*	*Omitted category*	*Omitted category*
Investment Objective-by-Month fixed effects?	Yes	Yes	Yes	Yes
Fund-level control variables?	Yes	Yes	Yes	Yes
Sample size	28,633	23,623	5,645	28,633
R^2	0.1915	0.0184	0.1782	0.1317
Difference between direct-sold and broker-sold	0.161***	0.124***	0.106***	-0.106***
P-value from H_0: Direct-sold = broker-sold	0.0015	0.0060	0.0329	0.0087

Table 6. Mutual Fund Manager Educational Backgrounds Across Market Segments (2002)

This table uses Morningstar data on the educational backgrounds of actively managed domestic equity fund managers in 2002. For each of the 939 managers directly employed by a mutual fund family, we observe the name of the undergraduate college or university whether the manager later earned an MBA, or some other advanced degree (PhD, JD, MD). We obtain (recent) admissions rates for 243 of the 276 different undergraduate institutions from U.S. Department of Education's National Center for Education Statistics College Navigator website. We obtain the interquartile range of (recent) student math SAT scores for 251 undergraduate institutions. We classify schools as being in the top (bottom) quartile of math SAT scores when the midpoint of the interquartile range is above 650 (below 560). Each column is a separate regression and the omitted variable is a dummy variable indicating that at least 75% of the TNA of the fund is distributed through the institutional segment. The dependent variable in column (1) and (2) is the fraction of a fund's portfolio managers who attended one of the 25 most selective U.S. undergraduate institutions (based on admission rates). In columns (3) through (6) it is the fraction of the fund's managers that attended undergraduate institutions within the top and bottom quartiles of the math SAT score distribution. In Columns (7) and (8), it is the fraction of a fund's managers that obtained an MBA. In columns (9) and (10) it is the fraction of the fund's managers that report having an advanced degree other than an MBA (PhD, JD, M.A., M.S.). We cluster standard errors on mutual fund family, and report them in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable:	% Managers from Top 25 US School		% Managers from US School with Math SAT scores in Top Quartile		% Managers from US School with Math SAT scores in Bottom Quartile		% Managers that report having an MBA		% Managers that report having other advanced degree	
Direct-sold fund	0.103*	0.088*	0.101	0.073	-0.011	0.003	0.029	0.020	0.002	-0.001
	(0.053)	(0.052)	(0.074)	(0.067)	(0.032)	(0.032)	(0.055)	(0.056)	(0.038)	(0.038)
Broker-sold fund	0.064	0.053	0.010	-0.009	0.044	0.054*	0.107**	0.101*	-0.064	-0.066*
	(0.044)	(0.046)	(0.064)	(0.064)	(0.028)	(0.028)	(0.053)	(0.054)	(0.036)	(0.036)
Ln Family TNA in Actively-managed funds		0.024***		0.040***		-0.021***		0.015***		0.004
		(0.006)		(0.010)		(0.006)		(0.008)		(0.006)
Constant	0.193***	0.012	0.508***	0.208**	0.098***	0.260***	0.526***	0.409***	0.165***	0.132***
	(0.044)	(0.064)	(0.057)	(0.092)	(0.022)	(0.052)	(0.047)	(0.075)	(0.032)	(0.053)
Sample size	829	829	801	801	801	801	829	829	829	829
R^2	0.0067	0.0261	0.0098	0.0518	0.0084	0.0394	0.0098	0.0166	0.0115	0.0126
Difference between Direct-sold and Broker-sold	0.039	0.035	0.091*	0.082*	-0.056**	-0.051**	-0.078*	-0.081**	0.066**	0.066**
P-value from H_0:Direct-sold = Broker-sold	0.3144	0.3306	0.0718	0.0712	0.0434	0.0567	0.0640	0.0494	0.0125	0.0137

Table 7. Fund Family Specialization by Morningstar Investment Style Across Market Segments (1996-2002)

This table contains regressions of measures of family specialization by Morningstar investment style on market segment dummies and on family TNA in actively-managed funds. In columns (1) through (3) the dependent variable is the maximum fraction of family assets in a single Morningstar style. To compute this we aggregate the TNA of each actively-managed domestic equity fund of a family for each of the nine Morningstar styles (small-cap growth, large-cap value, etc.) to compute the fraction of assets in each style. In columns (4) through (6) the dependent variable is the number of different styles offered by the family, which ranges from one to nine. The omitted category is a dummy variable equal to one if the family's primary market segment is institutional. Columns (1), (2), (4), and (5) use only data f rom 2002 to match samples in Tables 6 and 8. Columns (3) and (6) use data from 1996 to 2002, which is the period for which we possess data on Morningstar style categories. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Maximum fraction of assets in single Morningstar style			Number of Morningstar styles offered by the mutual fund family (ranges from 1-9)		
Sample period:	2002	2002	1996-2002	2002	2002	1996-2002
Direct -sold family dummy (t)	0.147***	0.104***	0.092***	-1.033***	-0.516**	-0.359**
	(0.033)	(0.028)	(0.021)	(0.284)	(0.212)	(0.158)
Broker-sold family dummy (t)	0.013	0.010	0.032	0.263	0.298	0.066
	(0.036)	(0.029)	(0.021)	(0.322)	(0.222)	(0.154)
Ln Family TNA in Active funds (t-1)		-0.050***	-0.050***		0.603***	0.565***
		(0.004)	(0.003)		(0.039)	(0.032)
Constant	0.697***	0.994***	1.028***	3.237***	-0.324	-0.694***
	(0.029)	(0.031)	(0.024)	(0.244)	(0.267)	(0.217)
Year fixed effects?	No	No	Yes	No	No	Yes
Sample size	371	371	2591	371	371	2591
R^2	0.0816	0.3363	0.3150	0.0759	0.5240	0.5056
Difference direct-sold and broker-sold?	0.134***	0.094***	0.060***	-1.296***	-0.815***	-0.425***
P-value from Ho: direct-sold = broker-sold	0.0000	0.0001	0.0004	0.0000	0.0000	0.0010

Table 8. Separate Account Performance Across Market Segments, 1999-2001

The table below reports coefficients from cross-sectional regressions of separate account *i*'s three-year annualized average return from 1999 to 2001 on portfolio characteristics. The sample is restricted to non-specialty domestic equity separate accounts from the Thomson Financial/Nelson Information's 2002 *Directory of Investment Managers*. The Direct-sold family dummy variable equals one if the separate account firm also sells mutual funds and the firm distributes more of their mutual fund assets through the direct channel relative to all other channels. The Broker-sold family dummy variable equals one if the separate account firm also sells mutual funds and the firm distributes more of their mutual fund assets through the broker-sold channel relative to all other channels. The Institutional family dummy variable equals one if the separate account firm also sells mutual funds and the firm distributes more of their mutual fund assets through the institutional channel relative to all other channels. The Pure Separate Account Manager dummy is equal to one if the firm does not offer mutual funds. The first three control variables are dummy variables equal to one if the investment style of the separate account portfolio is either aggressive growth, growth, or value. The omitted category is Growth & Value. Market cap less than S&P500 is equal to one if the weighted average of the market capitalization of the individual stocks in the portfolio is lower than the weighted average market capitalization of the S&P500 Index. Market cap close to the S&P500 is the omitted category. P/E less than the S&P500 is equal to one if the weighted average of the P/E ratio of the individual stocks in the portfolio is lower than the P/E ratio of the S&P500 Index. P/E close to the S&P500 is the omitted category. Risk less than S&P500 is equal to one if the weighted average of the betas of the individual stocks in the portfolio is lower than that of the S&P500 Index. Risk close to the S&P500 is the omitted category. Turnover under 50% is equal to one if the turnover rate of the separate account portfolio is below 50% annually. The omitted category is turnover between 50 and 100%. Ln fund size is the natural log of the asssets under management in the separate account. Fraction of research done internally is a firm-level variable ranging from 0 to 100% and indicates the tendency of the firm to rely on buy-side research instead of sell-side research. Quantitative strategy equals one if the portfolio is managed using a quantitative methods. Performance fee equals one if performance-based fee structures are offered for clients to choose. Performance net of fee equals one if the reported returns are net of fees and commissions. Standard errors are clustered on asset management firm and reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Three-year annualized average return (t)					
Sample:	Separate Accounts with Domestic Equity Investment Objective		Separate Accounts Managed by Mutual Fund Families		Separate Accounts Managed by Mutual Fund Families in Direct-sold or Broker-sold	
Direct-sold family dummy (t)	*Omitted category*	*Omitted category*	*Omitted category*	*Omitted category*	*Omitted category*	*Omitted category*
Broker-sold family dummy (t)	-1.782	-1.728	-1.905*	-1.822	-1.921*	-2.104*
	(1.104)	(1.201)	(1.115)	(1.170)	(1.126)	(1.164)
Institutional family dummy (t)	-3.266***	-3.063**	-3.534**	-3.166**		
	(1.266)	(1.007)	(1.286)	(1.226)		
Pure Separate Account Manager dummy (t)	-1.540	-1.264				
	(0.944)	(1.029)				

Aggressive Growth	4.402***	2.550	4.240**	6.373***	3.657*	7.790***
	(1.519)	(1.572)	(1.827)	(2.422)	(1.926)	(2.783)
Growth	-0.524	-1.123	1.365	1.253	1.295	2.842
	(0.597)	(0.841)	(1.213)	(1.846)	(1.478)	(2.273)
Value	5.029***	2.660***	6.103***	2.888	6.336***	2.571
	(0.547)	(0.718)	(0.895)	(1.748)	(1.058)	(2.167)
Market cap less than S&P 500		5.009***		6.583***		7.063***
		(0.509)		(0.920)		(1.021)
Market cap more than S&P 500		-1.298*		1.648		1.962
		(0.716)		(1.533)		(1.892)
P/E less than S&P 500		1.171		2.164		2.536
		(0.715)		(1.644)		(2.160)
P/E more than S&P 500		-1.001		-0.607		-2.138
		(0.713)		(1.405)		(1.896)
Risk less than S&P 500		0.465		1.175		0.508
		(0.647)		(1.445)		(1.478)
Risk more than S&P 500		1.851***		0.367		-0.842
		(0.679)		(1.085)		(1.217)
Turnover under 50%		-0.385		-1.244		-0.624
		(0.558)		(1.070)		(1.116)
Turnover over 100%		0.103		-2.705*		-3.453**
		(0.783)		(1.282)		(1.559)
Ln fund size		-0.168		-0.355		-0.052
		(0.135)		(0.247)		(0.273)
Fraction of research done internally		2.119		0.456		1.902
		(1.296)		(2.801)		(3.540)
Quantitative strategy		-4.378***		-3.307***		-2.406
		(0.891)		(1.532)		(1.776)
Performance fee		0.008		0.219		-0.169
		(0.515)		(0.927)		(1.096)

Performance reported net of fee		-0.413		-0.580		0.024
		(0.576)		(0.956)		(1.225)
Constant	5.766***	4.227**	4.835***	4.355	4.825***	0.778
	(0.914)	(1.822)	(0.876)	(3.286)	(0.917)	(3.905)
Sample size	1,690	1,300	514	403	378	306
R^2	0.0920	0.2582	0.1112	0.2993	0.1108	0.3255

Appendix Table A1. Monthly flow-performance sensitivity using specification in Bergstresser, Chalmers, and Tufano (2009)

This table reports panel regressions where the dependent variable is monthly net percentage fund flow, using the standard definition of flow, the growth in TNA less capital appreciation. The unit of observation is actively managed fund i in month t. All regressions include the following fund-level control variables interacted with market segment fixed effects, the coefficients of which are not reported: lagged expense ratio, lagged no-load fund dummy, lagged 12b-1 fee, lagged log of fund TNA, lagged log of family TNA, and current fund age measured in years. All regressions also include market segment-by-investment objective-by-month fixed effects. The specification is intended to match Table 6 of BCT, except that we use monthly flow instead of annual flow, and we exclude index funds. Standard errors are clustered on both fund family and month and are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels.

	(1)		(2)		(3)		(4)	
Dependent variable:	Net flow (t)		Net flow (t)		Net flow (t)		Net flow (t)	
Sample:	Direct-sold	Broker-sold	Direct-sold	Broker-sold	Direct-sold	Broker-sold	Direct-sold	Broker-sold
Net flow (t-1)	0.187***	0.222***	0.186***	0.222***	0.187***	0.222***	0.186***	0.222***
	(0.048)	(0.026)	(0.048)	(0.026)	(0.048)	(0.026)	(0.048)	(0.026)
Net return (t-1)	0.111***	0.146***	0.025	0.132***	0.040	0.136***	0.027	0.120***
	(0.037)	(0.018)	(0.037)	(0.023)	(0.045)	(0.023)	(0.036)	(0.025)
Net return (t-1) * Net return (t-1) > 0?			0.133***	0.035			0.124**	-0.029
			(0.053)	(0.053)			(0.054)	(0.061)
4-factor Alpha (t-1)					0.174***	0.021	0.170***	0.029
					(0.048)	(0.020)	(0.056)	(0.025)
4-factor Alpha (t-1) * 4-factor Alpha (t-1) > 0?							0.002	-0.016
							(0.058)	(0.039)
H_0: Coefficients on lagged net return equal across segments?		0.331		0.065*		0.030**		0.012**
H_0: Coefficients on positive lagged net return equal across segments?				0.750				0.231
H_0: Coefficients on 4-factor alpha equal across segments?						0.001***		0.015**
H_0: Coefficients on positive 4-factor alpha equal across segments?								0.004***
Sample size		120,070		120,070		120,070		120,070
R^2		0.0842		0.0846		0.0857		0.0860