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Abstract: Morningstar, Inc., has been hailed in both academic and practitioner circles as having the most influential rating system in the mutual fund industry. We investigate Morningstar's influence by estimating the value of a star in terms of the asset flow it generates for the typical fund. We use event-study methods on a sample of 3,388 domestic equity mutual funds from November 1996 to October 1999 to isolate the "Morningstar effect" from other influences on fund flow.

We separately study initial rating events, whereby a fund is rated for the first time on its 36-month anniversary, and rating change events. An initial five-star rating results in average six-month abnormal flow of $26 million, or 53 percent above normal expected flow. Following rating changes, we find economically and statistically significant abnormal flow in the expected direction, positive for rating upgrades and negative for rating downgrades. Furthermore, we observe an immediate flow response, suggesting that some investors vigilantly monitor this information and view the rating change as "new" information on fund quality. Overall, our results indicate that Morningstar ratings have unique power to affect asset flow.

JEL classification: G11, G14, G20

Key words: mutual funds, asset flow, event-study

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Star Power: The Effect of Morningstar Ratings on Mutual Fund Flows

"[T]he brand that has emerged as dominant in the 1990s is not Fidelity, Putnam or even Merrill Lynch—but instead is Morningstar."

- R. Pozen, The Mutual Fund Business, 1998, p. 75

I. Introduction

A casual reading of the business press and mutual fund advertisements gives the impression that Morningstar, Inc., the Chicago-based rating agency, is highly influential with investors. As support for this claim, most publications cite the statistic that equity mutual funds rated with four or five stars by Morningstar have received 80%–100% of all net inflows.[1] Several recent academic studies motivate their analysis with the argument that Morningstar is the "most popular" and "best-known" ranking service among investors.[2] However, we currently have little empirical evidence that investors actually use Morningstar ratings in their decision-making. The literature relating fund flow to performance presents some cross-sectional evidence on this question, but inferring a causal relation between flow and star ratings is problematic because of the existence of other contemporaneous influences.[3] This paper employs a more powerful time-series event study of rating changes to better isolate a causal relation, if one exists, between Morningstar ratings and fund flow. From this we uncover insights into how investors use fund quality information that are not possible using a cross-sectional analysis.

The stated goal of several studies in the flow-performance literature is to better understand how mutual fund investors make purchase and redemption decisions. The typical approach is to relate flow and performance via cross-sectional analysis (often over multiple years), and infer that the performance measures significantly related to fund flow are the ones

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[1] Some version of this statistic, attributed to a study by Financial Research Corporation has appeared in *The Wall Street Journal* ("Morningstar edges toward one-year ratings" 4/5/96, p C1), *Business Week* ("One good turnaround deserves…" 8/25/97 p. 154), *The Economist* ("A Survey of Fund Management" 10/25/97 p. 22), Sharpe (1998), Morey (2000), and Blake and Morey (2000).

[2] Blume (1998), Sharpe (1998), and Morey (2000) scrutinize Morningstar's rating algorithm, while Blake and Morey (2000) test the predictive power of star ratings.

that investors use to allocate money among mutual funds. A common result in this literature is that several performance measures are simultaneously significantly related to flow. For example, Sirri and Tufano (1998) report that mutual fund flow is significantly related to both raw return and one-factor alpha in multivariate specifications. Gruber (1996) reports a similar result, finding both raw returns and four-factor alphas to be significant. These authors acknowledge, however, that the correlation among performance measures makes it difficult to decipher how investors actually use this information.

We argue that a time-series approach provides new insights into investor decision-making, because one can observe and isolate investor response to a change in the "quality" of the fund. A Morningstar star rating represents a very specific and observable packaging of information on fund quality that arrives monthly. The discrete nature of Morningstar's one- to five-star ranking system, and the wide-availability of the rating at low cost to investors, implies that a rating change is an unambiguous and easily observable quality signal to fund investors. These inherent features of a star rating make them particularly well suited to the application of event study methods.

As traditionally designed, an event study is a powerful method to disentangle the influence of the star rating itself from other factors that influence fund flow. Benchmarking each fund's flow against its expected flow isolates the influence of the star rating change, from the underlying return performance that led to it. In addition, the aggregation of many funds in event rather than calendar time averages out any idiosyncratic influences on fund flow. Thus, measuring the flow response to a change in Morningstar rating provides a more precise picture of how investors respond to new information on fund quality, including how quickly they respond.

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[3] For example, Del Guercio and Tkac (2001) and Bergstresser and Poterba (2001) find that Morningstar star ratings have independent power to explain fund flows once they are added to a cross-sectional regression.

In contrast, investor response to other fund quality measures studied in the flow-performance literature, such as Jensen's alpha, is much more difficult to assess because of complicating measurement issues. For example, one could test whether a change in Jensen's alpha is followed by a flow response, but that represents the joint hypothesis of whether investors respond to changes in alpha, and whether we have observed the same quality signal as investors. Because alpha is a continuous variable, it is not at all obvious what magnitude of change in alpha is large enough to offset decision and transactions costs and therefore induce investors to reallocate assets. Furthermore, it is not obvious how often investors seek updated information on alpha, and therefore whether we should expect changes at weekly, monthly, or some other frequency to generate a flow response. For these reasons, event study methods are less appropriate for these more traditional performance measures, as we do not have a well-defined "event" to study.

In a sense, using published star ratings eliminates the joint hypothesis problem because we observe the same quality signal that investors see. Thus, testing for a flow response amounts to testing whether investors use star ratings, without having to make assumptions about how they use them. This method also allows us to address broader questions such as: At what frequency is a flow response to new fund information detectable? Do investors respond symmetrically to positive and negative information on fund quality?

We use monthly data on 3,388 domestic equity mutual funds over the period November 1996 to October 1999, and identify over 12,000 rating change events. We test for evidence of abnormal flow around changes in Morningstar ratings as well as rating initiations, when Morningstar rates a fund for the first time upon reaching its three-year anniversary of inception. Our results indicate that receiving an initial Morningstar rating is a significant event in the life of

some funds. The initiation of a 5-star rating results in average abnormal flow of $26 million, or 53% above normal expected flow for these funds, over the six months following the initial rating. We find that the strong positive flow response is unique to funds earning an initial 5-star rating. The fact that 1- to 4-star initiations do not generate a positive flow response suggests that Morningstar ratings do not have "marquee" value in and of themselves.

Our analysis of rating changes indicates that investors value the packaging of fund quality information that a star rating provides, and view the rating change as "new" information. Specifically, we find significant positive responses to rating upgrades, and negative responses to rating downgrades, typically ranging from 15-35% of normal flow. Consistent with the results for initiations, an upgrade from 4- to 5-stars has the largest effect on flow in the 6 months following the upgrade, resulting in $44 million in abnormal flow, or 35% above normal expected flow. In contrast, a downgrade from 5- to 4-stars has a much smaller impact of only -$8 million in abnormal flow, suggesting that the flow response to a downgrade from 5-star status is not symmetric to an upgrade to 5-stars.

Most of the observed flow responses are significant beginning in event month 0, indicating that investor response is detectable at the same monthly frequency that Morningstar releases new information. This is a new finding regarding the timeliness of investor response, as most previous studies relating flow and performance use annual cross-sections of funds. Overall, our results contribute to a better overall understanding of how mutual fund investors use information in their financial decision-making.

Our findings also have implications for studies of portfolio manager incentives and behavior, such as Brown, Harlow and Starks (1996) and Chevalier and Ellison (1997). Because management fees are typically a percentage of assets under management, attracting assets is of

primary concern. Managers therefore have an incentive to focus their efforts on delivering the dimension of performance that results in increased flow, whether it is high returns, high alphas, or 5-star ratings. Viewed in this context, the marginal impact of an additional star on fund flow provides a measure of their potential influence on managerial behavior. Insights from our detailed time-series analysis of monthly flow response set the stage for more specific tests to identify managerial behaviors, such as the risk-shifting incentive studied in the literature.

II. Data

A. Background on Morningstar's Star Rating

Morningstar first offered its star ratings in 1986 by subscription to its print product *Morningstar Mutual Funds* and currently offers them free on its website. Morningstar covers virtually all funds in existence and calculates star ratings for all funds that are at least three years old. Star ratings are recomputed monthly and available on Morningstar's website approximately three business days after month-end. Below we briefly describe the rating process, but interested readers should see Blume (1998) and Sharpe (1997, 1998) for a thorough description of Morningstar's rating algorithm.

A fund's Morningstar star rating is based on its historical performance with respect to both return and risk relative to its peer group. Specifically, Morningstar uses 36 months of load-adjusted returns to compute a three-year risk-adjusted rating for each fund. For each of four mutually exclusive peer groups (domestic equity, international equity, taxable bond, and municipal bond), it then ranks funds according to this three-year risk-adjusted rating. A three-year star rating is assigned for each peer group based on this ranking. Specifically, funds with risk-adjusted ratings in the top 10% of their peer group are assigned five stars, the next 22.5%

receive four stars, the next 35% receive three stars, the next 22.5% receive two stars, while the bottom 10% of funds in each peer group receive one star. Morningstar computes a five-year and ten-year star rating in the same way, with the only difference being the number of months of load-adjusted returns used in the calculations. The overall star rating is computed as a weighted average of these ratings.[4] For funds too young to have a five- and ten-year rating, its overall rating is equal to its three-year rating. This rule apparently applies to the majority of funds, as Sharpe (1997) reports that overall star ratings coincide with three-year star ratings for 72.2% of domestic equity funds at the end of 1996. In this study we analyze the overall star rating because this appears to be the most widely used and cited among publications geared to investors.[5]

B. Description of our Sample

We obtain a spreadsheet containing fund names and a monthly time-series of Morningstar overall star ratings from November 1996 to October 1999 directly from Morningstar, Inc. These data include star rating histories of all funds in Morningstar's domestic equity star rating category as of October 1999. In other words, to be included in this database the fund must exist and have a star rating as of October 1999. Because of the high rate of liquidation and mergers in the fund industry over this sample period, survivorship bias is a legitimate concern. Therefore, through the use of monthly editions of Morningstar's CD-ROM *Principia* product, we fill in star ratings for all of the funds that disappeared over this period, totaling 4,040 fund-months. To match the rest of the sample, we only include dead funds if they were old enough to have a star rating by October 1999. We supplement fund ratings with data on returns, total net assets, and

[4] For example, for a fund at least 10 years old, its overall star rating equals 0.2 times its three-year rating, plus 0.3 times its five-year rating, plus 0.5 times its ten-year rating.

[5] In support of this, we collected information on all mutual fund advertisements that appeared during the month of June 1999 in either *Barron's*, *Money Magazine*, or the Money & Investing section of the *Wall Street Journal*. Of 43

other fund characteristics from the *1999 Survivor-bias Free Mutual Fund Database* from the Center for Research in Security Prices (CRSP). We perform numerous checks to ensure that the data from the two sources are properly linked.[6] Finally, we delete all fund-months that coincide with a fund merger since the fund flow numbers are likely to be distorted. Our final dataset contains 111,715 fund-months from 3,388 distinct funds.[7]

Since our goal is to measure the response of mutual fund investors to a change in a fund's Morningstar rating, it is important that the ratings we study reflect information available to investors at that time. Morningstar's master data file contains historical star ratings for each fund that reflect the rating algorithm currently in place, rather than the one in place at that time. Consequently, our analysis begins in November 1996 because Morningstar rewrote their master file when they changed their algorithm in October to exclude international funds from the domestic equity rating category peer group.

We confirm that the ratings data we use match those available to investors by comparing our star ratings to those on the original CD-ROM at two points in time, July 1997 and October 1999. Only 2.3% of the funds with a star rating for July 1997 in our data could not be found on the original CD-ROM, indicating that backfilling is not a concern. We also find that only 103, or 4.5% of the funds, have different star ratings listed in the two sources in July 1997. In October 1999, we find no discrepancies in star ratings between the two sources.

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ads that advertised a Morningstar rating, 43, or 100% of them included the overall rating. Of these 43, 37 were for domestic equity funds.

[6] We are grateful to Morningstar for providing a spreadsheet with fund name and a monthly time-series of total net assets. These data were invaluable in properly linking the two data sources. There are 173 funds on the spreadsheet from Morningstar that we could not identify as existing on the CRSP database. An additional 4,406 fund-months dropped out because CRSP lacked data on an important variable for our analysis (e.g., total net assets).

[7] We consider a share class (e.g., class A) of a fund to be a unique fund for two reasons. First, Morningstar treats each share class independently for the purpose of assigning a star rating. In fact, we commonly observe that a star rating differs between classes of the same underlying fund. Second, since our main interest is in flow measurement, it is not obvious that flows of different classes are closely related. For this reason, we are not double-counting observations as would happen in a study of fund performance.

C. Timing and Measurement of Fund Flows and Summary Statistics

We analyze monthly net dollar flows in or out of a fund, using the standard definition in the literature of the change in total net assets minus appreciation:

$$Flow_{it} = TNA_{it} - TNA_{it-1}(1 + R_{it}).$$

This definition of fund flow assumes that flow occurs at the end of the month. Updated star ratings reflect the most recent month's performance and are available to investors at the beginning of the following month. Thus, if a star change occurs using return data through October 1998, we record November 1998 as the month of the star change and designate the flow in November as the first possible flow that could be due to the change.

Panel A of Table I provides summary statistics on monthly flow aggregated over the entire sample period for each Morningstar star rating group. The flow is measured and summed across all funds in the same rating group. Consistent with widely-cited statistics on the popularity of four- and five-star funds, these funds attract large dollar flows totaling $349 billion, while funds with three-stars or less experience net outflow of $133 billion. Thus, four- and five-star funds collectively attract 124.4% of all flow to domestic equity funds. Notice that unrated funds in our sample also receive positive flow. In fact, unrated funds collectively receive more flow than funds rated with three stars or less.

Figure 1 tells a similar story when the data are analyzed on a disaggregated basis. Figure 1 plots the mean monthly dollar flow over the sample period in each of five star rating categories. The typical fund with one, two, or three stars experiences $2 million in outflow, while the typical four- and five-star fund receives inflows of $6 million and $33 million. The highly convex relation between fund flow and Morningstar rating is consistent with the well-documented non-linear relation between flow and past performance in studies such as Sirri and

Tufano (1998). The resemblance of this figure to others in the literature illustrates the importance of identifying a methodology that can disentangle the Morningstar effect from other influences on fund flow.

III. Empirical Approach and Methodology

This section describes the details of how we apply event study methods to the context of mutual fund flows, and provides summary statistics on the informational events we study.

A. Frequency of Star Rating Change Events

Panels B and C of Table 1 provide sample summary statistics on the frequency of star rating change events. Panel B reports the frequency count of funds receiving an initial star rating upon their third anniversary as a fund, which is a special case of a change in star rating. We identify 1,637 initial star rating events, with a breakdown by initial star rating that closely follows that of 10%, 22.5%, 35%, 22.5%, 10% expected under Morningstar's algorithm.

Panel C reports the frequency of star rating changes in our sample. We observe 10,735 rating changes, which represent close to 10% (10,735/111,715) of total fund-months. The vast majority of these changes are upgrades or downgrades of one star. We do not analyze changes greater than one star, which represent less than 1% of all rating changes.

B. Event study method for calculating abnormal flow

An event-study allows us to isolate the incremental flow due to the rating change as separate from "normal" flow to that fund. To compute expected, or normal, flow we estimate the following benchmark regression for each fund i:

$$F_t^i = a^i + b_1^i SF_t^i + b_2^i RET_{t-1}^i + b_3^i F_{t-1}^i + e_t^i$$

where F_t^i is the net dollar flow to fund *i* at month *t* and SF_t^i is the aggregate net flow to all funds in the same style category as fund *i* at month *t*, RET_{t-1}^i is fund *i*'s return at *t-1*, and F_{t-1}^i is the net flow to fund *i* at *t-1*. We use nineteen Morningstar-defined style categories to identify each fund's style and to compute aggregate style flows. The appendix contains details of our procedure for constructing these style flow benchmarks. We define the first month an investor would have information available about a new Morningstar rating as event time 0. To estimate the coefficients for the benchmark flow regressions we use 12 months of data, ending 3 months before time 0 (i.e., event month -14 to -3).[8]

Using the analogy to a market model for stock returns, appropriate regressors for the benchmark model are those expected to both affect all funds and vary over time. For example, the aggregate net flow to a particular style category (SF_t) is a common factor for all funds in that category, and flows to various styles differ substantially over time. We estimate the sensitivity of each fund to the popularity of its style (b_1^i) to account for this component of a fund's flow around the event of a rating change.

We also include fund-specific measures of lagged returns and lagged flow because they have been found to influence flow in the cross-section (Gruber (1996), Chevalier and Ellison (1997), Del Guercio and Tkac (2001)). Benchmark diagnostics indicate a statistical relation among a fund's own raw return performance, its flow, and its flow in the subsequent month. Thus, we include these fund-specific measures rather than construct a cross-sectional factor, such as the flow "premium" experienced by funds with superior prior performance. Although cross-sectional studies also find a relation between flow and fund size, relative fund size (versus other

[8] We find that analyzing a longer estimation period, (-36, -3), indicates that benchmark coefficients are not stable over this horizon, especially for the initiation events. We find the most recent previous twelve-month period to result

funds) does not vary much over time suggesting it has limited applicability as a cross-sectional factor.

Our measure of abnormal flow around a change in Morningstar star rating is therefore:

$$AF_t^i = F_t^i - \hat{a}^i - \hat{b}_1^i SF_t^i - \hat{b}_2^i RET_t^i - \hat{b}_3^i F_{t-1}^i.$$

In words, the abnormal flow to fund *i* at time *t* equals the actual flow at time *t* minus the expected flow due to aggregate style flow, its lagged return, and lagged flow, minus the average abnormal flow to fund *i* ($\hat{a}^i$). This average abnormal flow captures fund-specific determinants of flow that do not vary over time. Note that the sign of abnormal flow does not have the same interpretation as net flow. For example, a negative abnormal flow does not necessarily imply that the fund is experiencing outflows. Rather, it implies that the fund is receiving less flow than expected. Expected, or normal, flow may also be either positive or negative. For example, a fund might simultaneously have high positive normal flow because its style is very popular this month or it has a strong performance track record, and negative abnormal flow because of a recent rating downgrade.

Panel D of Table I contains estimation period diagnostics that suggest our benchmark model is reliable. Events appear to be reasonably spread out over the sample period indicating that calendar time clustering is not a concern. The overall fit of the benchmark regressions justifies the inclusion of fund-specific lagged return and lagged flow in addition to the aggregate style flow factor. Including these three regressors results in a median R^2 across events of 0.34, with 25% of these events exhibiting an R^2 of over 0.54. By comparison, the median R^2 is only 0.09 when we include only the aggregate style flow factor.

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in the most well-behaved abnormal flows during the estimation period (i.e., average abnormal flows in the months prior to the event not significantly different from zero).

Panel D also contains cross-sectional correlations, pooled over all funds and over all months in the estimation period, of residual flow with benchmark regressors, as well as of predicted (normal) flow with benchmark regressors. As expected from a well-specified benchmark, the cross-sectional correlation between the estimation residuals and the regressors are not significantly different from zero. The negligible positive correlation between the residuals and fund size further justifies excluding size as a regressor, and suggests that heteroskedasticity of the residuals is unlikely to be a problem. In contrast, there is a strong positive correlation between predicted flows and fund size implying that large funds have higher normal flow.[9] Together, these diagnostics indicate that the model does a reasonable job accounting for flow that may be related to size, possibly captured by the benchmark's fund-specific intercept term. Overall, we are reasonably confident that the benchmark specification accurately accounts for the determinants of flow established by the previous cross-sectional literature.

In our main tests we apply the event study methods described in Dodd and Warner (1983) to the context of fund flows. Specifically, we focus on standardized abnormal flows, where event period abnormal flows are standardized by the estimated forecast variance of the normal flow. We also compute cumulative standardized abnormal flows by summing the standardized abnormal flows for each fund from event time 0 to t, and then dividing by the square root of the number of months used in the cumulation. Following standard practice, at each event date t we compute average standardized abnormal flows ($ASTAF_t$) and average cumulative standardized abnormal flows ($ACSTAF_t$) by averaging across N events (funds). An advantage of analyzing standardized abnormal flows is that it prevents funds with large forecast variances (noisy flows)

[9] While the correlation between fund size and normal flow appears small for rating changes relative to the sample of rating initiations, it is much more similar in magnitude to that for initiations in the higher rating groups (e.g., 4- and

from dominating the statistical tests. Under this method of calculating ASTAF, funds with more precisely measured abnormal flows are implicitly weighted more heavily.

We compute $ASTAF_t$ and $ACSTAF_t$ over the event window month 0 to +6. While it seems reasonable to test for abnormal flows up to six months after a rating change, the length of the event window is somewhat arbitrary.[10] Unlike an event study of returns where market efficiency implies an immediate stock price reaction to new information, it is not obvious how quickly to expect to see the impact of a rating change on fund flows. An immediate flow reaction to a star change is presumably due to vigilant investors who monitor funds on a monthly basis. Perhaps these investors view star rating changes as a low-cost information update on their fund's recent performance. A delayed flow response is also plausible either because more casual investors take time to respond to the new rating, or because the majority of these investors primarily respond to fund advertisements touting the new rating, which take time to place in publications.[11]

By grouping funds according to their pre-change star rating, we can calculate the flow response due to a change from three to four stars, from four to five stars, etc. and assess these measures for statistical significance. We use the standardized cross-sectional test of Boehmer, Musumeci, and Poulsen (1991) to assess the statistical significance of event period $ASTAF_t$ and $ACSTAF_t$. Specifically, we divide $ASTAF_t$ and $ACSTAF_t$ by its contemporaneous cross-sectional standard error. Thus, the cross-section of events used to compute the mean of the standardized abnormal flows is also used to compute the standard error, assuming that

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5-star funds).

[10] Given that Morningstar releases ratings within a few business days of month end, event month 6 is technically more than six months after a rating change (i.e., six months plus a fractional month). Nonetheless, we refer to this throughout the paper as six months after a rating change for simplicity.

[11] To investigate this we sampled all mutual fund ads featuring domestic equity funds appearing in *Money*, *Barron's* and the *Wall Street Journal* during the month of June 1999. We find that of the 37 domestic equity fund ads that

standardized abnormal flows are independently and identically distributed. Because this measure uses event-period abnormal flows to calculate the standard errors, it adjusts for any change in the variance of the standardized abnormal flow from the estimation period to the event-window. This is the most appropriate statistic to use when testing out of sample event-window abnormal flows. Since we do see larger event-window cross-sectional variances, if anything this statistic will bias against finding a significant Morningstar effect. For example, if funds differ widely in their response to a change from 5- to 4-stars, this will result in a large cross-sectional standard error and lower t-statistic, making it more difficult to reject the null hypothesis of no abnormal flow response.

We also report statistics on the percentage of funds that experience positive standardized abnormal flows for each event date. Specifically, we report the results of a chi-square test under the null hypothesis that 50% of sample funds have positive standardized abnormal flow. This nonparametric test statistic complements the parametric tests by providing information on the distribution of standardized abnormal flow.

IV. Results

The primary goal for the first part of our analysis is isolating the Morningstar effect from other influences on fund flow. As a result, we first focus on the *standardized* abnormal flow measures and test statistics described in the previous section, which we find to have the most well-behaved statistical properties for testing the null hypothesis of zero abnormal flow response. The focus on standardized measures, however, does not lend itself to straightforward interpretations of abnormal flow in magnitudes like millions of dollars. To avoid any confusion

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report a star rating, only 10% use the most recent rating (as of May 1999) while 32% use a one-month old rating and 54% use a two-month old rating.

across standardized and non-standardized measures of abnormal flow, we address the economic significance of the Morningstar effect in separate sub-sections.

We report results based on the full sample of funds experiencing a rating change, including those that undergo a subsequent change within the six-month event window. Thus, estimates of average abnormal flow represent the unconditional Morningstar effect, equivalent to the ex-ante expected value of a Morningstar rating change. This is the most appropriate sample to study because investors cannot know in advance whether a rating will change again. We also analyze screened samples of funds that do not experience any further rating changes in the subsequent six months as a robustness check. The results and inferences are qualitatively the same and so are not reported here. We do, however, report the results of some analysis on a screened sample in section C.

A. Abnormal Flow Response to Initial Morningstar Star Ratings

We begin our analysis by measuring the impact on flow of a fund being rated by Morningstar for the very first time. This event is perhaps the most straightforward to study because all funds share the common status of being an unrated, three-year old fund. Table II, panel A reports the average standardized abnormal flow (ASTAF) for each event month from 0 to 6, in five initial Morningstar star rating subsamples. To minimize the possibility that extreme observations drive the results, we delete the top and bottom 1% of standardized abnormal flows at each event date in each rating subsample throughout our analysis.

It is clear from panel A that a 5-star initiation is an unambiguously positive event for funds. The ASTAF are significantly positive in each of the six months following a 5-star initiation. The results of c^2 tests under the null that the percentage of positive standardized

abnormal flows equals 50% are also consistent with this interpretation. The percentage positive exceeds 50% for most event dates for 5-star funds, significantly so in event months 1 (67%) and 6 (60%). In contrast, the ASTAF and the percentage positive are only significant in one or two months out of the event window for the other initiation subsamples, and it is often the case that the inference is different across the parametric and non-parametric (c^2) tests for the same event date. We find only weak evidence that a 2-star initiation is a negative event and a 4-star initiation is a positive event.

Table II, panel B presents the average cumulative standardized abnormal flow (ACSTAF) for event month 0 to 6. Overall, the results are consistent with our inferences based on Panel A. The results are strongly significant for all event months, and the parametric and non-parametric tests are completely consistent, only for 5-star initiations. The cumulative response appears to be more strongly negative for 2-star initiations than the month-by-month response revealed in Panel A. This panel also shows a 4-star initiation to be a positive event for the average fund in this category; ACSTAF are significant at conventional levels in each event month, consistent with funds receiving a modest boost in flow upon receiving an initial 4-star rating.

A.1. Is the Initial Star Effect Driven by an Initial Jensen's Alpha Effect?

Rating initiations are unique in that they represent an opportunity to study the simultaneous release of two completely new pieces of fund quality information to investors. Morningstar provides an initial one-factor Jensen's alpha and an initial star rating simultaneously at the time of a fund's 36-month anniversary. An obvious question is whether the flow response documented in Table II is due to the Morningstar star rating or the new alpha information. To put alpha on equal footing with Morningstar's star rating in terms of its discreteness, we examine

various groupings of funds based on ranking by Jensen's alpha. In a sense, we create a simulated initial alpha rating.

Table III contains the test results comparing the ability of the initial alpha rating to explain variation in abnormal flow against the ability of the initial Morningstar star rating. Specifically, Table III reports the results of a two-way analysis of variance of six-month cumulative standardized abnormal flows following a fund's 36-month anniversary. We examine three alternative definitions of alpha groups: equal-sized quartiles, equal-sized quintiles, and "Morningstar-type" quintiles where the top 10% of alphas are in quintile 5, the next 22.5% in quintile 4, the next 35% in quintile 3, the next 22.5% in quintile 2, and the bottom 10% in quintile 1. Each alpha grouping represents a different method that investors might use to translate alpha onto a coarser grid of fund quality.

The Type II sum of squares tests indicate that conditional on the power of Morningstar star rating, none of the alpha categorizations has the power to explain cross-sectional variation in abnormal flows. Under each of the three definitions, we cannot reject the null hypothesis that average abnormal flows are equivalent across alpha groups. Thus, at least among these three plausible uses, an initial alpha does not appear to influence investor behavior.

At the same time, Morningstar star rating remains significant conditional on any of the alpha categorizations. When funds are in "Morningstar-type" alpha quintiles, we can reject the null hypothesis that Morningstar star rating does not matter (i.e., that average abnormal flows are the same across all star ratings) at the 1% confidence level. Therefore, the results of Table II appear to be robust and not driven by the simultaneous release of alpha information. We investigate this further, including consideration of continuous measures of initial alpha, in section C.

A.2. Assessment of the Economic Significance of the Morningstar Effect of Rating Initiations

Having established the statistical significance of the Morningstar effect on fund flows, we now examine the issue of economic significance. For example, one question of interest is how many millions of dollars an initial 5-star rating is worth to the average fund. To answer such questions, we analyze non-standardized abnormal dollar flow, rather than the standardized version used in the statistical tests. Non-standardized abnormal flow has the additional advantage of being in the same units as normal flow, which aids in drawing comparisons.

Figure 2 graphs the average normal and average abnormal flows cumulated over the 6 months following an initial star rating in each of the five star categories. This figure highlights the success of our benchmark methodology in capturing the higher normal flow typical in funds with strong performance track records. The convex relation, whereby 5-star funds have much higher normal flow than the other categories, parallels that found for total flows in the cross-sectional fund flow literature. This pattern of normal flow provides additional evidence that our technique isolates the incremental flow due to the star rating, over and above the flow due to a fund's performance history.

The pattern of abnormal flows shown in Figure 2 largely mirror the standardized abnormal flow results of Table II, but now we can interpret our findings in units of millions of dollars. The strong 5-star initiation response results in $25.7 million in abnormal flow over the following 6 months, which represents an impressive 53% increase above normal expected flow. The only difference from the Table II results is that average abnormal flow following an initial 4-star rating is negative in Figure 2, while its standardized version is positive in Table II. This is most likely due to negative abnormal flows in imprecisely measured funds that pull the raw, non-

standardized average abnormal flow below zero. This supports our earlier inference that only a five-star initiation is an unambiguously positive event.

Although it is much less obvious in the figure, an initial Morningstar rating appears to have a dramatic effect on 2-star funds as well. In contrast to the sizable normal flow typical of 5-star funds, funds with initial 2-star ratings have much more modest average normal flow of $4.5 million. However, the negative average abnormal flow following a 2-star initiation of -$5.9 million completely outweighs the average normal flow for these funds, resulting in outflows overall.

A.3. Investor Behavior Consistent with Abnormal Flow upon Initiations

Our main results so far indicate that an initial Morningstar rating is a significant event in the life of many funds. It appears that a fund must receive a 5-star rating before it will attract additional investor assets above its normal flow as an unrated fund. This result is reminiscent of the disproportionate flows accruing to "winning" funds documented by Sirri and Tufano (1998) and others. The key difference here is that it is not the performance per se that drives the additional flow, but the packaging of this performance in the form of an easily interpretable star rating.

There is some evidence that a 2-star rating results in significantly less flow and, more weakly, that a 4-star rating brings additional assets. For 1- and 3-star funds, however, a rating initiation is almost certainly a non-event. These results are consistent with investors who view fund allocation as a tournament in which only 5-star funds are the winners. This view is supported by the existence of financial advisor "select lists" that often screen out unrated funds and funds with less than a 5-star rating. Another influence might arise from corporate officials responsible for choosing the menu of funds available to their 401(k) participants. Trustees might

favor 5-star funds out of a desire to fulfill their fiduciary responsibility by offering only the best available funds, or by a need to have the validation and certification that a top Morningstar rating offers. Finally, funds are probably more likely to advertise if they have a 5-star rating to tout, which should further boost the flow of this elite group.[12] For example, Jain and Wu (2000) find that mutual funds advertised in *Barron's* or *Money* magazine have significantly higher flows than a control sample after controlling for fund performance. A combination of these factors might explain why an initial 5-star rating is uniquely capable of opening up a wider market of potential investors.

It is worth mentioning that being rated by Morningstar does not per se, produce abnormal flow as a fund moves from unrated to rated status. Thus, our results are inconsistent with the hypothesis that investors perceive rated funds to be superior, possibly because they have reached the three-year milestone and receive some certification by Morningstar. The results in Table II confirm the insight suggested by the summary statistics in Table I that non-rated funds generate more flow on average than 1-, 2- and 3-star funds. Overall, the initiation results imply that Morningstar ratings overall do not have "marquee" value in and of themselves, but that a 5-star rating does.

B. Abnormal Flow Response to Star Rating Changes

Initiations are merely a special case of the more frequent occurrence of a change in Morningstar rating. This section presents results using the same methodology for over 10,000 monthly star rating changes during the 1996 to 1999 period. In contrast to rating initiations that occur only once in the life of a fund, this sample is more representative of the Morningstar effect

[12] We find that of the 33 distinct funds that advertised a Morningstar rating in *Barron's*, *Money Magazine*, or the Money & Investing section of the *Wall Street Journal* in June 1999, 18 or 55% had a 5-star rating, 45% had a 4-star

across the entire universe of domestic equity funds. Using the full population of rating changes also allows us to more readily relate our findings based on the time-series to those of the cross-sectional literature.

As in our tests of initial ratings, a zero abnormal flow response in the six-months following a change in star rating is the null hypothesis. Table IV contains the results of the tests of this hypothesis. Specifically, panels A and B contain the ASTAF analysis for all rating upgrades and downgrades, while panels C and D contain the average cumulative standardized abnormal flow (ACSTAF) results. Abnormal flow in this context can be interpreted as a fund's actual flow relative to that expected if it had maintained its original star rating. Most event months show significant ASTAF and ACSTAF in the expected direction, namely positive for rating upgrades and negative for rating downgrades. In addition, c^2 tests generally confirm the inferences from the parametric tests, and suggest that rating changes are significant events.

There are two exceptions to the general result that upgrades are followed by positive abnormal flow and downgrades are followed by negative abnormal flow. Upgrades from 1- to 2-stars have only weak evidence of a positive flow response. This might not be surprising because these funds still remain near the bottom of the performance distribution. More surprising is the result that downgrades from 5- to 4-stars are associated with positive ASTAF and ACSTAF, instead of the expected negative. However, while the average response is positive, the c^2 test suggests that the median response is not different from zero. As we discuss in section C, this mixed response might be driven by reversals by some of these downgraded funds back up to 5-stars.

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rating. No funds advertised less than a 4-star rating.

Comparing the Table IV results for rating changes with those of Table II for initiations confirms that attainment of 5-star status stands out as an overwhelmingly positive event for funds. All test statistics are highly significant in every month in both panels and the magnitude of the response is over twice that for any other rating change category. An interesting contrast to the results for initiations, however, is the evidence here that ratings other than 5-stars matter. A decrease from 3- to 2-stars, and especially from 4- to 3-stars, implies significantly less flow for the average fund in these groups. We also find that upgrades from 2- to 3-stars, and 3- to 4-stars have positive value in generating abnormal flow.

B.1. Assessment of the Economic Significance of the Morningstar Effect of Rating Changes

Figure 3 graphs the non-standardized average normal and average abnormal flows cumulated through the 6 months following a change in star rating in each of the eight rating upgrade and downgrade categories. Much like the pattern of normal flows for initiations in Figure 2, better performing funds have higher normal flows across the downgrade and upgrade categories. Specifically, Figure 3 shows that 1- and 2-star funds experience outflows on average while the best performing funds experience large inflows. The figure also suggests that the benchmark reliably captures the flow resulting from the performance that led to an upgrade or downgrade. For example, comparing funds that both upgraded and downgraded from a previous rating of 4-stars, suggests that the average normal flow can be quite different for funds at the same pre-change rating ($-6 versus $124 million).

Similar to the result for rating initiations, achieving 5-star status is a meaningful event for a fund. We find that an upgrade from 4- to 5-stars results in $44 million in abnormal flow, or 35% above normal expected flow, over the 6 months following the upgrade. A downgrade from

5- to 4-stars, on the other hand, results in a loss of only $8 million in abnormal flow. Comparing these estimates to that of representative cross-sectional results summarized in Figure 1, highlights the value-added of partitioning flow into normal and abnormal components.

For example, using the average monthly flow estimates from Figure 1 for 4-star funds versus 5-star funds implies that there is a $26 million ($32-$6) difference in average monthly flow.[13] This cross-sectional relation therefore predicts that an upgrade from 4- to 5-stars would result in an average of $182 million of additional flow over the seven months following this rating change ($26 million per month*7 months). The analogous prediction for a downgrade from 5- to 4-stars is a $182 million decrease in flow on average. Our findings suggest that the prediction based on a cross-sectional analysis grossly overestimates the average response to a rating change, and most certainly overestimates an isolated Morningstar effect. Furthermore, while predictions based on a cross-section always imply a symmetric flow response to upgrades and downgrades, we find an asymmetric flow response to an upgrade and downgrade from 4- to 5-stars.

Figure 3 shows that the abnormal dollar flows following rating changes are relatively small in magnitude. However, the abnormal flow is economically significant when measured as a percentage of normal flow, ranging from 15-34%. Moreover, in the case of a downgrade from 4- to 3-stars, the magnitude of abnormal flow (-$14.9 million) exceeds the normal flow expected for these funds (-$6 million). Overall, we conclude that monthly Morningstar rating changes are, on average, significant economic events for domestic equity mutual funds. We also contend that

[13] While Figure 1 is a univariate illustration of the cross-sectional relation between flow and Morningstar rating, it closely mirrors a more sophisticated multivariate analysis. For example, we ran various cross-sectional regressions of monthly dollar flow on return quintile dummies, lagged flow, fund size, Morningstar dummies, and assorted interaction terms on our full sample of funds. The difference between the coefficients on the 4- and 5-star dummies ranges from $22 to $28 million in various specifications, which is very close to the $26 million from the univariate analysis. Thus, in discussing the marginal impact of Morningstar star ratings we use the more straightforward, but representative univariate calculations.

an event study is better suited to isolating the flow due to the change in star rating than a multivariate cross-sectional specification.

B.2. Investor Behavior Consistent with Abnormal Flow upon Star Rating Changes

The findings from our monthly time-series analysis on rating changes provide some new insights about how mutual fund investors make investment decisions. We find economically and statistically significant positive responses to rating upgrades, and negative responses to rating downgrades. Moreover, most of these flow responses are significant beginning in event month 0, indicating that investor response is detectable at the same monthly frequency that Morningstar releases new information. This is consistent with anecdotal evidence from an official at Morningstar that traffic on their website spikes on the days surrounding the release of new ratings.

These results imply that some investors vigilantly monitor rating information and, given that our method accounts for other influences on fund flow, view the rating change as "new" information on fund quality. This is somewhat surprising given that the rating change reflects just one additional rolling month of fund performance and that a great deal of information is already available to investors on these more seasoned funds.

Another insight from our analysis is the asymmetry in the response to an upgrade to 5-star status compared to a fall from this position. While a 5-star rating is extremely valuable in generating abnormal flow, the results indicate that a downgrade to 4-stars is at worst a mildly negative event. We conjecture that the same forces behind the strong 5-star initiation effect discussed earlier, namely advertising and 401k recommended lists, might be operating here as well. Perhaps upgrades to 5-stars are marketed aggressively while the information on

downgrades to 4-stars only reach investors who actively monitor ratings on their own. Similarly, perhaps funds are added to 401k plan options and recommended lists upon reaching 5-star status, but are only removed from these lists if performance lags either more dramatically or permanently. Alternatively, a tax lock-in effect might contribute to the asymmetric response if investors are reluctant to liquidate downgraded funds in order to avoid realizing taxable gains, which might be potentially large in former 5-star funds.[14]

Finally, we note some differences between the results on rating changes and those for initiations. While we did not find a flow response for 1-, 3- and 4-star rating initiations, we do find one for upgrades and downgrades into these categories, suggesting that investors view the information content of these two events differently. Perhaps the significant response to rating changes reflects an investor perception concerning performance persistence. For example, a flow response to downgrades is consistent with a pool of investors who believe that this information signals continued deterioration in future performance. Whatever the reason behind the flow response, investors appear to value the packaging of information that a star rating provides.

C. Cross-sectional Regressions of the Determinants of Cumulative Standardized Abnormal Flow

In this section, we test whether the Morningstar effect we identify in Tables II and IV is driven by other factors, such as fund performance in the event window, or fund-specific characteristics such as age. If we succeeded in isolating the Morningstar effect, we should find that star ratings explain variation in six-month cumulative standardized abnormal flows ($CSTAF_6$) after controlling for event-period performance and other fund characteristics.

[14] A recent paper that addresses the tax lock-in effect is Bergstresser and Poterba (2000).

Table V Panel A contains the results of a multivariate regression of $CSTAF_6$ on initial star rating dummies, four additional performance measures, and fund-specific variables. We estimate the regression separately for the full sample of all rating initiations with the necessary data (n=1101), and for a screened sample where we delete all funds that undergo a rating change during the six-month event window (n=564). The screened sample allows for a check of the robustness of the results to the deletion of potentially confounding events.

The first performance measure, initial Jensen's alpha measured as a continuous variable, represents fund quality information that is released simultaneously with the initial star rating. Its t-statistic thus represents a test in the spirit of the simulated alpha-events in Section IV.A.1. The other three performance measures represent new information during the event window: the change in alpha, the change in star rating, and the compounded return, all from time 0 to 5. Event-window performance could potentially confound the observed cumulative abnormal flow effect if, say, 5-star funds continue to improve in performance over the six-month period and the benchmark is not predicting the entire flow response to this performance.

We investigate several fund characteristics that may influence investor choices. First, we include a no-load dummy, the expense ratio, and the 12b-1 expense ratio. Funds with higher 12b-1 fees are presumably marketed more aggressively and so may experience higher flows. We include a year-end dummy equal to one if the rating change or initiation event occurred in December or January to check for a seasonal effect around the turn of the year when, anecdotally, most investors evaluate their investments. We include fund size and age because they have been found to explain flows in the cross-sectional literature. We include age only for rating change events because funds are all the same age upon rating initiations. Finally, we include a proxy variable for the amount of competition a fund faces, the number of funds in the

same Morningstar style and star-rating category. This measure should only be important if investors use star ratings in their decision-making. For example, if investors choosing among potential funds first decide on a style category and star rating, and then choose a fund from this group, this variable would have a negative and significant coefficient.

In both the full and screened samples we see the strong 5-star effect documented earlier. The statistically significant coefficients indicate that funds with initial 5-star ratings have significantly higher flow than other initial rating categories. Jensen's alpha is not significant in either sample, providing more evidence that the abnormal flow is indeed due to the Morningstar rating. In the full sample we find that future star rating changes are significantly positively related to abnormal flows. This is expected given our finding that rating upgrades are associated with positive abnormal flow and rating downgrades with negative. The contemporaneous performance measure, the change in alpha over the event window, is not significant once we remove funds that change star rating during the event window.

Contemporaneous raw return, however, is significantly related to abnormal flows. Because our procedure takes event-period returns explicitly into account in computing abnormal flows, this may be evidence that the benchmark relation between flow and performance is not stable from the estimation- to event-period. One interpretation of this stylized fact is that an initial star rating is truly an event in the life of a fund, perhaps marking a fundamental change for the fund.

Turning to the fund characteristics, none of the coefficients are significantly different from zero in both samples except for the number of competitors with the same star rating and style category. This variable has a negative coefficient, implying that a greater availability of

close-substitute funds implies lower abnormal flow. Overall, we conclude that the 5-star initiation effect is robust to the inclusion of other performance measures and characteristics.

Table V Panel B reports the analogous results for rating changes. The only difference from the earlier specification is that we exclude the alpha at the time of the rating change because it is not a new piece of information.[15] Consistent with our earlier analysis, coefficients on dummy variables for rating upgrades and downgrades are almost all significantly different from zero in the expected direction.

The full sample results indicate that the puzzling positive abnormal flows following a downgrade from 5 to 4 stars appears here as well. In the screened sample, however, the coefficient on the 5- to 4-star downgrade dummy is negative but insignificant. This suggests that the positive abnormal flows in Table IV are driven by funds that downgrade to 4-stars, but then quickly return to 5-star status within the event window. The insignificance of the negative abnormal flow suggests that investors do not view a downgrade from 5 to 4 stars as a reason to either stop investing in a fund or to pull money out of a fund. One interpretation is that four-star funds are still considered "good" funds, consistent with them being in the top third of all funds.

Similar to the initiations analysis, contemporaneous raw return has some explanatory power but alpha changes do not. The number of competitor funds is significant in the full sample, but not the screened sample perhaps indicating a somewhat weaker relation among these older funds. Of the other fund characteristics, only fund size and the end of the year dummy are significantly related to abnormal flow. The coefficient on fund size is actually negative, indicating that larger funds have lower average abnormal flows, controlling for the other

[15] In the case of initiations we had two new pieces of competing fund quality information released simultaneously. In the case of rating changes, it is not at all obvious what the competing fund quality information is. Given that alpha is a continuous variable, there are innumerable ways to define an alpha change, or to test the significance of a simulated alpha rating change event. A comprehensive test of the explanatory power of simulated alpha rating

variables in the regression. The positive coefficient on the year-end dummy is consistent with greater allocation activity at year-end.

V. Conclusion

Using the natural experiments of star rating initiations and rating changes, we analyze the effect Morningstar has on the allocation of investment capital by investors. We find that, among previously unrated funds, the initiation of a 5-star rating delivers $26 million, or 53% above normal expected flow, to the average fund achieving such a status. Similarly, being upgraded from 4- to 5-stars results in $44 million in abnormal flow, or 35% above normal expected flow. We argue that this might reflect the unique ability of a 5-star rating to attract new assets to a fund.

While most rating changes show significant abnormal flows in the expected direction, namely positive for rating upgrades and negative for rating downgrades, this is not the case for all rating initiation categories. For example, we find significant abnormal flows for a fund being downgraded to 3-stars or upgraded to 4-stars, yet an initial rating in these categories appears to be a non-event. This inconsistency between the response to changes and initiations leads us to conclude that the presence of a previous rating materially affects aggregate investor reallocation decisions.

One possible explanation is that the profile of the pool of investors generating the flow response is different for unrated versus rated funds. For example, new investors choosing among many potential funds might be behind the observed flow response to an initial rating, whereas the flow response to rating upgrades and downgrades might be primarily driven by current investors

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change events analogous to those in Table III for initiations is therefore beyond the scope of this paper. Given our other results, however, we are confident that alphas are not driving the Morningstar effects we document here.

in those funds who reallocate assets based on the update of information. Another possibility is that the pool of investors is the same, but that initial information on fund quality is assessed differently than information on marginal changes in quality. Further study is required to better understand the apparently complicated role that fund information plays in investor decision-making.

In a similar vein, we interpret significant flow responses as evidence that investors view rating changes as valuable new information on fund quality, but we have not explored under what conditions these responses can be interpreted as optimal. The previous literature on mutual fund persistence in general, and the ability of Morningstar star ratings to predict future performance provides some rationale for such behavior, but more research on this question is warranted.[16]

The economically and statistically significant Morningstar effect on fund flow that we identify supports the motivations in Blume (1998), Sharpe (1998), and Morey (2000). These studies scrutinize Morningstar's rating algorithm and identify systematic biases against load funds, sector funds, and younger funds implicit in their rating system. Our findings on the dollar value of a 5-star rating adds to this literature by quantifying the opportunity cost to a fund of being less likely to receive a 5-star rating.

Finally, our finding that investors reallocate an economically significant amount of assets in response to monthly information releases, and that a loss from a downgrade from 5- to 4-stars is not nearly as large as the gain from an upgrade from 4- to 5-stars, suggest possible extensions to current tests of managerial incentives and behavior. Central to these tests are the assumptions regarding the rules of the tournament being engaged in by portfolio managers. Our results

[16] See Blake and Morey (2000) for evidence on the predictive power of star ratings and Brown and Goetzmann (1995) for evidence on mutual fund performance persistence more generally.

indicate that insight might be gained from analyzing monthly, rather than annual, tournaments, and ones in which the rewards and penalties for changes in performance are asymmetric at several points of the performance spectrum.

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Appendix

Morningstar Style Categories and the Construction of Style Benchmarks

We use Morningstar's style category as a style identifier for sample funds. Morningstar divides the domestic equity star rating category peer group into nineteen mutually exclusive categories. We list the nineteen categories in the table below. For each fund in our sample, we assign it to the category Morningstar places it in as of October 1999. (For dead funds we use the Morningstar category reported in the month before its disappearance). This procedure should result in an accurate categorization since according to Morningstar's definition, the style category assignment is based on the fund's average investment style over the previous three years. At each point in time, Morningstar assigns a fund to a style category based on the style and size of the stocks the fund owns.

The style flow we use in our benchmarking procedure is an in-sample measure, using all funds in the sample within the same Morningstar category. Thus, large-cap growth funds are benchmarked using their sensitivity to the overall flow to large-cap growth funds. Because our sample is constructed to include all domestic equity funds that were rated at any time during the sample period, the only funds missing from the aggregate style flow measure are funds coming into existence after November 1996 (and thus not rated by Morningstar throughout our sample period). Below we report the number of funds in each category that we use to compute aggregate style flows.

Morningstar category	Number of funds
Large-cap growth	376
Large-cap blend	552
Large-cap value	406
Medium-cap growth	279
Medium-cap blend	168
Medium-cap value	147
Small-cap growth	246
Small-cap blend	132
Small-cap value	123
Specialty-Health	30
Specialty-Technology	51
Specialty-Utilities	83
Specialty-Communications	16
Specialty-Financials	25
Specialty-Real Estate	59
Specialty-Natural Resources	43
Specialty-Precious Metals	40
Convertible Bond	47
Domestic Hybrid	564

Table I. Descriptive statistics

Panel A. Summary Statistics on Mutual Fund Flow by Morningstar Star Rating Category

This panel contains the total dollar flow to mutual funds in six Morningstar star rating categories. The sample includes all funds in Morningstar's domestic equity star rating category over the period November 1996 through October 1999. In addition to the diversified equity funds that Morningstar assigns to one of nine equity styles (e.g, large-cap growth), this category also includes sector funds, convertible bond funds, and domestic hybrid funds (e.g., asset allocation funds). The sample contains flow data for a total of 111,715 fund-months and includes data for 3,388 unique funds. For these aggregate flow calculations, and in our empirical tests, we delete 220 fund-months that coincide with a fund merger. Fund-months appear in the not rated category if they are less than three years old during the month we measure flows, and therefore not yet rated by Morningstar. We only include unrated fund-months if the fund receives a rating by October 1999, the end of our sample period.

Morningstar star rating	Number of Fund-months	Total Flow ($ Millions)	Percent of Total Flow to Category
1	8,564	-20,497	-7.2
2	19,403	-57,106	-20.3
3	29,849	-55,714	-19.8
4	19,233	111,126	39.6
5	7,285	238,141	84.8
Not rated	27,381	64,998	23.1
Total	111,715	280,949	100

Table I. Descriptive statistics (continued)

Panel B. Frequency of Funds Receiving an Initial Star Rating from Morningstar

This panel reports the frequency count of funds receiving a Morningstar star rating for the very first time over the period November 1996 to October 1999. Receiving an initial rating coincides with the fund turning three-years old, and therefore having a 36-month return history.

Initial Morningstar star rating	Number of Fund-months	Percent of Total Initial Ratings
1	161	9.8
2	394	24.1
3	588	35.9
4	317	19.4
5	177	10.8
Total	1,637	100

Panel C. Frequency of Fund-Months with Changes in Morningstar Star Rating

This panel reports the frequency count of fund-months where the fund's Morningstar star rating is different from its previous month's star rating over the period November 1996 to October 1999. These star rating changes are divided into one-star rating upgrades (i.e., a change from one to two stars), and one-star rating downgrades. We also report the frequency of rating changes greater than one-star (e.g., a change from one to three stars), but we do not analyze these.

Morningstar star rating after change	One-star upgrade (N)	One-star downgrade (N)
1	N/A	739
2	653	1,678
3	1,588	2,065
4	2,053	931
5	944	N/A
Subtotal	5,238	5,413
Total number of one-star changes	10,651	
Upgrades greater than one-star	40	
Downgrades greater than one-star	44	
Total star rating changes	10,735	

Table I. Descriptive statistics (continued)

Panel D. Estimation period Statistics of the Event-study Methodology

This panel reports diagnostic statistics on the event study benchmark model used to calculate abnormal flow for star rating initiation and changes in star rating events. The benchmark model, analogous to a market model regression, regresses a fund's monthly flow on aggregate flow at time t to funds in its same style group, its own time t-1 flow, and its own time t-1 return. We separately fit this benchmark for each of the 11,858 rating initiation or rating change events, and define the estimation period as months (-14,-3). The pairwise cross-sectional correlations reported in the table are computed by pooling observations over all funds and months in the estimation period. The symbols *, **, and *** indicate statistical significance at the 10, 5, and 1% levels.

	Star rating initiations				Star rating changes			
	25th	Median	75th	percentile	25th	Median	75th	percentile
# events per month	36	43	58		251	293	363	
R^2	0.19	0.34	0.54		0.19	0.34	0.54	

Pairwise correlations	Star rating initiations				Star rating changes			
	Style flow	Lagged return	Lagged flow	Fund size	Style flow	Lagged return	Lagged flow	Fund size
Standardized residuals	0.002	0.0004	-0.003	0.012*	0.0001	0.0000	0.0000	0.003
Normal flow	0.069***	0.038***	0.034***	0.398***	0.092***	0.019***	-0.054***	0.009***

Table II. Initial Morningstar Star Ratings of Domestic Equity Funds

Panel A. Average Standardized Abnormal Flow

Average standardized abnormal flow ($ASTAF_t$) reported below is averaged across domestic equity funds within the same initial star-rating group. Morningstar assigns an initial star rating in the 36th month of a fund's existence. We define standardized abnormal flow in month t as the actual dollar flow in month t minus the normal, or expected, flow standardized by the estimated forecast variance of the normal flow. Normal flow is based on a market-model regression whereby a fund's monthly flow is regressed on aggregate flow at time t to funds in its same style group, its time t-1 flow, and its time t-1 return. We use nineteen Morningstar-defined style categories to compute aggregate style flows. See the appendix for details on the style categories we use. The estimation period for computing the market-model parameters is months (-14,-3). The standard error is equal to the cross-sectional standard deviation over *N* sample events of the standardized abnormal flows, divided by the square root of N. $ASTAF_t$ significantly different from zero at the 5% level or higher in a two-tailed test are indicated in bold. For each event date, we also report the percentage of sample events with positive standardized abnormal flows. We indicate in bold the percentage positive that differs from 50% at the 5% significance level or better, using a chi-square test with one degree of freedom. The number of observations differs from Panel B of Table I because we delete fund-months that coincide with mergers, observations that do not have the data necessary to compute flows, and the top and bottom 1% of standardized abnormal flows at each event date.

Event-	One-star (n=136)			Two-stars (n=330)			Three-stars (n=496)			Four-stars (n=261)			Five-stars (n=147)		
month	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0
0	0.28	1.59	56.2	**-0.25**	-2.30	**43.7**	-0.03	-0.36	46.2	0.38	1.93	47.7	**0.56**	1.99	57.1
1	-0.08	-0.41	45.9	-0.13	-1.10	**44.4**	0.03	0.33	48.4	**0.32**	2.40	52.3	**1.13**	4.70	**66.7**
2	-0.09	-0.54	41.9	-0.19	-1.64	**37.1**	0.09	0.82	48.6	-0.01	-0.07	49.2	**0.86**	2.64	56.2
3	0.15	0.72	52.4	-0.06	-0.55	**43.6**	0.05	0.46	49.3	0.21	1.55	51.2	**0.92**	2.64	55.3
4	-0.12	-0.60	51.6	-0.08	-0.66	46.5	-0.18	-1.56	**43.3**	0.17	0.97	50.0	**0.82**	2.21	52.5
5	-0.05	-0.22	49.6	-0.02	-0.15	48.9	-0.12	-1.04	**42.4**	0.31	1.82	50.9	**0.60**	2.32	50.9
6	**0.70**	2.01	58.6	-0.10	-0.58	**42.4**	-0.15	-1.09	**40.3**	0.30	1.47	49.3	**1.27**	2.92	**60.0**

Panel B. Average Cumulative Standardized Abnormal Flow

This panel reports the average cumulative standardized abnormal flow ($ACSTAF_t$) for each date t in the event window. We first compute the cumulative standardized abnormal flow for each fund by summing the standardized abnormal flow from 0 to t, and then dividing by the square root of the number of months used in the cumulation. We then average these over the N sample events to obtain ACSTAF at each event date t. ACSTAF significantly different from zero in a two-tailed test, and the percentage positive different from 50% using a chi-square test with one degree of freedom, both at the 5% significance level or better, are indicated in bold.

Event-	One-star (n=136)			Two-stars (n=330)			Three-stars (n=496)			Four-stars (n=261)			Five-stars (n=147)		
month	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0
0	0.28	1.59	56.2	**-0.25**	-2.30	**43.7**	-0.03	-0.36	46.2	0.38	1.93	47.7	**0.56**	1.99	57.1
1	0.11	0.45	50.4	**-0.27**	-2.21	**42.9**	0.01	0.11	46.5	**0.50**	2.74	50.0	**1.21**	3.90	**62.5**
2	-0.10	-0.54	44.2	**-0.36**	-2.53	**38.1**	0.05	0.35	46.2	**0.45**	2.34	51.6	**1.50**	3.72	**61.5**
3	-0.01	-0.06	50.8	**-0.34**	-2.12	**40.9**	0.04	0.29	47.3	**0.49**	2.32	51.7	**1.80**	3.73	**62.6**
4	-0.02	-0.07	48.4	-0.32	-1.78	**40.2**	-0.10	-0.61	47.2	**0.53**	2.23	50.4	**1.98**	3.50	**59.2**
5	-0.01	-0.04	47.9	-0.26	-1.28	**43.5**	-0.13	-0.69	46.8	**0.63**	2.41	51.8	**2.11**	3.45	**59.8**
6	0.28	0.80	51.7	-0.28	-1.18	**41.6**	-0.15	-0.71	**45.2**	**0.71**	2.28	51.2	**2.44**	3.57	**61.8**

Table III. Determinants of the Six-Month Cumulative Standardized Abnormal Flow Response to an Initial Star Rating: Initial Jensen's Alpha versus Initial Morningstar Star Rating

This table reports the results of a two-way analysis of variance of cumulative standardized abnormal flows from month 0 to 6 ($CSTAF_6$) for the full sample of funds receiving an initial Morningstar star rating (N=1101). We compare the explanatory power of a fund's initial Morningstar rating (one to five stars) to a fund's Jensen's alpha group. We present three ways of defining Jensen's alpha groups: equal-sized quartiles, equal-sized quintiles, and "Morningstar-type" quintiles where the top 10% of alphas are in quintile 5, the next 22.5% in quintile 4, the next 35% in quintile 3, the next 22.5% in quintile 2, and the bottom 10% in quintile 1. For each comparison below labeled (1), (2), and (3), we report the F-statistic and the corresponding p-value for the test of the null hypothesis that the sample means are identical across groups in the one rating system, conditional on the other rating system. The F test has $(n_1 - 1, (n_1 - 1)(n_2 - 1))$ degrees of freedom, where n_1 equals the number of groups in the first rating system and n_2 equals the number of groups in the second rating system. For example, the F-statistic for the test that the mean values of $CSTAF_6$ are identical across Jensen's alpha quartiles, holding constant the effect of Morningstar star rating, is 1.10 and the degrees of freedom for this test are (3, 12). The F-statistic for the test that the mean values of $CSTAF_6$ are identical across Morningstar star ratings, holding constant the effect of Jensen's alpha quartiles, is 2.70, with (4,12) degrees of freedom. The symbols *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Categorizations	Type II Sum of Squares F-statistic	Prob > F
(1)	Jensen's alpha quartiles	1.10	0.347
	Morningstar star rating groups	2.70**	0.030
(2)	Jensen's alpha quintiles	0.46	0.766
	Morningstar star rating groups	2.07*	0.082
(3)	Jensen's alpha "Morningstar-type" quintiles	1.34	0.253
	Morningstar star rating groups	3.33***	0.010

Table IV. Morningstar Star Rating Changes of Domestic Equity Funds

Panel A. Average Standardized Abnormal Flow for Rating Upgrades

Average standardized abnormal flow ($ASTAF_t$) reported below is averaged across domestic equity funds within the same star-rating change group. We define standardized abnormal flow in month t as the actual dollar flow in month t minus the normal, or expected, flow standardized by the estimated forecast variance of the normal flow. Normal flow is based on a market-model regression whereby a fund's monthly flow is regressed on aggregate flow at time t to funds in its same style group, its time t-1 flow, and its time t-1 return. The estimation period for computing the market-model parameters is months (-14,-3). The standard error is equal to the cross-sectional standard deviation over *N* sample events of the standardized abnormal flows, divided by the square root of N. Average standardized abnormal flows significantly different from zero at the 5% level or higher in a two-tailed test are indicated in bold. For each event date, we also report the percentage of sample events with positive abnormal flows. We indicate in bold the percentage positive that differs from 50% at the 5% significance level or better, using a chi-square test with one degree of freedom. The number of observations differs from Panel C of Table I because we delete fund-months that coincide with mergers, observations that do not have the data necessary to compute flows, and the top and bottom 1% of standardized abnormal flows at each event date.

Event-month	From 1 to 2-stars (n=555)			From 2 to 3-stars (n=1390)			From 3 to 4-stars (n=1770)			From 4 to 5-stars (n=824)		
	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0
0	-0.01	-0.13	50.3	**0.17**	3.15	52.3	**0.11**	2.26	50.2	**0.43**	4.86	**55.6**
1	0.07	0.91	50.7	**0.21**	3.44	52.5	**0.15**	2.98	51.9	**0.67**	6.95	**54.9**
2	0.03	0.34	54.2	**0.23**	3.65	**53.3**	**0.22**	3.86	52.2	**0.69**	5.73	**55.8**
3	0.04	0.52	52.7	**0.42**	6.08	**56.0**	**0.32**	4.90	**52.6**	**0.61**	4.49	**53.8**
4	**0.24**	2.92	**56.6**	**0.21**	3.03	**53.2**	**0.35**	5.18	**53.1**	**0.66**	4.67	**55.6**
5	**0.22**	2.15	**56.3**	**0.51**	6.53	**57.6**	**0.32**	4.41	**53.6**	**0.82**	4.83	**57.1**
6	0.20	1.84	53.2	**0.45**	5.15	**55.2**	**0.31**	3.93	52.0	**0.97**	4.46	51.5

Panel B. Average Standardized Abnormal Flow for Rating Downgrades

Event-month	From 2 to 1-star (n=605)			From 3 to 2-stars (n=1437)			From 4 to 3-stars (n=1744)			From 5 to 4-stars (n=783)		
	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0	$ASTAF_t$	t-stat	%>0
0	**-0.13**	-2.16	48.3	-0.07	-1.39	49.0	-0.07	-1.61	**46.8**	**0.21**	2.54	50.2
1	**-0.16**	-2.06	48.7	**-0.10**	-2.08	48.9	**-0.13**	-2.82	**45.8**	**0.18**	2.14	51.5
2	**-0.13**	-2.02	47.2	**-0.11**	-2.26	48.7	**-0.15**	-3.18	**44.7**	0.03	0.34	47.3
3	**-0.20**	-2.64	49.2	**-0.25**	-4.78	**45.1**	**-0.16**	-2.90	**44.8**	0.02	0.18	48.0
4	-0.15	-1.85	47.5	**-0.17**	-2.80	**46.2**	**-0.17**	-2.78	**44.3**	**0.31**	2.76	50.5
5	-0.10	-1.16	47.1	**-0.22**	-3.61	**46.5**	**-0.20**	-3.14	**45.1**	0.26	1.84	47.7
6	**-0.22**	-2.55	46.1	-0.07	-1.03	47.9	**-0.19**	-2.63	**45.5**	**0.49**	2.88	48.3

Table IV. Morningstar Star Rating Changes of Domestic Equity Funds (continued)

Panel C. Average Cumulative Standardized Abnormal Flow for Rating Upgrades

This panel reports the average cumulative standardized abnormal flow ($ACSTAF_t$) for each date t in the event window. We first compute the cumulative standardized abnormal flow for each fund by summing the standardized abnormal flow from 0 to t, and then dividing by the square root of the number of months used in the cumulation. We then average these standardized cumulated abnormal flows over the N sample events in each star-rating change group to obtain ACSTAF at each event date t. ACSTAF significantly different from zero at the 5% level or higher in a two-tailed test are indicated in bold. For each event date, we also report the percentage of sample events with positive cumulative standardized abnormal flows. We indicate in bold the percentage positive that differs from 50% at the 5% significance level or better, using a chi-square test with one degree of freedom. The number of observations differs from Panel C of Table I because we delete fund-months that coincide with mergers, observations that do not have the data necessary to compute flows, and the top and bottom 1% of standardized abnormal flows at each event date.

Event-month	From 1 to 2-stars (n=555)			From 2 to 3-stars (n=1390)			From 3 to 4-stars (n=1770)			From 4 to 5-stars (n=824)		
	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0
0	-0.01	-0.13	50.3	**0.17**	3.15	52.3	**0.11**	2.26	50.2	**0.43**	4.86	**55.6**
1	0.05	0.63	49.3	**0.27**	4.16	**53.0**	**0.18**	3.15	50.6	**0.79**	6.97	**57.8**
2	0.04	0.45	49.8	**0.37**	4.82	51.2	**0.26**	3.77	52.2	**1.02**	7.07	**56.9**
3	0.07	0.70	50.1	**0.54**	6.16	**54.7**	**0.39**	4.67	52.5	**1.17**	6.67	**57.6**
4	0.17	1.48	52.9	**0.59**	6.07	**53.6**	**0.50**	5.23	**54.0**	**1.36**	6.60	**58.1**
5	**0.28**	2.19	**55.3**	**0.78**	7.10	**56.3**	**0.57**	5.36	**53.7**	**1.60**	6.66	**58.6**
6	**0.35**	2.37	**56.3**	**0.90**	7.24	**55.9**	**0.64**	5.36	**53.2**	**1.92**	6.78	**58.9**

Panel D. Average Cumulative Standardized Abnormal Flow for Rating Downgrades

Event-month	From 2 to 1-star (n=605)			From 3 to 2-stars (n=1437)			From 4 to 3-stars (n=1744)			From 5 to 4-stars (n=783)		
	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0	$ACSTAF_t$	t-stat	%>0
0	**-0.13**	-2.16	48.3	-0.07	-1.39	49.0	-0.07	-1.61	**46.8**	**0.21**	2.54	50.2
1	**-0.21**	-2.78	48.9	**-0.11**	-2.09	47.7	**-0.14**	-2.64	**46.5**	**0.28**	2.82	49.9
2	**-0.25**	-3.04	46.6	**-0.16**	-2.70	47.4	**-0.20**	-3.38	**45.1**	**0.28**	2.36	48.6
3	**-0.31**	-3.39	45.8	**-0.27**	-3.93	**46.5**	**-0.26**	-3.74	**44.3**	**0.28**	1.95	47.9
4	**-0.33**	-3.23	45.9	**-0.31**	-3.95	**46.6**	**-0.33**	-4.00	**43.8**	**0.40**	2.47	48.7
5	**-0.34**	-3.04	46.1	**-0.41**	-4.63	**44.0**	**-0.42**	-4.57	**42.5**	**0.47**	2.35	49.7
6	**-0.39**	-3.13	46.9	**-0.40**	-3.99	**46.2**	**-0.47**	-4.56	**42.7**	**0.64**	2.75	48.4

Table V. Cross-sectional Regressions of Cumulative Standardized Abnormal Flow on Event-Window Performance and Fund Characteristics

Panel A. Initial Star Rating Events

This panel reports cross-sectional regressions for funds receiving an initial star rating of cumulative standardized abnormal flows from month 0 to 6 ($CSTAF_6$) on contemporaneous performance measures and other fund characteristics. We indicate the event timing of the measurement of the contemporaneous performance measures in the table. For example, the change in alpha (0, 5) equals the alpha of the fund at month 5 (which uses returns over the previous 36 months in its estimation) minus the alpha of the fund at month 0. Return (0,5) is the fund's compounded return from month 0 to 5. The year-end event date dummy equals one if month 0 occurred in December or January and zero otherwise. T-statistics are in parentheses and N represents the number of observations. The full sample represents the sample analyzed in Table II and the screened sample is the subsample of rating initiations where the fund did not have a rating change during the (0,6) event window. The symbols *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Full sample $CSTAF_6$	Screened sample $CSTAF_6$
Intercept	1.31	-0.88
	(1.40)	(-0.70)
Two star dummy	-0.56	0.10
	(-1.03)	(0.15)
Three star dummy	0.21	0.73
	(0.33)	(0.84)
Four star dummy	0.73	1.17
	(1.04)	(1.27)
Five star dummy	1.98**	3.36***
	(2.41)	(3.25)
Initial Jensen's alpha (t = 0) (%)	0.37	-0.34
	(1.07)	(-0.75)
Change in alpha (0,5) (%)	-1.47***	-1.13
	(-2.83)	(-1.60)
Change in star rating (0,5)	0.42*	
	(1.74)	
Return (0,5) (%)	0.08***	0.07***
	(6.39)	(3.77)
Number of funds in style and star category	-0.007***	-0.005*
	(-3.58)	(-1.80)
Log of total net assets (t = -1)	-0.17**	-0.07
	(-2.20)	(-0.64)
Expense ratio (%)	-0.67*	-0.15
	(-1.68)	(-0.27)
12b-1 ratio (%)	0.73	0.71
	(1.25)	(0.90)
No-load fund dummy	-0.11	0.40
	(-0.28)	(0.74)
Year-end event date dummy	-0.03	0.01
	(-0.09)	(0.02)
Adjusted R-squared	0.075	0.068
N	1101	564

Table V. Cross-sectional Regressions of Cumulative Standardized Abnormal Flow on Event-Window Performance and Fund Characteristics (continued)

Panel B. Star Rating Change Events

This table reports cross-sectional regressions for funds experiencing a change in star rating of cumulative standardized abnormal flows from month 0 to 6 ($CSTAF_6$) on contemporaneous performance measures and other fund characteristics. We indicate the event timing of the measurement of the contemporaneous performance measures in the table. For example, the change in alpha (0, 5) equals the alpha of the fund at month 5 (which uses returns over the previous 36 months in its estimation) minus the alpha of the fund at month 0. Return (0,5) is the fund's compounded return from month 0 to 5. The year-end event date dummy equals one if month 0 occurred in December or January and zero otherwise. T-statistics are in parentheses and N represents the number of observations. The full sample represents the sample analyzed in Table III and the screened sample is the subsample of rating changes where the fund did not have any further rating changes during the (0,6) event window. The symbols *, **, *** indicate statistical significance at the 10, 5, and 1% level.

	Full sample $CSTAF_6$	Screened sample $CSTAF_6$
Intercept	1.14***	0.88
	(2.83)	(0.87)
Upgrade (2 to 3 star) dummy	0.79***	1.47**
	(3.20)	(2.44)
Upgrade (3 to 4 star) dummy	0.88***	0.95
	(3.61)	(1.58)
Upgrade (4 to 5 star) dummy	2.20***	1.41**
	(7.90)	(1.97)
Downgrade (2 to 1 star) dummy	-1.05***	-1.36**
	(-3.58)	(-1.92)
Downgrade (3 to 2 star) dummy	-0.91***	-1.80***
	(-3.66)	(-2.95)
Downgrade (4 to 3 star) dummy	-0.51**	-1.30**
	(-2.06)	(-2.11)
Downgrade (5 to 4 star) dummy	0.71**	-1.08
	(2.54)	(-1.51)
Change in alpha (0,5) (%)	0.51**	0.22
	(2.31)	(0.37)
Change in star (0,5)	0.56***	
	(5.88)	
Return (0,5) (%)	0.01**	0.04**
	(2.18)	(2.43)
Number of funds in style and star category	-0.006***	-0.003
	(-7.10)	(-1.49)
Log of total net assets (t = -1)	-0.19***	-0.19**
	(-5.88)	(-2.22)
Log of fund age	-0.01	0.15
	(-0.15)	(0.72)
Expense ratio (%)	0.21	-0.30
	(1.28)	(-0.69)
12b-1 ratio (%)	0.18	0.84
	(0.81)	(1.47)

	Full sample	Screened sample
No-load fund dummy	-0.10	-0.12
	(-0.77)	(-0.35)
Year-end event date dummy	0.11	0.81**
	(0.82)	(2.51)
Adjusted R-squared	0.057	0.118
N	7019	1067

Figure 1. Average Monthly Dollar Flow in Five Morningstar Star Rating Categories
To create this plot, we average monthly dollar fund flow for funds with a one through five star rating from November 1996 through October 1999. We use all funds in Morningstar's domestic equity star rating category described in Table 1 Panel A (111,715 fund-months).

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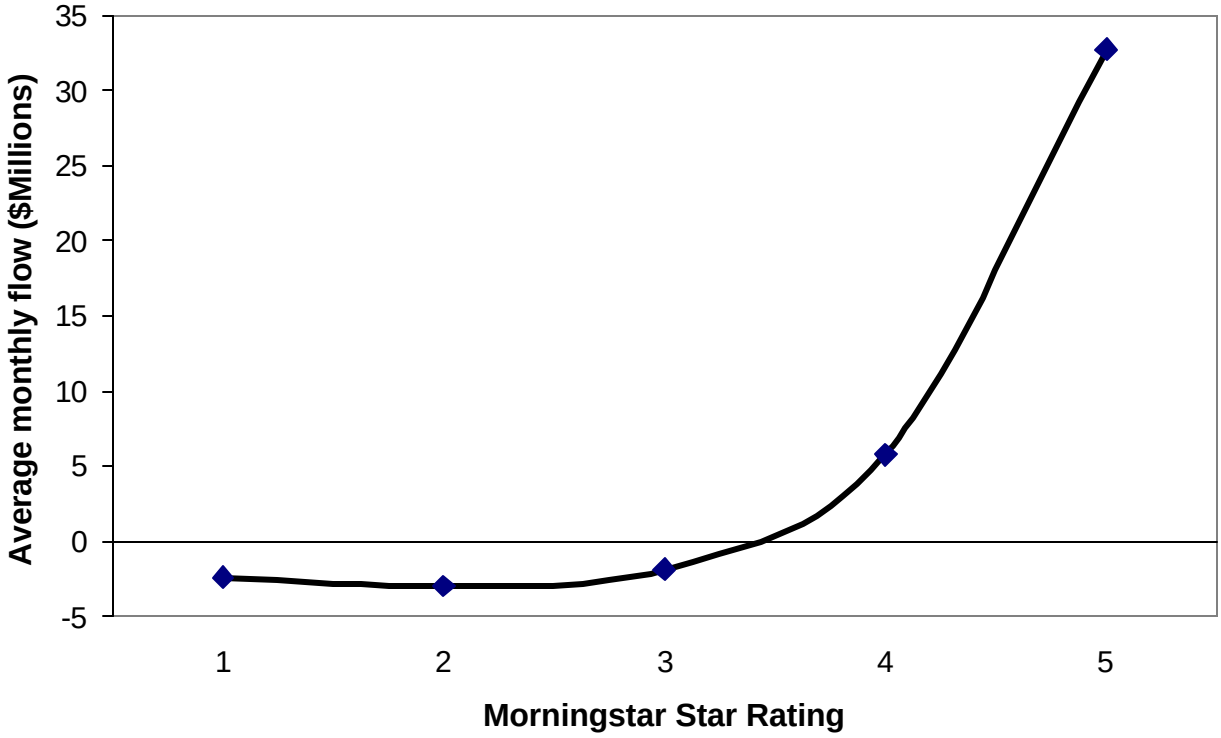

Figure 2. Average Six-Month Cumulative Abnormal Flow for Initial Morningstar Star Ratings

To create this plot, we averaged six-month (0,6) cumulative abnormal flow and six-month cumulative normal flow across domestic equity funds within the same initial star-rating group. Morningstar assigns an initial star rating in the 36th month of a fund's existence. Normal flow is based on a market-model regression whereby a fund's monthly flow is regressed on aggregate flow at time t to funds in its same style group, its time t-1 flow, and its time t-1 return. Abnormal flow in month t is the actual dollar flow in month t minus normal flow. Note that unlike the numbers reported in Table II, this figure contains measures of abnormal flow that are not standardized by the forecast variance.

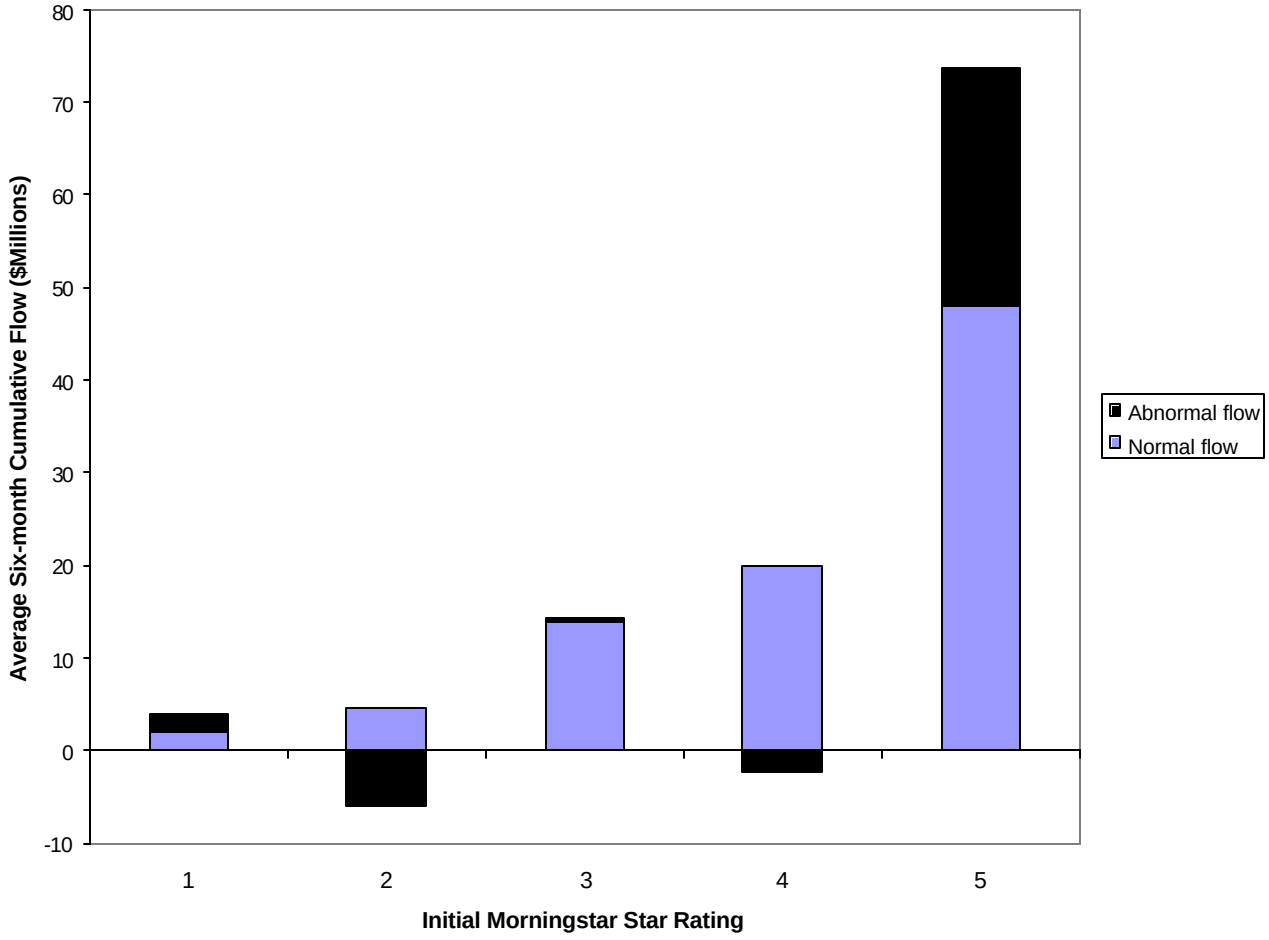

Figure 3. Average Six-Month Cumulative Abnormal Flow for Morningstar Star Rating Changes

To create this plot, we averaged six-month (0,6) cumulative abnormal flow and six-month cumulative normal flow across domestic equity funds within the same star-rating change group. Normal flow is based on a market-model regression whereby a fund's monthly flow is regressed on aggregate flow at time t to funds in its same style group, its time t-1 flow, and its time t-1 return. Abnormal flow in month t is the actual dollar flow in month t minus normal flow. Note that unlike the numbers reported in Table III, this figure contains measures of abnormal flow that are not standardized by the forecast variance.