Investor Sentiment, Fund Pricing, Performance, and Survival

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ABSTRACT

Using a comprehensive database of passively and actively managed equity mutual funds and exchange-traded products in the United States, this study shows that market-wide investor sentiment at inception predicts fund pricing, performance, and survival. Passive and active funds launched in high-sentiment periods are significantly more expensive than those launched in low-sentiment periods, at inception and thereafter. Also, funds launched in high-sentiment periods underperform on a before-cost basis and are less likely to survive over the short term as well as long term. Together, the results are consistent with fund sponsors exploiting the "windows of opportunity" in high-sentiment periods by launching lower quality investment products.

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I. Introduction

The regulated funds industry in the United States (U.S.), including open-end mutual funds and exchange-traded products, managed $18.7 trillion in assets in 2017. In the largest asset class– U.S. domestic equity– around 40% of assets were passively managed and 60% actively managed, with passive funds dramatically growing their market share from less than 5% in 1995.[2] The growth of the cheaper passively managed segment and the concurrent declining trend in fees charged by active funds in recent years have been the topic of passionate industry discussion.[3] One of the main reasons conjectured for these trends is the increasing sophistication of the average retail investor in terms of their awareness of the outperformance of low-cost funds and sensitivity to fund pricing. This conjecture draws attention to whether and how the asset management industry exploits unsophisticated investors using fund pricing and, more broadly, the quality of investment products they offer. In this paper, I examine investor sophistication through the lens of temporal variation in market-wide investor sentiment and its implications for the quality of investment products which enter the market, specifically in terms of fund pricing, performance, and survival.

Prior work in behavioral finance has related the degree of investor sophistication to market-wide sentiment. Studies focusing on stock returns posit that investors and analysts form less rational expectations about future earnings payoffs in high-sentiment periods, especially for hard-to-value stocks (e.g. Baker and Wurgler (2006, 2007); Hribar and McInnis (2012)). Moreover, the greater market participation of unsophisticated investors in high-sentiment periods is a likely driver of the sentiment effects on stock prices (e.g. Yu and Yuan (2011); Stambaugh, Yu, and Yuan (2012); Antoniou, Doukas, and Subrahmanyam (2016)), and fund flows reflect investor sentiment (Indro (2004); Frazzini and Lamont (2008); Ben-Raphael, Kandel, and Wohl (2012)). Also, investor sentiment effects are more pronounced during high-sentiment periods than low-sentiment periods, since investors are reluctant to engage in short-selling. This

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[2] The trend continues beyond 2017, with the total assets under management for passive funds exceeding those for active funds in August 2019, for the first time in modern markets. (https://www.bloomberg.com/news/articles/2019-09-11/passive-u-s-equity-funds-eclipse-active-in-epic-industry-shift)

[3] A particularly colorful 2016 note by Alliance Bernstein reflecting the pushback by active managers against recent industry trends was titled, "The Silent Road to Serfdom: Why Passive Investing is Worse than Marxism."

asymmetric effect of investor sentiment could be especially pertinent to the demand for open-end funds, where investors cannot take direct short positions in fund products. Thus, there are likely to be time-related sentiment effects on the representative fund investor's sophistication, which could have a significant bearing on business decisions made by fund sponsors. In this paper, I first investigate whether market-wide investor sentiment affects fee-setting, where previous studies have associated the demand for cheaper funds with investor sophistication, in light of the negative relation between fees and performance.[4] Second, I explore whether a fund's post-inception performance and likelihood of survival is related to sentiment levels at the fund's inception. If high-sentiment periods are associated with the launch of funds which perform poorly and are less likely to survive, i.e. are of poorer quality, it would suggest that fund sponsors time sentiment to exploit periods when investors act less rationally.

For the empirical analyses, I use the Morningstar Direct database on U.S. open-end retail equity mutual funds and exchange-traded funds (ETFs). I use the Baker and Wurgler (2006) sentiment index as the primary measure of investor sentiment. As a secondary measure, I use the growth in disposable personal income in the economy as a proxy for sentiment.[5] The final sample includes 1,040 passive and 7,799 active mutual fund share classes and ETFs ("funds" hereafter) of U.S. broad and sector equity retail funds. As expected, the demand for funds captured by average monthly flows is significantly higher in high-sentiment periods, defined as periods with above-median sentiment levels in the sample period.

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[4] The studies which focus on S&P 500 index funds (Hortacsu and Syverson (2004); Elton, Gruber, and Busse (2004); Choi, Laibson and Madrian (2010)) and money market funds (Christoffersen and Musto (2002)) provide among the most compelling evidence linking investor sophistication to fund pricing, where fund performance among the homogenous products is determined by fees charged to the investor. For actively managed funds, theory predicts a flat relation between fees and after-fees performance in the presence of manager skill (Berk and Green (2004)). However, several studies conclude that actively managed funds underperform on an after-fee and before-fee basis, suggesting that fund managers' skills do not justify the costs (e.g. Jensen (1968); Malkiel (1995); Gruber (1996); Carhart (1997); Wermers (2000); Gil-Bazo and Ruiz-Verdu (2009); Fama and French (2010)). Some recent studies have challenged the empirical evidence on the negative fee-performance relation for active funds (e.g. Berk and Van Binsbergen (2015); Pastor, Stambaugh, and Taylor (2017); Sheng, Simutin, and Zhang (2017)), leading to a lack of consensus in the literature on the fee-performance relation for actively managed funds.

[5] The median mutual fund-owning household earns a moderate income ($94,300 in 2016), suggesting that the average retail investor in the market for mutual funds faces financial constraints. Since market-wide sentiment is related to investor optimism, less wealthy and informed investors may increase participation in the fund industry when they are more optimistic, i.e. when there is high growth in disposable personal income in the economy. Also, other strands of literature, such as those studying the relation between consumer behavior and disposable income, link price sensitivity negatively to disposable income (e.g. Gilcheva, Hastings, and Villas-Boas (2010)).

Further, I show that passive and active funds launched in high-sentiment periods charge higher fees on average than those launched in low-sentiment periods, especially in their inception years. For example, in a regression specification including objective-year fixed effects to explain net expense ratios, passive funds tracking the S&P 500 index launched in high-sentiment periods charge a remarkable 30.3 basis points (bps) more than those launched in low-sentiment periods in their first year, i.e. a 45.9% increase relative to the median expense ratio of these funds. In another specification, active funds benchmarking versus the S&P index launched in high-sentiment periods charge 21.2 bps higher in their inception year compared to those launched in low-sentiment periods, i.e. a 13.8% increase relative to the median expense ratio of these funds. Based on the widely-held intuition that stocks are overvalued when investor sentiment is high, investors purchasing new equity funds in these periods are subject to the joint detrimental effects of exposure to overpriced stocks and a higher cost of fund ownership, even for passive funds.

Additionally, controlling for various determinants of fund performance including objective-month fixed effects, passive and active funds launched in high-sentiment periods underperform on a before-cost basis in the five years following inception compared to those launched in low-sentiment periods. The underperformance lasts beyond the first five years of a fund's life, ruling out short-term stock mispricing related to sentiment as a potential driver of observed differences in fund performance. Also, after controlling for the usual determinants of survival (e.g. size), funds launched in high-sentiment periods have a significantly lower likelihood of short-term and long-term survival. For example, over the short-term following inception, young passive and active funds launched in high-sentiment periods which benchmark versus the S&P 500 index are 10.8% and 11.0% less likely to survive another three years, respectively, compared to those launched in low-sentiment periods. Taken together, the results are consistent with fund sponsors increasing fee revenue and offering inferior products in high-sentiment periods.

This paper contributes to the literature on how the asset management industry exploits investor sentiment. Prior studies have focused on how active fund managers create value for their investors by adapting their portfolio holdings to exploit sentiment (e.g. Brunnermeier and Nagel (2004); Massa and Yadav (2015)). On the other hand, Avramov, Cheng, and Hameed (2019) show that active funds which tilt

their long positions towards overpriced stocks attract more flows from investors when sentiment is high, despite underperforming on average. To my knowledge, this is the first study to focus on fee-setting as a channel by which fund sponsors exploit investor sentiment, to the detriment of their clientele. Moreover, I am unaware of other studies which examine how passive funds could exploit sentiment. I show that uninformed demand incentivizes fund sponsors to charge higher fees for products launched in high-sentiment periods when fund investors are less price-sensitive (Jiang and Yüksel (2019)), in a setting where arbitrage is absent as a countering correction (Elton, Gruber, and Busse (2004)), and rational risk- or managerial skill-based explanations of pricing differences do not apply (e.g. among S&P 500 index funds). The results based particularly on the pricing of passive funds serve as novel evidence of the non-fundamental investor demand suggested by Baker and Wurgler (2013) as a main driver of sentiment effects in financial markets. Also, while prior studies document fund sponsors' strategic fee-setting to exploit the cross-sectional variation in the sophistication of retail clienteles (e.g. Gil-Bazo and Ruiz-Verdu (2009)), this paper documents a sizeable market timing component to fee-setting exploiting sentiment.

This study also parallels and complements the literature which relates new security issues with investor sentiment and optimism. Prior studies show that smart managers issue securities when sentiment levels are high, and new issues of equity and closed-end funds launched during these periods subsequently underperform (e.g. Ritter (1991); Lee, Shleifer, and Thaler (1991); Loughran and Ritter (1995); Baker and Wurgler (2006); McLean and Zhao (2014)). Rather than new equity or closed-end fund issues, this study focuses on new open-end managed investment products. To the best of my knowledge, this is the first study to empirically establish the negative link between the market-wide sentiment at the time of launch of mutual funds and ETFs with their short-term and long-term returns and likelihood of survival. Thus, using the rich and economically important setting of the open-end funds industry, this study expands the evidence on managers exploiting "windows of opportunity" when investors act less rationally.

The rest of the paper proceeds as follows. Section II describes the data and sample. Section III examines the relation between the demand for funds and investor sentiment. Section IV explores the relation between investor sentiment at inception and the quality of funds. Section V concludes.

II.   Data and Sample

II.A.   *Data on Investor Sentiment*

The primary measure of investor sentiment used in the paper is the monthly sentiment index of

Baker and Wurgler (2006) (BW hereafter). The BW sentiment index is constructed as the first principal

component of the following six measures of investor sentiment: the closed-end fund discount, the number

and the first-day returns of IPOs, NYSE turnover, the equity share in total new issues, and the dividend

premium.[6] Figure 1 plots the yearly average of the monthly BW sentiment index over 1965 to 2017. As

noted by others (e.g. Stambaugh, Yu, and Yuan (2012)), the BW index captures known fluctuations in

sentiment, such as the Dotcom bubble of 1999-2000 and, more recently, the financial crisis of 2007-2009.

As a secondary measure of investor sentiment, I use the growth in disposable personal income in

the economy.[7] Specifically, growth in personal disposable income is treated as a positive indicator of

sentiment. I use the monthly DSPI time series of the Bureau of Economic Analysis (BEA), which is the

seasonally adjusted disposable personal income in chained 2009 USD.[8] Figure 2 plots the yearly average

of the growth rate of monthly disposable personal income ($\Delta DSPI$ (in %)) over 1965 to 2017. Over the

sample period, the mean of the annual average monthly growth in disposable income is 0.54% and standard

deviation is 0.24%, suggesting that there is significant dispersion in $\Delta DSPI$.

II.B.   *Data on U.S. Equity Funds*

The data on U.S. open-end mutual funds and exchange-traded funds (ETFs) used in this study is

from the comprehensive survivorship bias-free Morningstar Direct (MD) database, starting in 1993. I focus

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[6] The data on the BW sentiment index is available on Jeffrey Wurgler's website at www.stern.nyu.edu/jwurgler.

[7] Unlike BW's measure, this measure is not constructed directly from stock market-based variables, but proxies for fluctuations in the financial prospects of the average investor's household which could reflect investor sentiment. Notably, unlike BW's index, the growth in disposable income is not orthogonalized relative to other macro variables.

[8] Disposable income is the amount of net income a household or individual has available to invest, save, or spend after income taxes. Disposable income indicators have a high correlation with personal savings and closely tracks consumer spending. Since economic indicators such as DSPI often have monotonous time trends and are endogenous with other macro factors, I follow many studies in using the short-run changes, as opposed to levels, in disposable income as the indicator that is comparable across time periods and could relate to sentiment in financial markets.

on retail (i.e. non-institutional) domestic equity funds, including broad and sector equity passively managed and actively managed funds domiciled in the U.S. I exclude enhanced index funds, money market funds, and fund of funds from the sample. To eliminate survivorship bias, I include defunct (i.e. merged or liquidated) funds in the sample. Consistent with previous studies which have examined fund expenses, I treat share classes as "funds" to allow for different clienteles in different share classes which vary in their fee structures (e.g. Hortacsu and Syverson (2004); Gil-Bazo and Ruiz-Verdu (2009)).[9]

For the above sample of passive and active U.S. domestic equity funds, I obtain data on total net assets (TNA), fund flows, monthly returns, annual expenses, investment objectives, and other share class and fund characteristics from MD covering the period 1993 to 2017. I also collect fund family data from MD, such as the total TNA of funds in the family. The broad domestic equity funds have stated objectives of aggressive growth, balanced, equity income, growth, growth and income, income, or small company.[10] The sector domestic equity funds have stated objectives listed as "specialty" in communications, financial, health, natural resources, real estate, technology, or utility sectors. Collectively, the sample of funds used in this paper manage 89.8% of the assets invested in U.S. domestic equity retail funds as listed in MD. For some of the analyses, I also supplement the data with aggregate data from Investment Company Institute's Annual Fact Book (e.g. percentage of U.S. households owning mutual funds).

The final sample includes 1,040 passively managed and 7,799 actively managed U.S. equity fund share classes, with inception years from 1965 (when the BW sentiment index starts) to 2017. The sample of fund share classes represent 825 unique passively managed fund portfolios and 3,150 unique actively managed fund portfolios. The passive funds comprise of 817 broad equity and 223 sector equity funds. The active funds comprise of 6,805 broad equity and 994 sector equity funds. As noted by industry observers, there has been a remarkable increase in TNA of passively managed funds. While only 3.6% of the assets ($12.4 billion) in U.S. domestic equity were passively managed in 1993 in the sample, 38.2% of

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[9] For more information on share classes and the different fee structures, see
https://www.morningstar.com/articles/346727/making-sense-of-shareclass-alphabet-soup.html.
[10] The results in the remainder of the paper are materially unchanged in analyses based on a sample excluding funds with balanced or income as investment objectives.

the assets ($1,168.3 billion) are passively managed in 2017 (see Appendix A, Panel A). The active funds, with average annual expense ratio of 1.58%, are more than twice as expensive as the passive funds with an average annual expense ratio of 0.66% (see Appendix A, Panel B). Around 48% of the passive funds are ETFs, and 21% represent sector funds.[11]

III. Investor Sentiment and the Demand for Funds

Before proceeding with formal analyses examining fund pricing, performance, and survival, I first explore whether investor sentiment affects the demand for managed investment products, as captured by fund flows. If high market-wide sentiment levels are associated with positive demand shocks for equity funds, fund flows should have a positive relation with investor sentiment.

Table I reports the results of time-series regressions examining the relation between fund flows and investor sentiment. The dependent variable is the average annualized monthly flow (in %) across all funds in the sample in month t, where fund flow is the estimated net flow to a fund (from MD) in month t divided by the fund's net assets measured at the end of month $t-1$. The explanatory variables of interest are the two indicator variables proxying for investor sentiment, *High_Sent* and *High_DSPI*. *High_Sent* is an indicator variable assigned a value of one if the BW index in month $t-1$ is above the median level in the sample period, and zero if it is below the median. *High_DSPI* is an indicator variable assigned a value of one if the cumulative monthly growth in personal disposable income over months $t-6$ to $t-1$ is above the median level in the sample period, and zero if it is below the median.[12] As controls, I consider *%Households*, *Lag_SP500Ret*, and indicator variables representing calendar quarters (1-4) to capture possible seasonal effects in fund flows (e.g. tax-motivated flows at year-end). *%Households* is the percentage of U.S. households owning mutual funds in the year, obtained from ICI Factbook. *Lag_SP500Ret* controls for

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[11] Appendix B reports the distribution of passive and active funds in the sample by investment objectives.

[12] The six-month window accounts for potential time lags in the impact of disposable income on investing. However, the results are robust to growth in personal disposable income computed over $t-5$ to t and $t-7$ to $t-2$.

recent stock market returns, measured on a rolling basis as the cumulative returns on the S&P 500 Composite Index over months $t-6$ to $t-1$. Also, to control for the size and recent performance of the industry, I include the natural logarithm of the sum of TNA across all funds in the sample in month $t-1$ (*log (All TNA)*), and the mean four-factor gross alpha across the funds in month $t-1$ (*Alpha*), measured using factor loadings estimated with gross monthly returns for each fund over months $t-36$ to $t-1$ (see Fama and French (1993); Carhart (1997)). The *p*-values are based on the heteroskedasticity- and autocorrelation-corrected (HAC) standard errors of Newey and West (1987) with three lags.

Table I shows that fund flows have a significantly positive relation with investor sentiment. In columns (1) (column (3)) including calendar quarter fixed effects, annualized monthly flows are an economically and statistically significant 10.29% (12.63%) higher following months when *High_Sent* (*High_DSPI*) equals one, compared to months when *High_Sent* (*High_DSPI*) equals zero. The results remain qualitatively unchanged in columns (2) and (4), when I include *log (All TNA)*, *Alpha*, *%Households*, and *Lag_SP500Ret* as control variables in addition to quarter fixed effects.

IV. Investor Sentiment at Inception

IV.A. Inception Year of Funds

Before investigating the quality of funds launched by fund sponsors, I report descriptive information on the number of funds by inception year in the sample. Figure 3 plots the number of passive and active funds launched by inception year over the period 1965-2017. The volume of active funds entering the market has exceeded the volume of passive funds entering the market for almost the entire sample period, with the peak in 2000 during the Dotcom bubble when 667 active funds (i.e. share classes) were launched. The highest volume of passive fund launches is in 2000 and 2017, with 94 and 96 funds, respectively. Consistent with the growth of the passive segment in the last two decades noted by industry observers, the number of passive and active funds entering the market have been converging since 2009.

IV.B.   Fund Pricing

In this section, I explore fee-setting for funds. Table II reports the results from multivariate regressions explaining net expense ratio of a fund in year *t* as the dependent variable (in basis points (bps)) for passive funds (columns (1)-(5)) and active funds (columns (6)-(10)). The unit of observation is fund-year. The goal is to examine whether funds launched in high-sentiment periods are more expensive compared to those launched in low-sentiment periods, controlling for a variety of factors that could affect fund fees, including objective-year fixed effects which account for systematic differences in fees across objective groups in each year.[13]   In Table II and the remainder of the paper, *High_IncSent* and *High_IncDSPI* are constructed to reflect sentiment levels at a fund's inception. *High_IncSent* and *High_IncDSPI* are indicator variables assigned a value of one for a fund if the BW sentiment index and the growth in disposable income, averaged across the 12 months in the fund's inception year, is above the median value in the sample period, and zero if it is below the median, respectively. *NewFund* is an indicator variable assigned a value of one in year *t* if it is the fund's inception year, and zero otherwise, and captures fee-setting in the year the fund is launched. The interaction terms *High_IncSent* x *NewFund* and *High_IncDSPI* x *NewFund* as explanatory variables capture the relation between sentiment levels in the inception year and the fees of new funds in the year they are launched. Fund-level control variables that could impact fund pricing included in the regressions are the average monthly gross returns in year *t* (*Return*), the average monthly fund flows in year *t* (*Flow*), annual turnover in year *t* (*Turnover*), the natural logarithm of the fund's monthly total net assets in the first available month of year *t* (*log* (*TNA*)), the natural logarithm of the average TNA of other share classes of the fund in the first available month of year *t* (*log* (*Other TNA*)), the natural logarithm of one plus the number of years since inception of the oldest share class of the fund as of year *t* (*log* (*Oldest Age*)), an indicator variable signifying an ETF (*Dummy_ETF*), and an indicator variable signifying a sector fund (*Dummy_Sector*). Since family-level factors are also known to

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[13] In alternative specifications including family fixed effects, in addition to objective-year fixed effects, the results remained qualitative similar but were based on fewer observations. The family fixed effects eliminate sponsor-level heterogeneities in fee-setting, such as a common pool of independent directors who sit on the boards of multiple funds within a complex (e.g. Tufano and Sevick (1997)). For brevity, I do not tabulate these results (available upon request).

affect fees, I include the following family-level controls: the natural logarithm of the sum of TNA across all equity funds in the family in the first month of year t (*log* (*Family TNA*)), average expense ratios across all equity funds in the family in year t (*Family Expense Ratio*), average gross monthly return across all equity funds in the family in year t (*Family Return*), and average monthly flows across all equity funds in the family in year t (*Family Flow*).[14] The *p*-values are based on standard errors clustered by fund family.

In column (1) of Table II, the coefficient on *High_IncSent* is positive and significant at the 1% level, suggesting that passive funds launched in high-sentiment periods charge higher expense ratios than those launched in low-sentiment periods on average.[15] The results are also economically significant, with passive funds launched in high-sentiment periods charging 10.8 bps more than those launched in low-sentiment periods on average, which is a large increase of 21.6% relative to the median expense ratio of 50 bps in the sample of passive funds. In column (2), the coefficients on *High_IncSent* and the interaction term *High_IncSent* x *NewFund* are significantly positive, whereas the coefficient on *NewFund* is significantly negative. Together, the results indicate that new funds charge significantly less than incumbent peers when launched in low-sentiment periods, but significantly more when launched in high-sentiment periods. Column (2) shows that new passive funds launched in high-sentiment periods charge 23.9 bps higher in their inception year than those launched in low-sentiment periods. The results are similar in columns (3) and (4), when *High_IncDSPI* is used as the measure of sentiment level at inception. In column (4), new passive funds launched in high-sentiment periods charge 17.9 bps higher than those launched in low-sentiment periods in their inception year, and 7.1 bps thereafter, on average. In column (5), I focus on the sample of passive funds tracking the S&P 500 index, which are among the most popular sub-categories of passive funds. New passive S&P 500 funds launched in high-sentiment periods charge around 30.3 bps higher than those launched in low-sentiment periods on average in their inception year, which is

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[14] In robustness checks, I run regressions including lagged control variables measured in year t-1. However, this excludes observations for funds in their inception year. Other qualitative results remain unchanged. Additionally, the results on fees over the long term are robust to measuring control variables capturing fund and family performance using alphas, for which a minimum of 36 months of fund returns should be available to compute factor loadings.

[15] The main results in Table II and in the remainder of the paper are robust to excluding the subsample of funds with the Dotcom bubble period of 1998-2000 as inception years (available upon request).

a remarkable 45.9% increase relative to the median of 66 bps for these funds. Among other results, passive funds with higher turnover, larger TNA of other share classes, and from families with higher average expense ratios and flows, are more expensive. Also, larger passive funds and funds from larger families (based on TNA) are cheaper, consistent with economies of scale in fund pricing.

Columns (6)-(10) in Table II show that the results based on active funds are qualitatively similar to those based on passive funds. In column (6), active funds launched in high-sentiment periods charge expense ratios that are 5.9 bps higher than those launched in low-sentiment periods on average (significant at the 5% level), which is a 3.8% increase relative to the median expense ratio of 155 bps in the sample. In column (7), active funds launched in high-sentiment periods charge 14.6 bps higher on average in their inception year than those launched in low-sentiment periods, and 4.0 bps thereafter, on average. The sentiment effects are similar in columns (8)-(9), with *High_IncDSPI* as the proxy for sentiment levels at inception. In column (10), active funds benchmarking versus the S&P 500 index launched in high-sentiment periods charge 21.2 bps higher in their inception year compared to those launched in low-sentiment periods, which is a 13.8% increase relative to the median expense ratio of these funds.[16] Among other results, expense ratios of active funds increase with returns, sum of TNA of other share classes of the fund, and the family's average expense ratio. Also, larger funds and funds with more flows are cheaper.

In sum, the results are consistent with strategic fee-setting by fund sponsors conditional on investor sentiment, both in the passively managed and actively managed segments.[17] Interestingly, the economic magnitude of the sentiment effects on fund pricing is larger in the passive segment, which has been conjectured to have more sophisticated clienteles (see Gruber (1996); Elton, Gruber, and Busse (2004)).

IV.C.   Fund Performance

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[16] As an additional examination of fee-setting, I replicate the results based on 12b-1 fees charged by funds as the measure of a fund's fees. In unreported robustness checks, the regression results explaining 12b-1 fees are qualitatively similar to those reported based on expense ratios.

[17] In unreported non-parametric tests, TNA-weighted fees are also significantly higher for passive and active funds launched in high-sentiment periods than low-sentiment periods.

In this section, I investigate whether funds launched in high-sentiment periods systematically differ in performance compared to those launched in low-sentiment periods.

Table III reports the results of multivariate regressions explaining annualized gross return in month t, for passive funds (columns (1)-(5)) and active funds (columns (6)-(10)).[18] I consider gross returns to account for the value potentially added by managerial skill (applicable for actively managed funds) and other unobserved factors associated with the quality of the fund, which affect before-cost return.[19] The unit of analysis is fund-month. I include objective-month fixed effects to account for systematic differences in return attributes within a fund's objective, such as those driven by the common risk factors in the objective's asset universe. I include a variety of lagged fund- and family-level controls that could explain performance. *YoungFund* in month t is an indicator variable which equals one if t is within five years of the inception year, and zero otherwise. The interaction terms, *High_IncSent* x *YoungFund* and *High_IncDSPI* x *YoungFund*, capture the relation between sentiment levels at inception with the fund's performance in the five years following inception, representing the fund's short-term post-inception performance window. The *p*-values are based on standard errors clustered by fund and objective-month.

For passive funds in column (1) of Table III, the coefficient on *High_IncSent* suggests that passive funds launched in high-sentiment periods generate 0.64% lower annualized gross monthly returns than those launched in low-sentiment periods, ceteris paribus. Controlling for objective-month fixed effects, these results capture the variation in passive funds' performance driven by tracking error.[20] In column (2), the regression results show that passive funds launched in high-sentiment periods significantly underperform those launched in low-sentiment periods by 1.43% annualized gross monthly return in the five years following inception, and by 0.58% thereafter, ceteris paribus. Since the underperformance lasts

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[18] I do not use the standard four-factor alpha measure of performance due to the estimation period requirements for factor loadings (typically 36 to 60 months), which are not amenable to studying the funds' short-term performance in the post-inception period. In untabulated results, the results for long-term risk-adjusted fund performance, based on four-factor alphas computed using a 36-month estimation period for factor loadings, remain qualitatively similar.

[19] See, for example, Kacperczyk, Sialm, and Zheng (2008) who discuss the "unobserved actions" of active fund managers. The variation in gross returns for passive funds tracking the same index is determined by tracking error.

[20] Not surprisingly, given the earlier results on fees, the results strengthen when returns are measured net of fees.

beyond the short term following the funds' launch in high-sentiment periods, the results are not explained by potential sentiment-related stock mispricing that may disproportionately affect the returns of these funds over the short term. The sentiment effects on performance are similar on using *High_IncDSPI* to measure sentiment at inception in columns (3)-(4). In column (5), passive S&P 500 funds launched in high-sentiment periods significantly underperform those launched in low-sentiment periods by 0.33% annualized gross monthly return on average, but the sentiment effects are not significantly different between the short-term and long-term post-inception window.

The results are similar for active funds in column (6)-(10) in Table III. Columns (7) and (9) show that funds launched in high-sentiment periods underperform those launched in low-sentiment periods by an annualized return of 2.16% and 2.53% on average in the five years following inception, and 0.32% and 0.20% over the longer term. In column (10), active funds benchmarking versus the S&P 500 index launched in high-sentiment periods significantly underperform those launched in low-sentiment periods by 2.27% annualized return on average in the five years post-inception, and by 0.22% over the longer term.

IV.D.   Fund Survival

Next, I investigate whether sentiment levels at inception predict the likelihood of a fund's survival. Previous work has posited that poor performance increases the likelihood of market exit of a fund, and funds are more likely to exit when the overall market conditions are poor (see Brown and Goetzmann (1995); Elton, Gruber, and Blake (1996); Zhao (2005)). However, these studies do not investigate the potential impact of the market environment at inception and, specifically, investor sentiment at inception.

Table IV reports the results from multivariate logistic regressions explaining fund survival for passive funds (columns (1)-(5)) and active funds (columns (6)-(10)). The unit of analysis is fund-year. The dependent variable, *Survival*, is an indicator variable equal to zero in year *t* if a fund experiences closure (via liquidation or merger) in the window *t* through *t*+3, and one otherwise, computed on a rolling basis in

each fund-year in the window starting at $t=0$ (the inception year).[21] A forward-looking rolling window spanning three years is used to account for lags between observing factors that can affect fund survival and the fund's market exit. To study survival of young funds over the short term, *PostIncep* is constructed as an indicator variable in year t which equals one if t is in the window [0, 2], and zero otherwise. Thus, the interaction terms *High_IncSent* x *PostIncep* and *High_IncDSPI* x *PostIncep* capture the effect of sentiment at inception on fund survival up to five years following inception. I include objective-year fixed effects to account for heterogeneities in fund survival rates within each objective and year. I include fund-level variables which could affect survival, such as size, performance, and asset flows, measured in year t. I also control for family-level attributes such as the size of the family, recent performance, and asset flows, measured in year t, which can have an important bearing on a fund sponsor's decision to close a fund in the window t through $t+3$. The p-values in parentheses are based on standard errors clustered by objective-year. The marginal effects for the key variables are in brackets below the p-values.

The results in Table IV suggest that passive and active funds launched in high-sentiment periods have a lower likelihood of survival, over the short term and long term. Column (1) (Column (3)) reveals that *High_IncSent* (*High_IncDSPI*) is negatively related to the survival of passive funds in a statistically significant way, with funds launched in high sentiment periods 3.2% (3.0%) less likely to survive at least another three years at any point in their life than those launched in low-sentiment periods. In columns (2) and (4), passive funds launched in high-sentiment periods are 6.1% and 16.2% less likely to survive at least another three years at any time in the two year-window following inception, compared to those launched in low-sentiment periods. In column (5), passive S&P 500 funds launched in high-sentiment periods are 10.8% less likely to survive at least another three years in the two year-window following inception, and 7.0% less likely to survive another three years at any point in their life over the longer term, compared to those launched in low-sentiment periods. Among other results for passive funds, smaller funds, sector

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[21] In untabluated results, I also repeat the analyses of fund survival including only fund liquidations as market exit, and omitting mergers, since liquidations are less ambiguous than mergers as "involuntary" exits. The results remain materially unchanged.

funds, funds with lower flows and, perhaps surprisingly, lower turnover are less likely to survive. Ceteris paribus, passive funds from families with higher average expense ratios and lower flows are less likely to survive another three years at any point in their life.

Column (6) of Table IV shows that active funds launched in high-sentiment periods are 3.4% less likely to survive another three years at any point in their life than those launched in low-sentiment periods, ceteris paribus. In columns (7) and (9), active funds launched in high-sentiment periods are 10.4% and 11.5% less likely to survive another three years in the two year-window following inception, compared to those launched in low-sentiment periods, and 2.6% and 1.5% less likely to survive another three years at any point in their life over the longer term, respectively. In column (10), active funds benchmarking versus the S&P 500 launched in high-sentiment periods are 11.0% less likely to survive another three years in the two year-window following inception, on average, relative to those launched in low-sentiment periods. Among other results for active funds, smaller funds and funds with poor past performance, lower flows, higher expense ratios and higher turnover are less likely to survive.

IV.E.   Robustness Checks

For robustness checks, I consider three alternative proxies for investor sentiment, described in Appendix C. The robustness checks are reported in Table C.1. and show that the main results are robust to alternative measures of investor sentiment.

V.   Conclusion

Given the importance of the asset management industry in the last few decades, the sophistication of investors in this industry has drawn considerable attention among practitioners and academics. This paper views investor sophistication through the lens of temporal variation in investor sentiment to document how fund sponsors exploit sentiment. I show that passive and active funds launched in high-sentiment periods are more expensive, tend to underperform before-cost, and are less likely to survive relative to their

peers launched in low-sentiment periods, over the short term and long term. The findings suggest that fund sponsors exploit sentiment by launching inferior investment products in high-sentiment periods.

The evidence in this study suggests avenues for future research. There has been an increasing focus in recent years on regulatory interventions by policy-makers seeking to improve the quality of investment decisions of retail investors, which can subsequently increase investor welfare. The findings in this paper call for a deeper understanding of not just the types of costly mistakes retail investors make, but also *when* they are more likely to make mistakes, which could serve to enrich these policy discussions and increase investor awareness. Since prior studies have viewed the clienteles of passive funds as more sophisticated (see Gruber (1996); Elton, Gruber, and Busse (2004)), which should be less susceptible to sentiment effects, another aspect of the findings in this paper that may merit further investigation is the somewhat puzzling evidence that the effect of investor sentiment on fund pricing is economically larger in the passive segment of asset management. Perhaps the large influx of capital into the passively managed segment in the last two decades has changed the attributes of the clientele in ways that have long term implications for strategic decision-making by fund sponsors and the industry's competitive dynamics.

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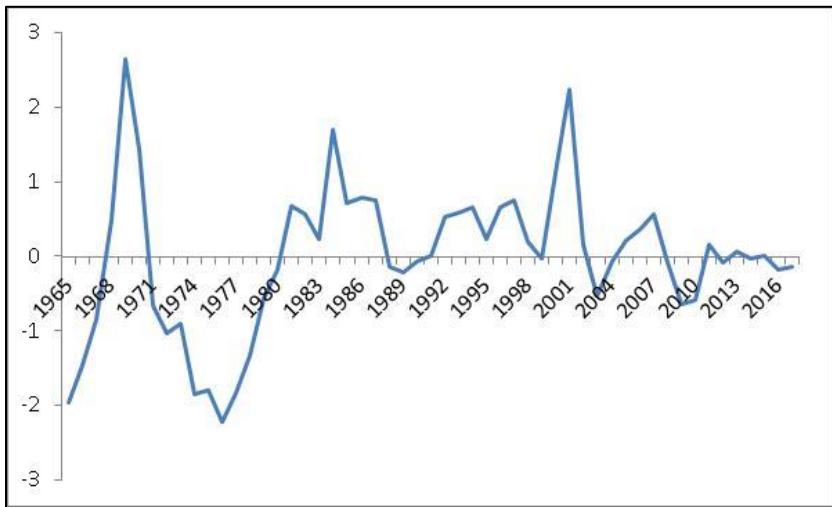
Figure 1
Investor Sentiment

The graph plots the yearly average monthly investor sentiment index of Baker and Wurgler (2006) from 1965 to 2017. The sentiment index is the first principal component of six measures: the closed-end fund discount, NYSE share turnover, the number of and the average of first-day returns on initial public offerings, the equity share in new issues, and the dividend premium.
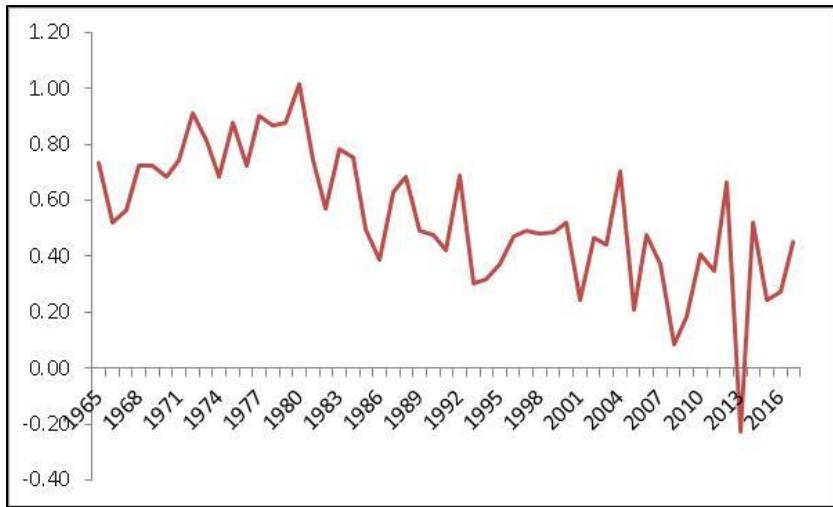
Figure 2
Growth in Disposable Income

The graph plots the yearly average monthly growth rate (*ΔDSPI*) (in %) of the seasonally-adjusted monthly disposable personal income in chained 2009 dollars over 1965 to 2017. (Source: U.S. Bureau of Economic Analysis)
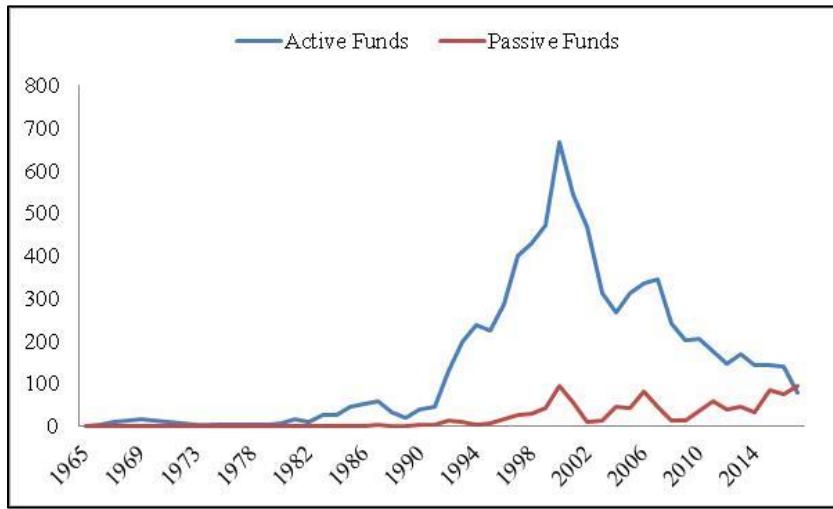
Figure 3
Inception Year of Funds

The graph plots the frequency of passively managed and actively managed U.S. equity fund share classes by inception year in the period 1965 to 2017.

Table I
Investor Sentiment and Fund Flows

This table reports the mean coefficient estimates and associated *p*-values (in parentheses) from regressions explaining flows to U.S. equity funds during 1993 to 2017. The dependent variable is the mean annualized monthly flow in month *t* to all funds in the sample. *High_Sent* is an indicator variable that is assigned a value of one if the Baker and Wurgler (2006) sentiment index in month *t*−1 is above the median level in the sample period, and zero if it is below the median. *High_DSPI* is an indicator variable that is assigned a value of one if the cumulative monthly growth in disposable income over months *t*−6 to *t*−1 is above the median in the sample period, and zero if it is below the median. *log (All TNA)* is the natural logarithm of the sum of TNA across all funds in month *t*−1. *Alpha* is the mean four-factor alpha across all funds in month *t*−1, measured using factor loadings estimated for each fund over months *t*−36 to *t*−1. *%Households* is the percentage of U.S. households owning mutual funds in the year. *Lag_SP500Ret* is the cumulative monthly returns on the S&P 500 Composite Index in the months *t*−6 to *t*−1. All specifications include calendar quarter (season) fixed effects for the four quarters. The *p*-values are based on heteroskedasticity- and autocorrelation-consistent (HAC) Newey-West standard errors with three lags. ***, **, * represent 1%, 5%, and 10% confidence levels, respectively.

	(1)	(2)	(3)	(4)
High_Sent	10.290***	15.396***		
	(0.006)	(0.000)		
High_DSPI			12.630***	6.052***
			(0.000)	(0.001)
log (All TNA)		-37.139***		-31.273***
		(0.000)		(0.000)
Alpha		0.119		0.153*
		(0.125)		(0.054)
%Households		1.371***		1.038***
		(0.000)		(0.000)
Lag_SP500Ret		0.414***		0.340***
		(0.000)		(0.000)
Quarter (1-4) F.E.	Yes	Yes	Yes	Yes
Observations	298	298	298	298
R-squared	0.047	0.754	0.128	0.695

Table II
Fee-setting and Investor Sentiment

This table reports the mean coefficient estimates and associated *p*-values (in parentheses) from yearly regressions explaining fee-setting in retail passive funds (columns (1)-(5)) and active funds (columns (6)-(10)). Column (5) and column (10) are based on the subsample of passive and active funds with the S&P 500 index as benchmark, respectively. The dependent variable is *Expense Ratio*, the fund's net expense ratio in the year *t* (in basis points). *NewFund* is an indicator variable assigned a value of one if the year *t* is the year of inception of the fund, and zero otherwise. *High_IncSent* and *High_IncDSPI* are indicator variables assigned a value of one if the monthly Baker and Wurgler (2006) sentiment index and the growth in disposable income, averaged across the 12 months in the inception year of the fund, is above the median value in the sample period, and zero if it is below the median, respectively. *Return* is the fund's average gross monthly return in year *t*. *Flow* is the fund's average monthly flow in year *t*. *Turnover* is the fund's turnover in year *t*. *log (TNA)* is the natural logarithm of the fund's total net assets in the first available month of year *t*. *log (Other TNA)* is the natural logarithm of the total net assets across all other share classes of the fund in the first available month of year *t*. *log (Oldest Age)* is the natural logarithm of the fund's oldest share class in years measured in year *t* plus one. *Dummy_ETF* is an indicator variable which equals one if the fund is an ETF, and zero otherwise. *Dummy_Sector* is an indicator variable assigned a value of one if the fund is a specialized sector equity fund, and zero otherwise. *log (Family TNA)* is the natural logarithm of the sum of total net assets of funds in the family in the first available month of year *t*. *Family Expense Ratio* is the average expense ratio across funds in the family in year *t*. *Family Return* is the average monthly fund return across funds in the family in year *t*. *Family Flow* is the average monthly fund flows across funds in the family in year *t*. All specifications include objective-year or year fixed effects. The *p*-values are based on robust standard errors that account for clustering by fund family. ***, **, * represent 1%, 5%, and 10% confidence levels, respectively.

Table II (continued)
Fee-setting in New Funds

	Passive Funds					Active Funds				
	All	All	All	All	S&P	All	All	All	All	S&P
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High_IncSent	10.827***	10.437***			3.547	5.903**	4.048**			9.467***
	(0.003)	(0.008)			(0.435)	(0.023)	(0.033)			(0.003)
NewFund	-5.309	-11.832**	-5.874	-9.872**	-28.494***	-9.469***	-12.341***	-8.851***	-13.949***	-9.279***
	(0.116)	(0.011)	(0.111)	(0.041)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)
High_IncSent x *NewFund*		13.458***			30.354***		10.522**			11.759***
		(0.001)			(0.003)		(0.011)			(0.007)
High_IncDSPI			8.544**	7.136**				6.396*	6.044*	
			(0.016)	(0.044)				(0.085)	(0.055)	
High_IncDSPI x *NewFund*				10.725***					12.895***	
				(0.008)					(0.000)	
Return	-0.077	-0.059	-0.100	-0.094	-0.077	0.183***	0.186***	0.179***	0.182***	0.150***
	(0.371)	(0.485)	(0.237)	(0.266)	(0.816)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)
Flow	-0.218	-0.279	-0.260	-0.282	-0.962*	-0.681***	-0.692***	-0.736***	-0.745***	-0.695***
	(0.264)	(0.165)	(0.163)	(0.122)	(0.056)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)
Turnover	9.263***	9.267***	9.030***	9.001***	27.540***	0.509	0.504	0.609	0.603	0.890
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.383)	(0.388)	(0.290)	(0.295)	(0.172)
log (TNA)	-5.443***	-5.454***	-5.715***	-5.710***	-7.513***	-6.296***	-6.295***	-6.132***	-6.134***	-5.989***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log (Other TNA)	1.177***	1.181***	1.247***	1.243***	1.514***	1.336***	1.332***	1.292***	1.292***	1.265***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log (Oldest Age)	3.277	3.111	3.557	3.496	-2.612	-1.664*	-1.672*	-0.264	-0.241	-3.901**
	(0.232)	(0.257)	(0.217)	(0.225)	(0.494)	(0.078)	(0.077)	(0.752)	(0.772)	(0.015)
Dummy_ETF	3.883	3.840	5.532	5.436	10.855	10.401	10.327	10.760	10.300	
	(0.500)	(0.503)	(0.374)	(0.382)	(0.293)	(0.320)	(0.330)	(0.282)	(0.294)	
Dummy_Sector	6.248	6.634	5.148	5.246		-4.369	-4.367	17.975	19.080	8.894***
	(0.541)	(0.519)	(0.528)	(0.523)		(1.000)	(1.000)	(0.377)	(0.358)	(0.000)
log (Family TNA)	-4.343***	-4.319***	-4.119***	-4.108***	0.150	0.860**	0.863**	0.883**	0.882**	0.758
	(0.000)	(0.000)	(0.000)	(0.000)	(0.916)	(0.028)	(0.027)	(0.030)	(0.030)	(0.104)
Family Expense Ratio	0.426***	0.427***	0.432***	0.433***	0.336***	0.729***	0.729***	0.732***	0.732***	0.762***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Family Return	0.002	0.003	-0.011	-0.005	-0.014	-0.017	-0.017	-0.026	-0.026	-0.029
	(0.984)	(0.967)	(0.896)	(0.948)	(0.924)	(0.482)	(0.482)	(0.307)	(0.290)	(0.369)
Family Flow	2.140***	2.154***	2.413***	2.426***	-0.643	-0.488***	-0.481**	-0.312	-0.309	-0.671***
	(0.003)	(0.003)	(0.001)	(0.001)	(0.373)	(0.009)	(0.011)	(0.122)	(0.125)	(0.007)
Objective-Year F.E.	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Year F.E.	No	No	No	No	Yes	No	No	No	No	No
Observations	8,265	8,265	8,265	8,265	1,720	56,378	56,378	56,378	56,378	18,073
R-squared	0.767	0.768	0.768	0.768	0.543	0.467	0.467	0.454	0.455	0.526

Table III
Performance of Funds and Investor Sentiment

This table reports the mean coefficient estimates and associated *p*-values (in parentheses) from regressions explaining annualized monthly gross return in month *t* (in %) for retail passive funds (columns (1)-(5)) and active funds (columns (6)-(10)). Column (5) and column (10) are based on the subsample of passive and active funds with the S&P 500 index as benchmark, respectively. *YoungFund* is an indicator variable assigned a value of one for each year in the post-inception window [0, 5], with year 0 being the fund's inception year. All other independent variables are as defined in Table II, measured in the previous year for annual values, and in month *t*-1 for monthly values. All specifications include objective-month or month fixed effects. The *p*-values are based on robust standard errors that account for clustering by fund and objective-month in all specifications, except column (5) where they are clustered by fund and month. ***, **, * represent 1%, 5%, and 10% confidence levels, respectively.

	Passive Funds					Active Funds				
	All	All	All	All	S&P	All	All	All	All	S&P
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High_IncSent	-0.635**	-0.584**			-0.326**	-0.785***	-0.322*			-0.221**
	(0.014)	(0.033)			(0.025)	(0.000)	(0.080)			(0.047)
YoungFund	-0.130	-0.363**	-0.037	0.146	0.017	-0.159*	-0.216**	-0.185**	-0.147	0.024
	(0.499)	(0.191)	(0.850)	(0.568)	(0.868)	(0.055)	(0.032)	(0.037)	(0.169)	(0.884)
High_IncSent x YoungFund		-0.841***			-0.405		-1.837***			-2.046**
		(0.009)			(0.114)		(0.000)			(0.025)
High_IncDSPI			-0.624	-0.314**				-0.484**	-0.199**	
			(0.245)	(0.036)				(0.028)	(0.047)	
High_IncDSPI x YoungFund				-1.158***					-2.525***	
				(0.005)					(0.007)	
Expense Ratio	-0.487***	-0.496***	-0.559***	-0.546***	0.050	-0.100	-0.101	-0.131	-0.130	-0.123
	(0.009)	(0.008)	(0.003)	(0.003)	(0.638)	(0.204)	(0.201)	(0.106)	(0.109)	(0.287)
Turnover	-0.036	-0.037	-0.034	-0.032	0.329	-0.266**	-0.267**	-0.261**	-0.261**	-0.250***
	(0.687)	(0.680)	(0.700)	(0.719)	(0.174)	(0.022)	(0.022)	(0.023)	(0.022)	(0.007)
Flow	-0.000	-0.000	-0.000	-0.000	0.002	0.004***	0.004***	0.003***	0.003***	0.002**
	(0.875)	(0.871)	(0.902)	(0.904)	(0.135)	(0.000)	(0.000)	(0.000)	(0.000)	(0.042)
log (TNA)	-0.074*	-0.075*	-0.088**	-0.090**	-0.018	-0.067***	-0.067***	-0.071***	-0.071***	-0.085***
	(0.063)	(0.059)	(0.025)	(0.021)	(0.357)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)
log (Other TNA)	0.000	0.001	0.003	0.004	-0.005	-0.008	-0.008	-0.006	-0.006	-0.017**
	(0.964)	(0.905)	(0.689)	(0.678)	(0.176)	(0.273)	(0.258)	(0.410)	(0.411)	(0.043)
log (Oldest Age)	0.229*	0.213*	0.240**	0.251**	0.156*	-0.065	-0.064	-0.047	-0.047	-0.062
	(0.057)	(0.083)	(0.048)	(0.039)	(0.084)	(0.308)	(0.312)	(0.462)	(0.461)	(0.434)
Dummy_ETF	-0.166	-0.168	-0.100	-0.082	0.069	-0.777***	-0.758***	-0.451**	-0.458**	
	(0.428)	(0.422)	(0.642)	(0.700)	(0.526)	(0.002)	(0.002)	(0.040)	(0.040)	
Dummy_Sector	-3.535***	-3.525***	-3.875***	-3.871***		-0.877***	-0.864***	0.985***	0.984***	-0.437***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log (Family TNA)	0.087**	0.087**	0.096**	0.097**	0.039	0.135***	0.135***	0.133***	0.133***	0.186***
	(0.027)	(0.027)	(0.014)	(0.013)	(0.233)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Family Expense Ratio	0.070	0.068	0.134	0.127	0.014	0.006	0.006	0.003	0.002	0.205
	(0.668)	(0.675)	(0.414)	(0.437)	(0.870)	(0.949)	(0.949)	(0.977)	(0.985)	(0.277)
Family Return	0.013	0.013	0.012	0.012	0.006	0.022***	0.022***	0.021***	0.021***	0.016*
	(0.294)	(0.292)	(0.304)	(0.309)	(0.385)	(0.001)	(0.001)	(0.002)	(0.002)	(0.075)
Family Flow	0.076*	0.076*	0.077*	0.077*	-0.036	0.018	0.018	0.023	0.023	0.023
	(0.052)	(0.052)	(0.051)	(0.051)	(0.158)	(0.341)	(0.343)	(0.216)	(0.219)	(0.431)
Objective-Month F.E.	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Month F.E.	No	No	No	No	Yes	No	No	No	No	No
Observations	59,881	59,881	59,881	59,881	14,951	531,040	531,040	531,040	531,040	178,523
R-squared	0.791	0.791	0.785	0.785	0.981	0.699	0.699	0.698	0.698	0.722

Table IV
Fund Survival and Investor Sentiment

This table reports the mean coefficient estimates and associated *p*-values (in parentheses) from pooled logit regressions predicting fund survival. The regression estimates are based on retail passive funds (columns (1)-(5)) and active funds (columns (6)-(10)). Column (5) and column (10) are based on the subsample of passive and active funds with the S&P 500 index as benchmark, respectively. A positive coefficient on a variable indicates that the probability of survival goes up as that variable goes up. The unit of analysis is a fund-year pair, starting with year 0, the fund's inception year. The dependent variable is, *Survival*, an indicator variable equal to zero in year *t* if a fund experiences closure (via liquidation or merger) in the window (*t*, *t*+3), and one otherwise, computed on a rolling basis in each fund-year over the life of the fund in the sample period. *PostIncep* is an indicator variable assigned a value of one for each year in the post-inception window [0, 2], thus accounting for survival in the window [0, 5]. *LowReturn* is an indicator variable assigned a value of one if the fund's average gross monthly return in year *t* is below the median average monthly gross return across all funds in the fund's objective-year group in year *t*, and zero if it is above the median. *LowFlow* is an indicator variable assigned a value of one if the fund's average monthly flow in year *t* is below the median average monthly flow across all funds in the fund's objective-year group in year *t*, and zero if it is above the median. All other independent variables are as defined in Table II, measured in year *t*. All specifications include objective-year or year fixed effects. The *p*-values are based on robust standard errors that account for clustering by objective-year in all specifications, except column (5) where they are clustered by year. Marginal effects for the variables of interest are in square brackets. ***, **, * represent 1%, 5%, and 10% confidence levels, respectively.

Table IV (continued)
Fund Survival and Investor Sentiment

	Passive Funds					Active Funds				
	All	All	All	All	S&P	All	All	All	All	S&P
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High_IncSent	-0.484**	-0.414***			-0.716***	-0.245***	-0.399***			-0.236**
	(0.012)	(0.005)			(0.000)	(0.000)	(0.006)			(0.015)
	[-0.032]	[-0.024]			[-0.070]	[-0.034]	[-0.026]			[-0.019]
PostIncep	-0.053	0.276	-0.037	0.819***	0.037	0.365***	0.580***	0.396***	0.700***	0.397***
	(0.835)	(0.441)	(0.883)	(0.001)	(0.950)	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)
	[-0.002]	[0.016]	[-0.001]	[0.046]	[0.008]	[0.020]	[0.052]	[0.036]	[0.061]	[0.036]
High_IncSent x *PostIncep*		-0.513**			-0.369**		-0.717***			-0.870***
		(0.030)			(0.021)		(0.000)			(0.004)
		[-0.037]			[-0.038]		[-0.078]			[-0.091]
High_IncDSPI			-0.484**	-0.311*				-0.234**	-0.165*	
			(0.018)	(0.074)				(0.025)	(0.060)	
			[-0.030]	[-0.041]				[-0.038]	[-0.015]	
High_IncDSPI x *PostIncep*				-1.430***					-1.086***	
				(0.000)					(0.000)	
				[-0.121]					[-0.100]	
LowReturn	-0.001	0.006	0.031	-0.016	-0.761*	-0.410***	-0.406***	-0.410***	-0.410***	-0.389***
	(0.998)	(0.980)	(0.886)	(0.936)	(0.057)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
LowFlow	-0.662***	-0.673***	-0.645***	-0.649***	-0.498***	-0.898***	-0.903***	-0.843***	-0.847***	-0.893***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Expense Ratio	0.259*	0.275**	0.198	0.249	0.394	-0.131***	-0.128***	-0.150***	-0.144***	-0.126**
	(0.062)	(0.039)	(0.207)	(0.120)	(0.208)	(0.009)	(0.008)	(0.004)	(0.004)	(0.028)
Turnover	0.687***	0.692***	0.682***	0.701***	0.713*	-0.116***	-0.115***	-0.127***	-0.126***	-0.084*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.060)	(0.000)	(0.001)	(0.000)	(0.000)	(0.052)
log (TNA)	0.432***	0.438***	0.422***	0.420***	0.468***	0.359***	0.358***	0.355***	0.357***	0.407***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log (Other TNA)	0.073***	0.073***	0.072***	0.073***	0.105***	0.055***	0.055***	0.053***	0.054***	0.052***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log (Oldest Age)	0.006	0.013	-0.000	0.005	0.261	0.078*	0.073*	0.060	0.062	0.111*
	(0.973)	(0.938)	(0.998)	(0.974)	(0.208)	(0.057)	(0.067)	(0.124)	(0.128)	(0.082)
Dummy_Sector	-2.764***	-2.800***	-2.478**	-2.288**		-1.515***	-1.591***	-1.611***	-1.612***	-12.329***
	(0.008)	(0.005)	(0.016)	(0.032)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
log (Family TNA)	-0.009	-0.010	-0.007	-0.011	-0.003	-0.060***	-0.059***	-0.059***	-0.060***	-0.127***
	(0.783)	(0.764)	(0.817)	(0.728)	(0.939)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Family Expense Ratio	-0.888***	-0.893***	-0.769***	-0.782***	-0.780***	-0.124***	-0.127***	-0.041	-0.045	-0.243***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.007)	(0.007)	(0.386)	(0.324)	(0.005)
Family Return	-0.000	-0.000	-0.000	0.001	0.008	0.005*	0.005*	0.004	0.004	0.003
	(0.982)	(0.991)	(0.987)	(0.916)	(0.520)	(0.074)	(0.073)	(0.156)	(0.148)	(0.398)
Family Flow	0.176***	0.176***	0.182***	0.180***	0.156***	0.069***	0.068***	0.075***	0.075***	0.098***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Objective-Year F.E.	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Year F.E.	No	No	No	No	Yes	No	No	No	No	No
Observations	4,650	4,650	4,650	4,650	1,810	79,324	79,324	79,324	79,324	24,000
Pseudo R-squared	0.343	0.344	0.337	0.343	0.325	0.286	0.287	0.286	0.287	0.321

Appendix A
Summary Statistics

The table describes the sample of retail U.S. domestic equity funds during 1993 to 2017. Panel A reports the aggregate TNA for passively managed and actively managed funds in the sample. Panel B reports fund characteristics for the sample of passively managed and actively managed funds. *# Funds* is the number of unique funds (share classes). *TNA* is the total net assets in USD billions. *Age* is the number of years since the fund's inception. *# Share Classes* is the number of unique share classes of a fund. *Turnover* (in %) is the funds turnover. *Expense Ratio* (in %) is the net expense ratio of the fund. *12b-1 Fee* (%) is the fund's marketing and distribution (12b-1) fee. *Dummy_ETF* is an indicator variable assigned a value of one if the fund is an ETF, and zero otherwise. *Dummy_Sector* is an indicator variable assigned a value of one if the fund is a specialized sector equity fund, and zero otherwise.

	Panel A: Aggregate TNA ($billions) by Year	
Year	Passive	Active
1993	$12.4	$331.8
1994	$14.6	$385.8
1995	$18.8	$494.2
1996	$27.1	$664.5
1997	$43.5	$857.6
1998	$69.1	$1,049.6
1999	$108.6	$1,275.7
2000	$139.9	$1,597.4
2001	$153.5	$1,394.2
2002	$164.1	$1,236.2
2003	$182.1	$1,235.6
2004	$247.9	$1,501.4
2005	$297.8	$1,625.1
2006	$351.9	$1,773.5
2007	$421.3	$1,917.2
2008	$395.6	$1,567.0
2009	$360.7	$1,227.1
2010	$445.2	$1,410.8
2011	$529.6	$1,531.7
2012	$583.8	$1,512.8
2013	$716.6	$1,746.6
2014	$859.1	$1,991.2
2015	$944.4	$1,962.2
2016	$992.0	$1,827.2
2017	$1,168.3	$1,891.8

Appendix A (continued)
Summary Statistics

	All Funds		Excluding Sector Funds	
Panel B: Fund Characteristics				
	Passive	Active	Passive	Active
# Funds	1,040	7,799	817	6,805
TNA ($ bill)	1.78	0.50	2.02	0.54
Age (in years)	6.62	9.36	6.88	9.46
# Share Classes	1.90	3.49	2.11	3.49
Turnover (%)	27.99	84.68	28.08	82.30
Expense Ratio (%)	0.66	1.58	0.70	1.55
12b-1 Fee (%)	0.18	0.50	0.22	0.50
Dummy_ETF	0.48	0.00	0.37	0.00
Dummy_Sector	0.21	0.13		

Appendix B
Distribution of Sample by Fund Objectives

This table presents the number of retail U.S. domestic equity funds in each objective group during the period 1993 to 2017. Panel A reports statistics for passively managed and actively managed broad equity funds. Panel B reports statistics for passively managed and actively managed sector equity funds.

	Panel A: Broad Equity Funds	
	Passive	Active
Number of Funds	All	All
Aggressive Growth	3	135
Balanced	1	0
Equity-Income	29	362
Growth	396	4,331
Growth and Income	279	824
Income	23	25
Small Company	110	1,128
Total	841	6,805
	Panel B: Sector Equity Funds	
	Passive	Active
Number of Funds	All	All
Specialty - Communications	5	51
Specialty - Financial	26	91
Specialty - Health	27	143
Specialty - Natural Resources	38	107
Specialty - Real Estate	31	219
Specialty - Technology	51	303
Specialty - Utility	21	80
Total	199	994

APPENDIX C
Alternative Measures of Investor Sentiment

To conduct robustness checks based on alternative measures of investor sentiment, I use three alternative specifications of the measure of investor sentiment. First, I use a web survey-based measure of investor sentiment created by the American Association of Individual Investors (AAII) which is widely used by practitioners. The AAII sentiment survey measures the percentage of individual investors who are bullish, bearish, and neutral on the stock market short term. I construct an indicator variable *High_BullBearSprd* for each fund, which is assigned a value of one if the annual average of the monthly spread between the proportion of bullish and bearish investors in the fund's inception year is above the median, and zero when it is below the median in the sample period. Second, I use the monthly survey of U.S. consumer confidence levels conducted by the University of Michigan to create *High_ConsSent*, which is assigned a value of one if the annual average of the monthly consumer confidence index in the fund's inception year is above the median, and zero when it is below the median in the sample period.[22] Finally, I use a proxy for investor sentiment similar in spirit to that used by Ben-Raphael, Kandel, and Wohl (2012), based on the relative monthly flows between U.S. equity and U.S. bond mutual funds. I construct *High_EqtyBond* as an indicator variable assigned a value of one if the annual average of the monthly aggregate new money growth of U.S. equity funds minus the new money growth of U.S. bond funds in the fund's inception year is above the median, and zero when it is below the median in the sample period.[23] To the extent that investors drive more flows into equity funds relative to bond funds when the levels of sentiment in the stock market are high, periods when *High_EqtyBond* equals one represent high-sentiment periods.

In Table C.1., I repeat the main regression results in this paper based on these alternative specifications of investor sentiment.

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[22] As discussed by Stambaugh, Yu, and Yuan (2012), the consumer confidence index is likely to be less influenced by stock prices compared to the Baker and Wurgler (2006) index and the investment measure based on surveys of stock market investors conducted by AAII.

[23] In month *t*, the aggregate new money growth of U.S. equity funds and U.S. bond funds is the net estimated flows to U.S. equity funds in month *t* relative to the total net assets in U.S. equity funds in month *t*−1, and the net estimated flows to U.S. bond funds in month *t* relative to the total net assets in U.S. bond funds in month *t*−1, respectively.

TABLE C.1.
Robustness Checks Using Alternative Measures of Sentiment

The table reports the mean coefficient estimates from regressions. Panel A replicates specifications from Table II, where the dependent variable is the fund's net expense ratio in the year t (in basis points). Panel B replicates specifications from Table III, where the dependent variable is the fund's annualized gross return in month t (in %). Panel C replicates specifications from Table IV, where the dependent variable is *Survival*, an indicator variable equal to zero in a fund-year t if the fund experiences closure (via liquidation or merger) in the period t through $t+3$, and one otherwise, where the unit of observation is fund-year. *High_BullBearSprd* is an indicator variable assigned a value of one if the annual average of the monthly spread between the proportion of bullish and bearish investors in the fund's inception year t is above the median, and zero when the annual average of the monthly spread is below the median in the sample period. *High_ConsSent* is an indicator variable assigned a value of one if the annual average of the monthly consumer confidence index in the fund's inception year t is above the median, and zero when the annual average of the monthly consumer confidence index is below the median in the sample period. *High_EqtyBond* is an indicator variable assigned a value of one if the annual average of the monthly aggregate new money growth of U.S. equity funds minus the new money growth of U.S. bond funds in the fund's inception year t is above the median, and zero when the annual average of the monthly aggregate new money growth of U.S. equity funds minus the new money growth of U.S. bond funds is below the median in the sample period. In Panel A, the p-values (in parentheses) are based on robust standard errors that account for clustering by fund family. In Panel B, the p-values (in parentheses) are based on robust standard errors that account for clustering by fund and objective-month. In Panel C, the p-values (in parentheses) are based on robust standard errors that account for clustering by objective-year, and the marginal effect is reported below the p-value in brackets. ***, **, * represent 1%, 5%, and 10% confidence levels, respectively.

| | Panel A: Fee-setting | | | | | |
| | Passive Funds | | | Active Funds | | |
	(1)	(2)	(3)	(4)	(5)	(6)
NewFund	-3.149	-0.989	-3.193	-11.698***	-13.981***	-13.117***
	(0.439)	(0.802)	(0.438)	(0.000)	(0.000)	(0.000)
High_BullBearSprd	5.828**			5.808***		
	(0.048)			(0.002)		
High_ConsSent		7.904***			6.010***	
		(0.010)			(0.001)	
High_EqtyBond			8.109**			5.785**
			(0.027)			(0.012)
High_BullBearSprd x NewFund	5.453**			8.216**		
	(0.049)			(0.030)		
High_ConsSent x NewFund		6.493**			11.413***	
		(0.043)			(0.002)	
High_EqtyBond x NewFund			3.685			10.711***
			(0.270)			(0.001)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Objective-Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,327	8,327	8,281	57,624	57,624	56,733
R-squared	0.775	0.775	0.776	0.447	0.447	0.446

TABLE C.1. (continued)
Robustness Checks Using Alternative Measures of Sentiment

	Panel B: Performance of Funds					
	Passive Funds			Active Funds		
	(1)	(2)	(3)	(4)	(5)	(6)
YoungFund	-0.248**	-0.147	-0.098	-0.239***	-0.003	-0.048
	(0.044)	(0.487)	(0.922)	(0.003)	(0.968)	(0.568)
High_BullBearSprd	-0.395*			-0.443**		
	(0.051)			(0.018)		
High_ConsSent		-0.460**			-0.743***	
		(0.011)			(0.006)	
High_EqtyBond			-0.360			-0.543**
			(0.133)			(0.023)
High_BullBearSprd x YoungFund	-0.673***			-0.713**		
	(0.008)			(0.031)		
High_ConsSent x YoungFund		-1.173***			-0.825***	
		(0.004)			(0.001)	
High_EqtyBond x YoungFund			-0.833**			-0.904**
			(0.016)			(0.044)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Objective-Month F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	60,546	60,546	59,773	561,919	561,919	560,783
R-squared	0.804	0.786	0.786	0.674	0.674	0.674

	Panel C: Logit Model of Fund Survival					
	Passive Funds			Active Funds		
	(1)	(2)	(3)	(4)	(5)	(6)
PostIncep	0.003	0.043	-0.052	0.471***	0.536***	0.494***
	(0.993)	(0.886)	(0.880)	(0.000)	(0.000)	(0.000)
	[0.002]	[0.003]	[0.007]	[0.043]	[0.049]	[0.045]
High_BullBearSprd	-0.285**			-0.136*		
	(0.040)			(0.054)		
	[0.027]			[0.014]		
High_ConsSent		-0.225*			-0.258**	
		(0.064)			(0.041)	
		[0.018]			[0.026]	
High_EqtyBond			-0.496***			-0.258***
			(0.007)			(0.009)
			[0.033]			[0.023]
High_BullBearSprd x PostIncep	-0.250**			-0.520**		
	(0.031)			(0.014)		
	[-0.032]			[0.052]		
High_ConsSent x PostIncep		-0.412***			-0.662***	
		(0.009)			(0.009)	
		[0.030]			[-0.072]	
High_EqtyBond x PostIncep			-0.268**			-0.675**
			(0.044)			(0.027)
			[0.035]			[-0.070]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Objective-Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,715	4,715	4,701	83,607	83,607	83,591
R-squared	0.322	0.321	0.327	0.277	0.277	0.277