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Abstract

Mutual funds hold 32% of the U.S. equity market and comprise 58% of retirement savings, yet retail investors consistently make poor choices when selecting funds. Theory suggests poor choices are partially due to fund managers creating unnecessarily complex disclosures and fee structures to keep investors uninformed and obfuscate poor performance. An empirical challenge in investigating this "strategic obfuscation" theory is isolating manipulated complexity from complexity arising from inherent differences across funds. We examine obfuscation among S&P 500 index funds, which have largely the same regulations, risks, and gross returns but charge widely different fees. Using bespoke measures of complexity designed for mutual funds, we find evidence consistent with funds attempting to obfuscate high fees. This study improves our understanding of why investors make poor mutual fund choices and how price dispersion persists among homogeneous index funds. We also discuss insights for mutual fund regulation and academic literature on corporate disclosures.

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1. Introduction

Over 9,000 mutual funds, holding $21.3 trillion in assets, were traded on U.S. exchanges during 2019. Mutual funds hold 32% of the total U.S. equity market value and comprise 58% of retirement savings (Investment Company Institute 2020). Despite the popularity of mutual funds, many studies find that they underperform and that retail investors consistently make poor choices when selecting funds.[1] Investor advocates argue that poor mutual fund choices are due in part to complex disclosures and fee structures that make it difficult to understand and compare funds, and that unnecessary complexity persists despite decades of regulatory efforts (e.g., SEC 1998; 2009a; 2014; 2018; 2020). Theory suggests that complexity persists because it is part of a strategy to obfuscate unfavorable information and extract rents from retail investors (Carlin 2009). Given the size of the mutual fund market, rent extraction could have significant implications for investor wealth. We empirically investigate whether mutual funds create unnecessarily complex disclosures and fee structures to obfuscate weak net performance.

An econometric challenge in investigating strategic obfuscation in mutual funds is controlling for variation in non-discretionary complexity caused by differences across funds. We mitigate this issue by examining S&P 500 index funds, which have largely homogeneous gross investment returns and risks but charge different fees so have heterogeneous net returns. For example, Schwab's S&P 500 fund charged 2 basis points (bps) in 2019 while Deutsche's charged up to 508 bps, despite earning nearly identical pre-expense returns (31.46% and 31.47%). Thus, S&P 500 index funds provide a setting to examine how disclosures and fee structures vary across funds with weaker versus stronger net performance (i.e., due to differences

[1] As a few examples, see the following for evidence that mutual funds' net-of-fees performance is worse than that of benchmark portfolios, and that investors often choose high-fee funds even when similar low-fee funds are available: Jensen (1968), Malkiel (1995), Gruber (1996), French (2008), Fama & French (2010), Elton et al. (2004), Frazzini & Lamont (2008), Choi et al. (2010), Evans & Fahlenbrach (2012), and Del Guercio & Reuter (2014).

in fees), while holding constant many drivers of non-discretionary complexity.

1.1. Theory and predictions

Theory demonstrates why high-fee index funds are motivated to create unnecessarily complex disclosures and fee structures. Carlin (2009) models a competitive equilibrium in which complexity prevents investors from understanding and comparing fees across otherwise identical funds, thus enabling funds to charge excessive fees. Recognizing the benefits of having more uninformed investors, high-fee funds create unnecessary complexity to increase investors' learning costs. An increase in learning costs endogenously increases the fraction of uninformed investors in the market, and allows price dispersion and rent extraction to persist.

The core intuition of Carlin (2009) is that high-fee funds want to shroud the market in complexity, such that investors find it difficult to learn from disclosures and make informed decisions. They instead invest randomly or, in practice, likely turn to advisors for assistance. Thus, a practical benefit of complexity is to complement funds' marketing efforts, such as providing commissions to advisors for selling funds. Extensive prior evidence finds that advisors steer investors toward high-fee funds and charge excessive incremental fees for doing so (Wall Street Journal 2019a, 2019b; Elton et al. 2004; Bergstresser et al. 2009; Edelen et al. 2012).

We investigate two potential methods that high-fee funds could use to increase complexity and keep investors uninformed (Carlin 2009). The first is to increase "narrative complexity" by using unnecessarily bad writing to make disclosures less readable. The SEC has repeatedly expressed concerns about the narrative complexity of mutual fund disclosures, but to date it has received little academic attention. The second method is to increase "structural complexity" by creating complex intra-fund structures and fee schedules that make it hard for investors to compare funds and identify the fees they must pay. While structural complexity has

been the focus of prior research (see Section 2), we also investigate structural complexity for completeness because it affects some proxies for narrative complexity.

Our empirical predictions are that high-fee funds have greater narrative complexity and greater structural complexity. As both fees and complexity are choice variables, these predictions are not causal. Instead, as depicted in Figure 1 and modeled in Carlin (2009), the association between fees and complexity is a joint outcome of funds' strategic choice. Sources of tension in our predictions are that S&P 500 funds are simple and that mutual fund disclosures are heavily regulated, so strategic obfuscation is plausibly unrealistic.

1.2. Sample and variable measurement

After imposing data requirements, our sample spans 1994-2017 and includes 38 S&P 500 index mutual funds. We exclude fund classes that are only available to or through institutions (e.g., as part of a retirement plan), such that all classes in our sample are available to self-directed retail investors. Our sample comprises $463B in assets under management in 2017, which is 47% of the total S&P 500 index mutual fund market in 2017 (Investment Company Institute 2018). Our sample funds have an average tracking error of only 3.4 bps, consistent with findings that S&P 500 funds very closely mirror the underlying index (Elton et al. 2019).[2]

We measure funds' total fees including annual fees and amortized one-time charges (*Fees*). The within-year standard deviation of *Fees* is 51 bps. This variation in fees is economically meaningful; e.g., our data indicate that retail investors paid an extra $358M in 2017 alone by holding high-fee versions of S&P 500 index funds.

We examine narrative complexity within funds' prospectuses, and especially within

[2] Tracking error, defined as the deviation between a fund's gross returns and the S&P 500 index, is an inverse measure of how well the fund tracks the S&P 500 index. High tracking errors are more common for funds tracking indices with illiquid securities.

summary prospectuses, which research finds are a common source of information for retail investors (see Section 2.3). Further, we show that brokerage websites copy text directly from summary prospectuses, so investors can be affected by prospectus readability even if they do not read the document itself. We develop two custom measures of readability based on guidance from practitioners and the SEC. *FundsinFiling* is the number of unique funds that managers include in a single prospectus (e.g., S&P 500 fund, Russell 3000 fund, etc.). *Repetition* measures the degree to which the prospectus summary section exactly repeats language from the details section. We also use two standard narrative complexity proxies, *Length* and *WordsPerSentence*, measured for both the entire prospectus and just the summary expense disclosure.

We measure structural complexity based on the fund's number of share classes and types and tiers of fees, combined into a principal component *Structural_Complexity*.

1.3. Analysis and findings

Our analyses are based on OLS and robust regressions with year fixed effects to eliminate common temporal variation in index returns, risks, regulations, and other non-discretionary fund characteristics. Consistent with strategic obfuscation, we find strong and positive associations between fees and multiple measures of both narrative complexity and structural complexity. We also investigate a number of alternative explanations for our findings.

First, it is possible that funds obfuscate using only structural complexity, and the associations between fees and narrative complexity are simply a byproduct of fund structure choices. Two of our narrative complexity proxies, *FundsinFiling* and *WordsPerSentence*, are designed to be free of this confound. To further investigate this alternative explanation, we identify specific disclosures in the summary prospectus that are unaffected by differences in structural complexity: fund objective and equity risk descriptions. We find positive associations

between *Fees* and narrative complexity just within objective and equity risk descriptions, indicating that structural complexity is not the sole driver of narrative complexity.

Second, perhaps high fees are justified because their issuers offer a wider variety of funds and services, and narrative and structural complexity are unavoidable outcomes of issuer offerings. Inconsistent with this explanation, we find that high-fee fund issuers offer fewer other funds and a similar variety of services as do low-fee fund issuers (e.g., trading platforms, mortgages, and insurance). Relatedly, we find that high-fee funds are more expensive regardless of an investor's holding period, which is inconsistent with the explanation that multi-class funds are used to cater to different horizon preferences.

Third, it is possible that narrative complexity is a byproduct of high-fee funds' efforts to reduce litigation risk. Section 6.5 explains that disclosure regulations were purposefully designed to allow funds to mitigate incomplete disclosure litigation risk without conflicting with plain English rules. Specifically, the multi-part structure of disclosures allows summary sections to be kept concise and readable, while the prospectus details and Statements of Additional Information contain extensive information. We also find associations between fees and narrative complexity in specific disclosures that should be unaffected by litigation risk, again indicating that litigation risk is not the sole driver of narrative complexity.

Fourth, to further investigate whether narrative complexity is a non-discretionary byproduct of an omitted variable or irrelevant to investors, we examine the effects of two 2009 SEC regulations that were designed to reduce narrative complexity. We find that funds with the most narratively complex disclosures pre-2009 reduce their narrative complexity more than other funds after the regulations became effective, which suggests that prospectus narrative complexity is at least partially discretionary. We also find that funds with the most complex disclosures pre-

2009 are more likely to lose market share or close post-2009, which supports the underlying assumption that complexity affects investment decisions.

Finally, we investigate whether one motivation for obfuscation is that uninformed investors are more susceptible to high-fee funds' marketing and advisors.[3] As expected, we find positive associations between marketing efforts and both narrative and structural complexity. We also continue to find an association between complexity and high fees in disclosures that are unrelated to marketing, and after excluding marketing charges and service fees. Thus, complexity appears to be a strategy that complements high-fee funds' marketing efforts, but high fees do not solely compensate for fund advisors and services.

Across numerous other robustness tests, we find positive associations between fees and complexity that are inconsistent with plausible alternative explanations. We conclude that, consistent with theory and concerns from practitioners and the SEC, our findings are most consistent with the inference that high-fee index funds use narrative and structural complexity as part of an obfuscation strategy. We find similar results among the portfolios of funds offered by our sample parent companies, indicating that these findings likely generalize to the broader mutual fund market. That said, Section 6 discusses limitations for readers' consideration. We also note that obfuscation is unlikely to be funds' only strategy for extracting rents, and encourage future research to devise tests to estimate the impact of obfuscation on investors' choices in isolation from complementary strategies. Finally, our findings do not necessarily mean that managers *consciously* create complexity to obfuscate high fees. Alchian (1950) argues that strategic behaviors can evolve unintentionally through experimentation and mimicry. Still, even if managers do not understand the effects of complexity, our findings indicate that high-fee funds

[3] Traditional advertising is highly restricted for mutual funds, so marketing in recent years is often done by compensating advisors for recommending and selling funds to their clients (e.g., commissions).

have not embraced the SEC's efforts to reduce complexity in fund disclosures.

1.4. Contributions

Our primary contribution is to investigate whether mutual funds manipulate narrative complexity to obfuscate weak performance.[4] Although fund issuers argue that variation in prospectus readability is driven by innate factors, our results indicate that unreadable disclosures are part of a discretionary strategy to extract rents from retail investors. These findings add to a broad literature investigating why retail investors make poor mutual fund choices.[5] Our findings should also be of interest to the SEC as it develops and enforces regulations to improve fund disclosures (SEC 2020). Section 7.1 further discusses potential regulatory implications.

Our second contribution is to build on research examining funds' strategic use of structural complexity (e.g., Gabaix & Laibson 2006; Edelen et al. 2012; Adams et al. 2012; Badoer et al. 2020). Most of the existing literature, discussed in Section 2, examines heterogeneous active funds, and examines specific aspects of structural complexity in isolation. Our approach investigates structural complexity within homogeneous index funds and examines multiple aspects of complexity together. Thus, our results bolster prior findings and provide a fuller view of funds' obfuscation strategies.

Finally, our paper has implications for the corporate disclosure literature, which we discuss in Section 7.2.

2. Background Information on Mutual Funds and Disclosures

[4] Prior literature investigates other aspects of mutual fund disclosures. For example, research finds that funds (e.g., closet indexers) misrepresent their investment styles and holdings (e.g., Chan et al. 2002; Wermers 2012; Chen et al. 2020), and Ge & Zheng (2006) and Agarwal et al. (2015) examine fund quarterly versus semiannual reporting. Prior evidence on narrative complexity is limited to descriptive tests in Philpot & Johnson (2007), which find variation in reading scores across a sample of 60 disclosures for active mutual funds. Our results conflict with the associations in Philpot & Johnson (2007) in some regards, likely due to our better-specified research designs. Also, a working paper by Tucker & Xia (2020) examines whether prospectuses abide by plain English rules.

[5] As a few examples: Hortaçsu & Syverson (2004); Sirri & Tufano (1998); Alexander et al. (1998); Barber et al. (2005); Choi et al. (2010).

2.1. Mutual Fund Classes and Fee Structures

Figure 2 illustrates how mutual funds are structured. Funds are created and sold by institutions such as Schwab. A single fund can be subdivided into share classes, which can have different combinations of fees and may be available only to certain types of investors (e.g., institutions). All classes share the same asset pool so have the same gross returns and risks. Subdividing a fund into classes is discretionary, and many funds have only one class.

Fund classes can have a variety of fees. Most charge an annual management fee. Other annual charges include marketing and service fees ("12b-1" fees), maintenance fees, and "other" fees. Some funds offer fee waivers or reimbursements if certain conditions are met. Funds can also charge one-time fees when investors buy shares ("front loads") or sell shares ("rear loads"). Front loads can vary depending on the amount purchased. Rear loads can vary by both the amount sold and holding period. The cutoffs for tiers of front and back loads are called "breaks."

Appendix B provides an example of differences in classes and fees between two S&P 500 funds in 2019. In Example 1, Schwab has one share class with one annual fee of 2 bps. The prospectus shows that a $10,000 investment will incur fees of $2 over one year, $6 over three years, etc. In Example 2, Deutsche has five classes with identical assets but different fees, and details from later in the prospectus disclose that classes R6 and S are restricted to certain investors (see our Online Appendix). The cheapest unrestricted class from Deutsche is estimated to cost 232 bps over a one-year holding period (or 59 bps ignoring loads) while the most expensive costs 508 bps, but later details show that actual fees can differ substantially.

Studies have long questioned the motives for structural complexity (e.g., Herman 1963; Ferris & Chance 1987; Nanda et al. 2009). Despite funds' claims that multiple share classes and fees allow them to cater to different clienteles, research has found little evidence that clients

benefit from multi-class or multi-fee structures. Gabaix & Laibson (2006) analytically show how structural complexity can be used to obfuscate fees, and empirical research has examined several aspects of structural complexity in mutual funds. For example, Edelen et al. (2012) and Badoer et al. (2020) find evidence that funds obfuscate distribution fees and that the effects of structural complexity can be mitigated through increased disclosure. Adams et al. (2012) find that index funds with weak governance have more share classes, higher fees, and higher variation in fees across classes, again consistent with structural complexity as a strategy to extract rents.

2.2. Mutual Fund Disclosures

Mutual fund prospectuses provide information on fund objectives, investments, costs, risks, historical performance, and other details. Funds typically update their prospectuses several times per year. Fund issuers have a choice to file separate prospectuses for each of their funds or to combine multiple funds in one prospectus.

Since 2010, prospectuses must begin with a summary section to provide "key information in plain English in a clear and concise format" (SEC 2009a, p1). Summary sections can be disseminated independently from the full prospectus, and are sometimes referred to as "Summary Prospectuses." Summary section information must also be provided on funds' websites, and the information on third-party websites such as Fidelity is frequently copied directly from prospectus summary sections.[6] Thus, investors are likely to see summary section information even if they do not directly access the prospectus itself.

The examples in Appendix B are from prospectus summary sections. While both funds track the S&P 500 index, differences in their disclosures are immediately apparent. For example, Schwab uses 14 words to describe its objective:

[6] In Section OA 8 of our Online Appendix we provide results showing that four leading brokerage websites exactly copy funds' objective statements from the funds' prospectuses.

"The fund's goal is to track the total return of the S&P 500 Index."

And Deutsche uses 60 words:

"The fund seeks to provide investment results that, before expenses, correspond to the total return of common stocks publicly traded in the United States, as represented by the Standard & Poor's 500 Composite Stock Price Index (S&P 500 Index). The fund invests for capital appreciation, not income; any dividend and interest income is incidental to the pursuit of its objective."

Across the whole prospectus, Schwab averages 24 words per sentence and totals 120,700 words, while Deutsche averages 32 words per sentence and totals 177,271 words. While prior literature has investigated other aspects of fund disclosures, evidence on readability of fund disclosures is limited.

2.3. How Retail Investors Purchase Mutual Funds

Retail investors are the primary customer of mutual funds and held 87% of mutual fund assets in 2019 (Investment Company Institute 2020). Bergstresser et al. (2009) explain the three primary channels for purchasing mutual funds. "Institutional" classes are reserved for entities such as insurance companies, high-wealth individuals, or employer-sponsored retirement plans (e.g., as one of the options available within a 401(k) account). "Broker-sold" classes are sold by advisors, brokers, and dealers who have a specific financial arrangement with the fund. Most other classes are "direct-sold," where they can be purchased from the issuer or a supermarket such as E*Trade or Schwab, with or without the help of an advisor.[7] During 2003 through 2012, Del Guercio and Reuter (2014) and Reuter (2015) find that roughly 57% of the index fund market was direct-sold, under 3% was broker-sold, and the rest was mostly institutional classes.

[7] Bergstresser et al. (2009) note that the direct-sold channel is not as clearly delineated as the other two. For example, institutions can still buy direct-sold fund classes, although they would have little reason to do so if the equivalent institutional class is cheaper. Also, while individuals can buy direct-sold classes through a supermarket without the help of an advisor, advisors can still recommend direct-sold classes, even if those same advisors also have access to broker-sold classes.

Our study examines broker-sold and direct-sold classes because these are the classes for which retail investors have the most discretion in selecting funds or relying on advisors. Our logic for including broker-sold classes is that fund obfuscation can prevent learning and increase investors' reliance on brokers and advisors. We exclude institutional classes because investors may have limited discretion in buying S&P 500 index funds within a retirement plan.[8]

Extensive research indicates that retail investors do not understand fees or make well-informed choices when selecting which funds to buy. Carlin (2009) assumes that many retail investors at least attempt to learn from disclosures, but, due to industry-wide complexity, eventually conclude that learning is too costly.[9] Thus, many investors may instead turn to the advice of advisors who steer them into high-fee funds. Consistent with Carlin (2009), survey studies find that retail investors attempt to learn from fund disclosures, and the primary barrier is that disclosures are difficult to understand (e.g., SEC 2012; Alexander et al. 1998; Investment Company Institute 2006). Also, because investment websites frequently copy text directly from prospectuses, investors can be affected by narrative complexity even if they do not read the prospectus itself.[10]

3. Sample and Variable Construction

We briefly discuss our sample assembly here and provide details in our Online Appendix (OA 2). Appendix A has further details on variable definitions.

[8] Investment Company Institute (2020) reports that 24% of the total U.S. mutual fund market (including both active and passive) is held in defined contribution retirement plans. 13% of the market is owned by institutions such as insurance companies. The remaining 63% of funds are owned by individuals outside of retirement plans.
[9] Uninformed investors in Carlin (2009) buy randomly across funds. Empirical research finds evidence consistent with this assumption; for example, Huberman & Jiang (2006) find that pension plan participants allocate evenly across the funds offered, which is consistent with a "1/n strategy" of naïve diversification described by Benartzi & Thaler (2001). Also, investors do not reevaluate their purchases in Carlin's one-shot game, which is consistent with evidence that mutual fund investors do not learn from investment performance (e.g., Goetzmann & Peles 1997).
[10] Section OA 8 of our Online Appendix further discusses evidence indicating that many retail investors attempt to learn from fund disclosures, as well as evidence demonstrating that fund-related content on brokerage websites is frequently excerpted directly from funds' prospectuses.

3.1. Sample construction

We examine S&P 500 index mutual funds, which are the original type of index fund. We do not expand our sample to other funds because pooling heterogeneous funds would undermine the identification strengths of analyzing funds with homogeneous investments and risks, and because the process of identifying index funds and matching with prospectuses is largely manual. That said, Section 6.5 provides descriptive analyses of the broader mutual fund market.

Our sample starts with S&P 500 index funds from 1994 through 2017. We exclude institutional share classes that are designed to be offered to large investors or through institutions such as employer retirement plans. We match observations with their most recent prospectus and require the complexity data discussed below, and then aggregate monthly data to the fund-year level. Our sample for tests of full prospectuses includes 458 fund-years and 38 unique funds.[11] Constructing our sample of summary expense disclosures uses XBRL that was not required before 2011, so our tests of summary disclosures are limited to 123 fund-years and 28 funds.

3.2. Measuring Fund Fees

We follow Gil-Bazo & Ruiz-Verdú (2009) in measuring a fund's total annual cost of ownership, *Fees*, including all annual fees and annualized loads. We amortize loads over seven years. For funds with multiple retail classes, we use the maximum cost across retail classes.[12]

3.3. Measuring Narrative Complexity

We measure narrative complexity using four measures of readability. Less readable

[11] Our samples are aggregated to the fund-level, which explains why they are smaller than those of prior studies of index funds in which analyses are performed at the class-level (e.g., Hortaçsu & Syverson 2004). We must aggregate to the fund-level because prospectuses are typically not available at the class-level. Also, our sample excludes S&P 500 ETFs because ETFs are subject to different reporting requirements. Finally, our sample excludes institutional classes and non-U.S. funds. See the Online Appendix (OA 2 and OA 4) for further discussion, and for robustness tests related to how we identify retail share classes.

[12] Fees includes marketing costs, which we separately investigate in Section 6.5. Our Online Appendix (OA 4) discusses robustness tests using several different assumptions for constructing *Fees*.

prospectuses should demand greater processing efforts (Blankespoor et al. 2020).

Our first proxy, *FundsinFiling*, is the number of funds included in the prospectus. Investor groups and the SEC have noted that "multiple fund prospectuses contribute substantially to prospectus length and complexity, which act as barriers to investor understanding" (SEC 2009a). We therefore expect that higher *FundsinFiling* implies greater narrative complexity. *FundsinFiling* is available only after 2006, when the SEC required filers to electronically identify separate funds in their filings (SEC 2005).[13]

Our second readability proxy is *Repetition* between the summary section and the rest of the prospectus. The SEC has noted "the Summary Section is intended to summarize the key information that is important to an investment decision, with more detailed information presented elsewhere… [T]he repetition of substantially the same—or identical—information […] highlights that a fund has not provided a summary [but rather] unnecessary duplication of information" (SEC 2014). We calculate *Repetition* as the percent of sentences in the summary section that are repeated from the rest of the prospectus.

Our third proxy is based on document length. The SEC has repeatedly raised concerns that long prospectuses are difficult to understand, and has even considered imposing page limits (SEC 2009a; 2014). We measure document *Length* as the count of characters, which captures both words and quantitative information.[14]

Our fourth proxy, *WordsPerSentence*, captures writing clarity (Loughran & McDonald 2014). The SEC has raised concerns that prospectuses use overly complex language, and in 2009

[13] Analyses in Section 6.2 find that the parent institutions of high-fee S&P 500 index funds offer fewer other mutual funds than do the parent institutions of low-fee S&P 500 index funds. Thus, finding that high-fee S&P 500 funds have more *FundsinFiling* does not appear to be driven by the number funds offered by the parent institution.
[14] Our Online Appendix (OA 3) discusses robustness tests using additional measures of narrative complexity such as file size (Loughran & McDonald 2016) and BOG score (Bonsall et al. 2017).

introduced regulations intending "to improve mutual fund disclosure by providing investors with key information in plain English in a clear and concise format" (SEC 2009a).

We measure *Length* and *WordsPerSentence* for the whole fund prospectus and specifically within the summary expense disclosure (variables *Length_ExpDisc* and *WordsPerSent_ExpDisc*). Given that the summary expense disclosure is intended to be investors' primary source of information about fees, we expect that managers aiming to obfuscate high fees will do so by manipulating this text.

3.4. Measuring Structural Complexity

We use five characteristics to measure structural complexity, and combine them into a *Structural_Complexity* principal component.[15] The characteristics used in our *Structural_Complexity* measure are discretionary; i.e., we are unable to document any regulatory requirements for a fund to have these characteristics.

First, we use the number of retail share classes within a fund (*ShareClasses*). A critique of multi-class funds is that they make it difficult for investors to comparison shop.

Our next two characteristics are indicator variables relating to front loads and 12b-1 fees. Front loads and 12b-1 fees are controversial because few investors understand what they are (NASD 2003; Barber et al. 2005; Beshears et al. 2009), and these fees has been the focus of recent SEC investigations (Wall Street Journal 2019a). A particular concern with 12b-1 fees is that some funds advertise "no load" while charging high 12b-1 fees. The indicator variable *FrontLoad* identifies firms with front loads, and *NoLoad_12b1* is equal to one for funds without a front load but that do have a 12b-1 fee.

Our final two measures, *FrontLoadBreaks* and *RearLoadBreaks,* are counts of the

[15] Unless noted, all combinations herein generate one principal component with an eigenvalue greater than one.

numbers of breakpoints that determine the levels of the front and rear loads. Structures with more breakpoints are more complex.

4. Summary Statistics and Descriptive Information

Table 1 Panel A provides summary statistics. The rightmost column tabulates the residual standard deviation after each variable is orthogonalized to year fixed effects (deHaan 2020). We highlight a few details. First, there is considerable variation in *Fees*, as the interquartile range is 20 to 115 bps.[16] Moreover, the standard deviation of *Fees* is virtually unchanged between the raw data and orthogonalized data, indicating that dispersion in *Fees* between funds persists over time. Second, the mean tracking error is small at 3.4 bps. Third, we observe substantial and temporally persistent dispersion in our measures of structural and narrative complexity.

Table 1 Panel B divides the sample into low- and high-fee funds based on the lowest tercile and highest tercile of *Fees* by year. Class-level data in rows (i) and (ii) show that low-fee funds tend to have small differences in average *Fees* between their least and most expensive classes (17.4 bps and 20.0 bps), while the inter-class difference in *Fees* is larger within high-fee funds (77.4 bps and 131.1 bps). Rows (iii) through (viii) find similar patterns for most fee components. High-fee funds tend to be significantly more expensive than low-fee funds across the class-level fee components. The lower rows find that low-fee funds are larger than high-fee funds, as predicted by Carlin (2009), and that low-fee funds also tend to be older but update their prospectuses as often as high-fee funds.[17] Correlations tabulated in the Online Appendix find that our five measures of structural complexity are highly correlated, which motivates our use of the

[16] We assume a seven-year holding period to determine loads and amortize one-time charges, so our *Fees* estimates are lower than the one-year costs estimated by Deutsche in Appendix B. Deutsche estimates that annual costs for Class A will average roughly (754 bps / 5 =) 151 bps over five years and (1,132 bps / 10 =) 113 bps over 10 years.
[17] In Carlin (2009), the low-fee funds capture the entire share of informed investors plus an equal share of uninformed investors, while the high-fee funds capture only their share of the uninformed investors. Thus, fund size is endogenous and low-fee funds should be larger than high-fee funds. See the Online Appendix (OA 11) for analyses explicitly incorporating fund size.

Structural_Complexity principal component in most analyses.

Table 2 provides descriptive insights about the effects of S&P 500 fund price dispersion on investor wealth.[18] Table 2 presents assets and fees for the least expensive sample funds, defined as those with the lowest 20% of fees, versus all other sample funds. The average fees are weighted by class-level assets to estimate the aggregate fees paid by retail investors. In 2017, investors in inexpensive funds paid 13.8 bps (column ii) while investors in all other sample funds paid 63.7 bps (column iv). All else equal, had the investors in those other funds switched to inexpensive funds, column (vi) indicates that they would have saved $358M in total fees in 2017. Over 30 years, $358M would compound to $6.9B in additional retirement savings.

We also extrapolate what our results imply for the broader mutual fund market. Column (vii) of Table 2 shows the $358M fee differential between inexpensive and other funds in 2017 equates to 0.077 bps of the total assets of our sample funds. Thus, 0.077 bps of total market assets is an estimate of the extra fees that retail investors paid in 2017 for expensive versions of similar mutual funds. Investment Company Institute (2018) reports that retail investors held $16.7 trillion of mutual funds in 2017. Applying the 0.077 bps rate to the total holdings indicates that retail investors might have saved ($16.7T × 0.077 bps =) $12.9B in 2017 had they held inexpensive versions of similar mutual funds. While this estimate is a rough approximation, it may be understated if price dispersion among similar active funds is greater than dispersion among S&P 500 index funds.

To be clear, we are not implying that obfuscation alone causes these disparities in investor wealth. The purpose of these analyses is to highlight that differences in fees between

[18] The extrapolations in the next two paragraphs are a descriptive exercise in the spirit of French (2008). Average fees are weighted by class-level assets so cannot be directly compared to Table 1. Future values are based on the average S&P 500 dividend-reinvested gross return of 10%, minus average fees, and continuously compounded. Using a different growth rate or a different threshold for "inexpensive funds" would produce different results.

funds have significant effects. Thus, obfuscation is likely economically important even if it is responsible for only a portion of total excess fees paid.

5. Primary Analyses

As depicted in Figure 1, Carlin (2009) predicts that fund fees and complexity are simultaneous outcomes of the manager's choice of fund strategy. Thus, complexity does not cause high fees or vice versa. As we cannot observe managers' strategic choices, we cannot perform typical regressions in which outcome variables *Y* (in our case, high fees and complexity) are regressed on independent variables *X* (the manager's strategic choice). Instead, our empirical strategy is to test whether the two outcome variables from Carlin (2009) are associated with one another in the way predicted by the model. If managers aim to obfuscate high fees with complex disclosures and fee structures, then high fees and complexity should be positively associated.

Figure 3 provides visual evidence of the associations between *Fees* and complexity. The panes plot the average of each complexity measure (vertical axes) by tercile of *Fees* (horizontal axis). For brevity we only plot combined *Structural_Complexity*. The plots show positive associations between *Fees* and complexity, especially in the expense disclosure sample.

5.1. Regression tests

We test the associations between fees and complexity using OLS regressions. Because fees and complexity are both outcome variables, either can be the left-side variable in an OLS model. We include fees as the left-side variable so that we can investigate multiple complexity measures on the right-side at the same time:[19]

[19] OLS regressions are often used to test for causal relations between *X* and *Y*, but there is nothing necessarily causal about OLS estimates. OLS tests for statistical associations between *X* and *Y* and is appropriate for our purposes. Our Online Appendix (OA 5) presents regressions in which *Fees* is the right-side variable, all of which produce qualitatively similar results. "Qualitatively similar" means that the sign and significance of the coefficient of interest remains unchanged at the 10% level.

$$Fees_{i,y} = \beta_1 Complexity_{i,y} + \Sigma\beta_y Year_y + \varepsilon_{i,y}, \quad (1)$$

where *Fees* is the total annual cost of ownership for fund *i* in year *y*. *Complexity* is one or more of our complexity variables. β_1 estimates the association between complexity and fees, which we predict is positive. $Year_y$ fixed effects eliminate common temporal trends in the S&P 500 return, risks, regulations, and many other non-discretionary characteristics of the index funds, as well as common temporal trends in fees and complexity. Standard errors are clustered by fund. Given our small sample sizes, winsorizing is potentially ineffective in mitigating the effects of extreme observations. Thus, we also perform robust regressions in addition to OLS (Leone et al. 2019).

Table 3 Panel A presents results of model (1) for narrative complexity in the full prospectus. Columns (i) through (iv) examine each of *FundsinFiling*, *Repetition*, *Length*, and *WordsPerSentence*. The sample size changes because *FundsinFiling* is available post-2006 and *Repetition* is available post-2010. *FundsinFiling* and *Repetition* have significantly positive associations with *Fees*. Columns (v) and (vi) examine the readability measures together and find that coefficients on *FundsinFiling* and *Repetition* are positive and significant using OLS and using robust regression.[20]

Panel B presents stronger results for the expense disclosures, which are expected because the summary expense disclosures discuss the fees that managers likely aim to obfuscate. Columns (i) through (iv) find that each of our narrative complexity measures is positively associated with *Fees*. Columns (v) and (vi) present results considering all readability measures simultaneously. We find significantly positive coefficients on *FundsinFilings*, *Repetition*, and *Length_ExpDisc* using OLS and robust regression.

[20] Unless otherwise noted, all regressions that include multiple complexity measures have variance inflation factors below 10. For brevity we only tabulate and discuss robust regression results for the most complete models that include all complexity measures.

Overall, the results in Table 3 are consistent with managers using narrative complexity to obfuscate high fees. Results indicate that a one standard deviation increase in the expense disclosure narrative complexity measures is associated with 28 – 45 bps higher fees.

Results for structural complexity are in Table 4. Unlike in Table 3, we do not include the five separate measures in one regression because they are highly correlated and produce variance inflation factors above 10. All measures of structural complexity are individually significant, as is *Structural_Complexity*. These results are consistent with managers obfuscating high fees with structural complexity and indicate that a one standard deviation increase in structural complexity for the expense disclosure sample is associated with 35 – 52 bps higher fees.

5.2. Analyses within specific disclosures

It is possible that our narrative complexity proxies also capture the effects of structural complexity or other unobservable strategies. If so, their positive associations with *Fees* may not be due to managers manipulating narrative complexity *per se*. *Length* and possibly *WordsPerSentence* are affected by structural complexity.[21] It is less clear why structural complexity or unobservable strategies would affect *FundsinFiling* and *Repetition* (e.g., structural complexity should not force issuers to include more funds in a prospectus), but the possibility remains. We address this alternative explanation by examining specific disclosure items that should not be affected by differences in structural complexity or unobservable strategies.[22] These analyses also address potential confounds related to litigation risk, marketing, or parent characteristics, which are issues we further discuss in Section 6.

[21] For example, complex fund structures could take more words to explain, which would increase *Length* and possibly *WordsPerSentence* even if managers do not manipulate narrative complexity directly.

[22] Our intuition is that complexity throughout the prospectus, and not just in the specific disclosures discussing fees, increases processing costs and keeps investors uninformed. For example, if investors do not understand disclosures that come before fees in the prospectus (e.g., funds' objective statements), they plausibly conclude that understanding the entire prospectus is too difficult, and therefore stop reading.

We first examine funds' objective statements. S&P 500 funds ostensibly have the same objective, and it seems unlikely that differences in fund structures or other unobservable strategies should affect the narrative complexity of how funds describe their objective. Yet, the examples in Appendix B indicate that Deutsche's objective statement is less readable than Schwab's, and results in Table 5 Panel A find a significantly positive association between objective disclosure *Length* and fund *Fees*. These results are consistent with high-fee funds having more narratively complex objective statements. We find a positive but insignificant association for *WordsPerSent_ObjDisc*.

We next examine funds' "equity risk" descriptions. Equity risk is the generic risk that prices rise and fall, and most funds disclose equity risk as a risk factor in both their prospectus summaries and details. It seems unlikely that equity risk is affected by structural complexity, litigation risk, or other strategies, so these disclosures provide a relatively clean setting to examine how well funds summarize information from the prospectus details into the prospectus summary. Examples of risk disclosures for Schwab and Deutsche are in Appendix C.

We manually collect the equity risk descriptions for the most recent year for each of the 28 funds in our post-2010 sample. As explained in our Online Appendix (OA 2), we locate stand-alone equity risk descriptions for 25 funds. Based on our reading, the disclosures do not discuss issues relating to structural complexity or other factors that could confound our tests.

Results in Table 5 Panel B find significant associations between *Fees* and the length (column i) and words per sentence (column ii) of the summary risk disclosures, consistent with high-fee funds having longer and wordier summary discussions of what should be similar equity risk across funds. Results in column (iii) examine repetition and find insignificant results.

Results in columns (iv) and (v) more closely examine the extent to which funds

summarize their risk disclosures in the summary section. The variable *Length_Diff* measures the within-fund paired difference in the length of the summary and detailed discussions of equity risk. A lower *Length_Diff* indicates that the summary discussion is more concise.[23] We also create the indicator *ExactCopy*, which identifies whether the disclosure is identical between the summary and detailed discussions (i.e., has high narrative complexity). Results find a negative and significant association between *Fees* and *Length_Diff* in column (iv) and a positive and significant association between *Fees* and *ExactCopy* in column (v).

In sum, results in Table 5 indicate that high-fee funds use narrative complexity as part of an obfuscation strategy, in disclosures that should be unaffected by structural complexity or unobserved differences across funds.

5.3. Discussion

Our main results provide compelling evidence that high-fee S&P 500 funds have more complex disclosures and fee structures than low-fee funds. Here we discuss potential confounds.

A validity threat is that a correlated omitted variable in model (1) causes the positive association between *Fees* and *Complexity* for reasons other than strategic obfuscation. Model (1) does not control for fund characteristics such as size because: i) while they likely affect *Fees*, they are unlikely to also affect *Complexity* so should not cause omitted variable bias; and ii) some characteristics are endogenous outcomes of the pricing strategy and therefore over-control the model. We also do not include variables that capture complementary strategies taken by high-fee funds. Still, the Online Appendix presents results controlling for fund characteristics.

[23] A unique strength of examining risk disclosures is that we are able to calculate a measure of summarization between two blocks of text that we know discuss the same topic. *Length_Diff* is the within-filing paired difference in length between the summary and detailed risk disclosures, and is intended to capture the extent to which the former summarizes the latter. Identifying blocks of text that discuss the same topic in the full prospectus is impracticable, so we do not calculate *Lenth_Diff* in earlier analyses of the summary and full prospectuses.

A related validity threat is that our proxies for narrative and structural complexity could be compromised if they unintentionally capture other constructs. Results in Section 5.2 address the concern that our narrative complexity measures are confounded by structural complexity or other strategies. Section 6 investigates other confounds.

6. Additional Analyses and Discussion

This section investigates whether our results likely generalize to the broader mutual fund market, and summarizes tests of additional alternative explanations for our main results.

6.1. Parent-level Analyses

For descriptive purposes, we investigate whether the parent companies of S&P 500 funds follow a consistent obfuscation strategy for all of their funds. We expect that funds' strategies are determined at the parent-level due to economies of scale and synergies across funds, and because combining funds into one prospectus requires parent-level coordination. Parent-level tests have two main weaknesses relative to our tests of S&P 500 funds. First, they pool diverse funds so lack the identification strengths of examining homogeneous index funds. Second, *FundsinFiling* and *Repetition* require manual data collection, which is impracticable for a large sample.

These tests are based on 8,154 funds issued by the parents in our sample over 2000 – 2017. We start in 2000 because that is when CRSP began providing consistent parent identifiers. Sample construction procedures are detailed in our Online Appendix (OA 2). We calculate *Fees* and other variables for each fund-year and then average each measure to the parent-year level.

We investigate the association between the narrative complexity of S&P 500 funds and their parent-level averages using the following regression. For brevity we examine the expense disclosure sample, but results for the full prospectus are in the Online Appendix:

$$Parent\ Complexity_{i,y} = \beta_1\ S\&P500\ Fund\ Complexity_{i,y} + \Sigma\beta_y\ Year_y + \varepsilon_{i,y}. \quad (2)$$

Results in Table 6 Panel A indicate that S&P 500 fund *Length_ExpDisc*, *WordsPerSent_ExpDisc*, and *Structural Complexity* are positively associated with parent averages, indicating that complexity is a parent-level choice. Table 6 Panel B uses a version of model (1) to examine parent-level fees and complexity, and finds positive associations that are similar to those for S&P 500 funds. Together, these results indicate a high-fee and high-complexity strategy is a parent-level choice, and suggest that our findings for S&P 500 funds likely generalize to the broader mutual fund market.

6.2. Do High-Fee Fund Parent Institutions Offer More Fund Options or Financial Services?

We investigate the breadth of products offered by parent institutions to address four concerns. First, some S&P 500 funds might charge high fees because customers like that the parent companies offer a wider variety of funds and products. Second, some S&P 500 funds might charge high fees because they bundle or cross-sell funds with other products. Third, the parents of high-fee funds could be more complex institutions, and somehow this institutional complexity affects the complexity of fund prospectuses. Fourth, *FundsinFiling* might be higher for high-fee funds simply because the parent companies offer more funds. Details on our sample construction for these tests are provided in the Online Appendix (OA 2).

Table 7 finds that the parents of low-fee S&P 500 funds tend to issue funds that are cheaper (row i) and larger (row ii) than the parents of high-fee S&P 500 funds. Row (iii) finds no significant difference in whether or not parents are public companies. Rows (iv) through (vi) of Table 7 find that the parents of high-fee S&P 500 funds offer *fewer* passive funds and a similar number of active funds. Row (vii) finds that high-fee S&P 500 fund parents also offer a smaller variety of fund categories (e.g., large-cap and small-cap). Row (viii) summarizes how many of seven other retail financial products are offered by parent companies: bank accounts; mortgages

and loans; credit cards; life and long-term care insurance; auto and property insurance; trading and brokerage platforms; and ETFs. We find that the parents of low- and high-fee S&P 500 funds offer a similar variety of financial products.

6.3. Pre/Post-2009 SEC Regulation Changes

To further address concerns that narrative complexity may be a non-discretionary byproduct of an omitted variable or is irrelevant to investors, we investigate the effects of two 2009 SEC regulations. SEC releases 33-8998 and 33-9006 introduced mandatory summary prospectuses and required funds to make certain information available in interactive data format.

We expect that the regulations had two effects. First, the regulations highlighted the SEC's increased focus on protecting retail investors by improving disclosure readability, which likely motivated funds to make their disclosures more readable. Finding that high-complexity funds improve prospectus readability would further support our inference that narrative complexity is discretionary. Second, the introduction of summary prospectuses plausibly lowered investors' learning costs and thus reduced the effectiveness of high-complexity funds' strategies to capture uninformed investors. A caveat is that these regulations occurred during the financial crisis, so other factors could affect our outcome variables of interest. Also, plots in the Online Appendix Section OA 7 indicate that pre-regulation trends may not be parallel for all variables.

6.3.1. Impact on Narrative Complexity

Section II of 33-8998 criticizes prospectuses for being "too long and complicated, [and] difficult for investors to use efficiently in comparing their many choices" (p8). Although the regulations do not specifically mandate changes in prospectus length and wordiness, funds likely interpreted the regulations as evidence of increased SEC scrutiny of narrative complexity and

made efforts to improve prospectus *Length* and *WordsPerSentence*.[24] If *Length* and *WordsPerSentence* are indeed discretionary, funds with the most narratively complex disclosures pre-regulation should show the most improvement after 2009. For parsimony, these tests combine *Length* and *WordsPerSentence* into a single principal component, *Wordiness*.

We estimate the following difference-in-differences ("DID") regression:

$$Wordiness_{i,y} = \beta_0 + \beta_1 High\_Wordiness_i + \beta_2 Post_y * High\_Wordiness_i + \Sigma\beta_y Year_y + \varepsilon_{i,y} \quad (3)$$

where *Post* is an indicator for post-2009, and *High_Wordiness* is an indicator equal to one (zero) for funds with pre-regulation average *Wordiness* in the top (bottom) tercile of the sample. $Year_y$ fixed effects eliminate common temporal trends in complexity and subsume *Post*. We omit funds in the middle tercile. β_2 is the DID coefficient of interest, which estimates the extent to which *High_Wordiness* funds changed their narrative complexity between the pre-regulation period (2002 – 2008) and the post-regulation period (2010 – 2017) relative to low complexity funds.[25]

Column (i) of Table 8 finds a negative and significant DID coefficient, indicating that funds with the most narratively complex prospectuses before the regulations had the biggest reductions afterward. This result suggests that narrative complexity is indeed discretionary rather than a byproduct of an unobserved omitted variable.

6.3.2. Impact on Investors

We expect that the regulations reduced investors' learning costs and, therefore, reduced the effectiveness of high-fee funds' obfuscation strategies. If high-fee/complexity funds do not switch to a low-fee/complexity strategy (e.g., due to frictions associated with unwinding

[24] These proxies can be measured for the full pre- and post-regulation periods. *Repetition* cannot be calculated in the pre-regulation period and *FundsinFiling* is only available for two years pre-regulation.

[25] Funds began adopting some provisions in 2009, so we drop the 2009 transition year from these analyses. We begin these analyses in 2002 because the pre-2002 sample is limited, and because the goal is to identify funds' strategies as of the regulatory changes. These analyses only include funds that were still operating in 2008.

structural complexity), a likely outcome in the short-term is that high-fee/complexity funds lose market share to low-fee/complexity funds. We examine differences in fund size pre/post-2009 using model (3) with different dependent variables.

Column (ii) of Table 8 investigates fund *Size*, calculated as the log of net assets.[26] β_2 is negative and significant, indicating that high-complexity funds shrink relative to low-complexity funds in the post-regulation period. Column (iii) examines an indicator for funds that close and finds a significantly positive β_2, indicating that high-complexity funds are more likely to exit the market altogether in the post-regulation period. Column (iv) finds no evidence that high-complexity funds reduce their *Fees* relative to low-complexity funds after 2009.

Together, these results are consistent with the narrative complexity regulations shifting investment dollars from high-complexity to low-complexity funds, and forcing some high-complexity funds out of the market.

6.4. Analysis of Complementary Marketing & Customer Service Strategies

For two reasons, aggressive marketing is a natural complement to obfuscation; i.e., is an additional outcome of high-fee fund managers' strategic choice (see Figure 1). First, marketing efforts are likely more effective when high processing costs inhibit investors' independent research. Second, since investors ultimately foot the bill for funds' marketing efforts, funds can perform more marketing when investors are uninformed about fees.[27]

The existence of a complementary marketing strategy does not, by itself, undermine our main inferences that funds manipulate narrative and structural complexity as part of an

[26] The sample sizes are higher in columns (ii) and (iii) because *Size* is equal to zero for years after fund closures. *Wordiness* and *Fees* in columns (i) and (iv) are undefined in years after fund closures.
[27] Studies provide somewhat mixed evidence on whether fund marketing impairs investment decisions (e.g., Jain & Wu 2000; Huhmann & Bhattacharya 2005; Gallaher et al. 2015; Sirri & Tufano 1998; Khorana & Servaes 2012; Egan 2019).

obfuscation strategy. However, because marketing costs are included in *Fees*, marketing could pose a validity threat in model (1) if those marketing efforts directly affect our empirical proxies for complexity. We argue that there is little reason to think that marketing affects most of our narrative complexity proxies, especially in our tests of fund objective and equity risk disclosures. Similarly, it seems unlikely that marketing fully drives our structural complexity proxies.

Still, analyses in our Online Appendix (OA 6) investigate the role of marketing for high-fee funds. We replace *Fees* in model (1) with our estimates of funds' marketing efforts, and find significantly positive associations with most of our measures of both narrative and structural complexity. These results are consistent with complexity and marketing being complements.

We also remove marketing fees from *Fees* in model (1), and find results similar to those in Tables 3 and 4.[28] Customer service fees are included in our estimate of marketing fees, so these results also reduce concerns that investors buy high-fee funds because they provide better service.[29] Thus, although complexity appears to be a strategy that complements high-fee funds' marketing efforts, high fees do not solely compensate for advisors and other services.

6.5. Is Narrative Complexity Driven by Litigation Risk?

Funds are subject to three primary litigation risks, and here we consider whether efforts to reduce litigation risk could be an alternative explanation for the association between narrative complexity and fees.

The first two sources of litigation risk likely have opposite effects on narrative complexity (Glazer 2010; Investment Company Institute 2010). First, investors or the SEC can

[28] We do not exclude marketing fees in our main *Fees* measure because funds likely use narrative and structural complexity to obfuscate the fact that investors must pay these fees. Including marketing fees in *Fees* is standard within the literature.

[29] This finding is consistent with prior literature that does not find support for the hypothesis that high-fee funds offer extra benefits such as helpful investment advice or customer service (Anagol & Kim 2012). See Jain & Wu (2000), Cronqvist (2006), and Gallaher et al. (2015) for additional studies of mutual fund advertising.

allege that fund disclosures misstate or omit material information, violating Sections 11 and 12(a)(2) of the 1933 Act and Section 10(b) of the 1934 Act. Second, investors or the SEC can allege that disclosures do not comply with Rule 421 of the 1933 Act, which requires prospectuses to be written in "a clear, concise and understandable manner."[30] While incomplete disclosure risk incentivizes funds to write longer and more detailed prospectuses, risk from violating plain English rules incentivizes funds to write shorter and simpler prospectuses.

Glazer (2010, p4-12) explains that the current multi-part fund disclosure structure was designed "to reconcile the tension between clear communications and adequate disclosure." The summary prospectus is a concise summary, the details section contains other required information, and the Statement of Additional Information (SAI) can contain any other information that may be useful to some investors. Rule 498 under the 1933 Act permits "incorporation by reference" of the prospectus details section and SAI into the summary prospectus, which means that information from the prospectus details and SAI do not need to be repeated in the summary. Thus, the multi-part disclosure allows funds to mitigate "concerns about liability under the securities laws [by] including significantly more expansive disclosures in the SAI" (Glazer 2010, p4-17), without needing to complicate the summary prospectus.

Given that funds can mitigate incomplete disclosure risk by expanding the prospectus details and SAI, and that complex summaries can increase complex disclosure risk, it seems unlikely that the narrative complexity we observe in the summary prospectus is driven by high-fee funds' litigation concerns. Several of our other results are also inconsistent with litigation risk driving our inferences. Specifically, while the following should not reduce litigation risk, we

[30] For example, prospectuses should use "short, explanatory sentences," "avoid legal and highly technical business language," and avoid "disclosure repeated in different sections." See: https://www.law.cornell.edu/cfr/text/17/230.421, accessed January 2021. Similar provisions are in Form N-1A, in SEC Rule 33-8998 (SEC 2009), and in SEC guidance on writing prospectuses (SEC 2014).

find that high-fee funds have higher *FundsinFiling*, are more likely to duplicate risk descriptions between the summary and details sections, and have longer objective statements.

A third source of litigation risk is that Section 36(b) of the Investment Company Act allows investors to sue funds for charging excessive fees. "Liability under 36(b) arises not from inaccurate or incomplete disclosure, but from a determination that a mutual fund's expenses… were unjustifiably high" (Curtis 2018, p2). Demonstrating that fees are "unjustifiably high" has proven impossible as no plaintiff has won in court. Curtis (2018) concludes that 36(b) lawsuits are primarily filed to extract settlements and frequently target large funds, even though large funds tend to charge lower fees (also see Curtis & Morley 2014). As such, it seems unlikely that narrative complexity in the summary prospectus is a result of 36(b) litigation concerns, especially because concerned funds could again expand the prospectus details and SAI without risking litigation from unclear disclosure. Moreover, our findings for *FundsinFiling*, exactly repeating risk disclosures, and objective statement complexity are again most consistent with obfuscation rather than concerns about 36(b) litigation.

6.6. Analysis of Narrative and Structural Complexity Together

For descriptive purposes, Online Appendix Section OA 12 examines regressions of *Fees* on both narrative and structural complexity together. We find that *Structural Complexity* is significant in all tests. The narrative complexity proxies are overall significant in tests of the expense disclosure but insignificant in tests of the full prospectus. As discussed in the Online Appendix, we do not draw strong inferences from the mixed results for two reasons. First, our theory predicts that narrative and structural complexity are simultaneous aspects of a single strategy, so it is unclear how to interpret regressions that include proxies for both (i.e., because one controls for the other). Second, our tests of objective statements and equity risk disclosures

find evidence of narrative complexity in disclosures that are unaffected by structural complexity, which reduces concerns that structural complexity drives our collection of results.

6.7. Discussion of Other Variation across S&P 500 Index Funds

Analyses in this section address additional sources of variation across our sample funds.

One concern is that structural complexity, rather than obfuscating fees, is used to provide savings over certain investment horizons. Two results are inconsistent with this explanation. First, row (i) of Table 1 Panel B shows that the most expensive class within each low-fee fund has *Fees* of 20.0 bps, while row (ii) shows that the least expensive class within each high-fee fund has *Fees* of 77.4 bps. Thus, the cheapest classes from high-fee funds charge an average of 57.4 bps more than the most expensive classes from low-fee funds, and tests in our Online Appendix (OA 10) find that this difference is statistically significant. Second, results in the Online Appendix (Tables OA16 and OA17) calculate *Fees* based on three- and five-year holding periods, and find results that are very similar to our main results.

It is possible is that, unlike Carlin's (2009) assumption that funds choose high fees, some funds have higher operating costs and have no choice but to charge high fees. Non-discretionary high fees would not be a validity threat unless higher operating costs also cause structural and narrative complexity. Still, we investigate discretionary fees by decomposing *Fees* into its expected and excess components, and then testing whether the excess component is positively associated with complexity. We find positive associations between complexity and the excess component of fees that is not driven by fundamentals, consistent with managers attempting to obfuscate discretionarily high fees. See the Online Appendix (OA 11) for further discussion.

A final potential source of variation across funds is securities lending. As discussed in our Online Appendix (OA 9), research finds little evidence that lending affects the fees or

tracking errors of S&P 500 funds, nor should lending affect most of our complexity measures.

6.8. Limitations

Our setting and analyses hold constant many non-discretionary factors that affect complexity. However, unobservable differences across funds still exist, and readers should consider potential confounds when evaluating our findings.

One unobserved source of variation is other price dispersion strategies, such as market segmentation whereby fund classes are only available from specific institutions, or the effects of media coverage (e.g., Hortaçsu & Syverson 2004; Solomon et al. 2014). Funds' exploitation of these frictions may be a complementary strategy to obfuscation, similar to what we observe for marketing. While we are unaware of specific reasons why these complementary strategies should confound our complexity measures, the possibility remains.

A final unobserved source of variation is manager effort: lazy managers might put little effort into reducing fees and constructing clear disclosures. There are several reasons why this explanation seems less likely than strategic obfuscation. First, while Carlin (2009) shows that obfuscation allows high-fee funds to exist in a competitive market, it is theoretically unclear how laziness would allow such an equilibrium to persist. Second, the costs of reducing narrative complexity seem small relative to the size of S&P 500 funds and to the potential cost of SEC enforcement for not complying with disclosure regulations.[31] Finally, it plausibly takes more effort to run a structurally complex fund than a simple fund. Still, we cannot rule out this alternative explanation.

7. Summary and Concluding Discussion

We examine "strategic obfuscation" in mutual funds; i.e., whether fund managers attempt

[31] For example, while not specific to prospectuses, the SEC recently fined mutual fund issuers (including Deutsche) over $125M for failing to adequately disclose 12b-1 fees (Wall Street Journal 2019b)

to obfuscate unfavorable information via unnecessarily complex disclosures and fee structures. Our tests examine homogeneous S&P 500 index funds and use a within-year research design to hold constant many non-discretionary drivers of complexity. Consistent with theory in Carlin (2009), we find that funds with higher fees have greater narrative complexity (i.e., less readable disclosures) and structural complexity (i.e., more complicated fee structures), both of which increase investors' processing costs. These findings are consistent with funds attempting to use complexity to obfuscate high fees and extract rents from retail investors. That we find obfuscation and excessive fees among homogeneous S&P 500 index funds is especially striking because their disclosures are heavily regulated, and because conventional wisdom is that index funds are a cheap way to obtain a diverse portfolio.

Section 1.4 discusses the implications of our findings for the mutual funds literature. We conclude by discussing our implications for regulations and the corporate disclosure literature.

7.1. Regulatory implications

Our study should inform ongoing regulatory efforts to improve mutual fund disclosures. Although fund issuers argue that variation in prospectus readability is driven by innate factors, our results indicate that unreadable disclosures are part of a strategy to extract rents from retail investors. These findings should be of interest to the SEC as it develops and enforces regulations to improve fund disclosures (SEC 2020). In particular, the SEC should perhaps revisit its decisions not to prohibit multiple-fund prospectuses or summary sections that exceed a certain length (SEC 2014).

Our findings also raise questions about whether the SEC should tighten regulations on complex share classes and fee structures. While funds argue that share classes with different fees help them cater to a range of clients, we find that structurally complex funds are consistently

more expensive than simpler funds. Our results are consistent with concerns that funds use 12b-1 fees, loads, and load breaks to extract rents from investors. While the SEC has raised concerns about these fees and prosecuted advisors for lack of transparency, it has so far not prohibited them (e.g., Armstrong & Vickers 2012; Wall Street Journal 2019b; SEC 2019).

Finally, our findings are relevant to the SEC's 2019 "Regulation Best Interest," which requires advisors to only recommend financial products that are in a client's best interest. Section II.C.2 limits advisors' responsibility when making recommendations across mutual funds from different companies. Given that we find large differences in fees across S&P 500 funds, the SEC should perhaps consider raising advisors' responsibilities at least for highly similar index funds.

Any changes in regulations or enforcement require cost-benefit analyses that are beyond the scope of this paper. Still, our results should be valuable inputs to those analyses.

7.2. Insights for the corporate disclosure literature

Our findings provide several insights relevant to studies on corporate disclosure readability (e.g., Li 2008; Guay et al. 2016; Bonsall et al. 2017; Dyer et al. 2017). First, we provide new evidence that managers manipulate narrative complexity to obfuscate weak performance. Blankespoor et al. (2020, p92) conclude that isolating disclosure choices from non-discretionary characteristics is a fundamental challenge, and that "findings about whether disclosure characteristics are strategic versus non-discretionary remain mixed" (also see Leuz & Wysocki 2016). We use a novel approach to address non-discretionary complexity, and our findings help triangulate and support existing evidence of obfuscation. Given that fund managers use narrative complexity to obfuscate performance for entities as simple as index funds, it seems highly plausible that managers use narrative complexity to obfuscate poor firm performance.

Second, corporate disclosure studies often treat structural complexity as non-

discretionary and control for it when analyzing narrative complexity (e.g., controlling for reporting segments). However, our results show that funds use narrative and structural complexity together. It seems plausible that corporate managers also manipulate structural and narrative complexity as two parts of the same obfuscation strategy. Future research can endeavor to investigate whether the corporate structural and narrative complexity are jointly determined, and their joint effects on market outcomes.

Finally, similar to index funds, it seems plausible that corporate managers partially choose the poor performance they obfuscate.[32] For example, a manager may shirk and obfuscate the impact on performance via unclear disclosures. If performance and complexity are jointly determined in mutual funds, it seems likely that they are joint outcomes of corporate managers' strategies.

[32] Many studies on corporate opacity are silent about whether poor performance is discretionary (e.g., Li 2008). Merkley (2014) finds that longer disclosures help inform investors about poor performance, indicating that performance is non-discretionary. Guay et al. (2016) find that financial statement complexity is non-discretionary, implying that any associated poor performance is also non-discretionary. Performance is explicitly exogenous in Asay et al. (2018). Lo et al. (2017) find that corporate managers use complexity to mask earnings management, providing some evidence that performance and obfuscation are codetermined.

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Appendix A: Variable Definitions

This table provides variable definitions and data sources. All variables are constructed to be on a fund-calendar year basis. Unless otherwise noted, variables based on monthly data are first calculated on a fund-month basis and then averaged to the annual level. Continuous variables are winsorized at 1% and 99%. To facilitate comparisons across coefficients, all variables are standardized to have a mean (standard deviation) of zero (one) when used as independent variables in regression tests.

Variable Name	Description	Source
Closure	Indicator variable set to 1 if the fund has closed, identified as *Size*=0.	CRSP
ExactCopy	Indicator variable set to 1 if the equity risk disclosure in the details of the cleaned prospectus and the equity risk disclosure in the summary section of the cleaned prospectus are identical.	Mutual fund prospectuses
Fees	Total annual ownership cost charged to the fund's retail investors in percentage points. The total annual ownership cost includes annual fees, the annualized rear load (including contingent deferred sales charges), and the annualized front load. The annual expense ratio includes 12b-1 fees and may include waivers and reimbursements. We use an expected seven-year holding period to determine and amortize any front and rear loads. We use the maximum front load for classes with tiered front loads. For funds with multiple classes, we use the maximum cost across retail share classes. Robustness tests using alternate *Fees* assumptions are discussed in the Online Appendix (OA 4).	CRSP
FrontLoad	Indicator variable set to 1 if any share class of the fund, in a given year, has a front load.	CRSP
FrontLoadBreaks	Number of breakpoints in the front load. Calculated at the fund level as the maximum number of breakpoints across share classes.	CRSP
FundsinFiling	Log of the number of funds in the Form 485 filing. This measure is only available post-2006, when the SEC required investment company filers to electronically identify in their filings the separate "series," where each series is defined as a fund that invests in a separate portfolio of securities.	SEC Edgar filings
Length	Character count of the cleaned filing, scaled by 1,000.	SEC Analytics Suite
Length_Diff	Log of 1 plus the difference between the character count of the equity risk disclosure in the details of the cleaned prospectus and the character count of the equity risk disclosure in the summary section of the cleaned prospectus.	Mutual fund prospectuses
Length_ExpDisc	Character count of the expense disclosure within the cleaned prospectus summary disclosure, scaled by 1,000. Calculated at the annual level as the mean for each expense disclosure obtained from the tag "ExpenseNarrativeTextBlock" in the TXT files of the SEC Mutual Fund Prospectus Risk/Return Summary Data Sets for Form 485 filings related to the fund over the year.	SEC XBRL submissions
Length_ObjDisc	Character count of the objective disclosure within the cleaned prospectus summary disclosure, scaled by 1,000. Calculated at the annual level as the mean for each objective disclosure obtained from the tag "ObjectivePrimaryTextBlock" in the TXT files of the SEC Mutual Fund Prospectus Risk/Return Summary Data Sets for Form 485 filings related to the fund over the year.	SEC XBRL submissions

Length_RiskDisc	Character count of the equity risk disclosure within the cleaned prospectus summary disclosure, scaled by 1,000.	Mutual fund prospectuses
NoLoad_12b1	Indicator variable set to 1 if any share class of the fund, in a given year, has no front load but has a 12b-1 fee.	CRSP
RearLoadBreaks	Number of breakpoints in the rear load, also known as the Contingent Deferred Sales Charge. Calculated at the fund level as the maximum number of breakpoints across share classes.	CRSP
Repetition_RiskDisc	Fraction of sentences in the summary section equity risk disclosure that are repeated in the equity risk disclosure in the details of the prospectus. A sentence is coded as "repeated" if the cosine similarity between it and any of the sentences in the rest of the document is 90% or greater (Merkley 2014). *Repetition_RiskDisc* is available after 2010 when summary sections with XBRL tagging were first required.	SEC XBRL submissions
Repetition	Fraction of sentences in the summary section of Form 485 that are repeated in the rest of the document. A sentence is coded as "repeated" if the cosine similarity between it and any of the sentences in the rest of the document is 90% or greater (Merkley 2014). *Repetition* is available after 2010 when summary sections with XBRL tagging were first required.	SEC XBRL submissions, SEC Edgar filings
ShareClasses	The number of unique share classes of the fund.	CRSP
Size	Log of the fund's total net assets (i.e., assets under management) in millions, inclusive of all retail share classes. First, calculated at the monthly level as the summed net assets across all classes. Then, calculated at the annual level as the mean of the monthly sums. Missing share class level net assets are set to 0.	CRSP
Structural_Complexity	First principal component of combining the following five variables: *ShareClasses*, *FrontLoadBreaks*, *RearLoadBreaks*, *FrontLoad*, and *NoLoad_12b1*. Standardized to have a mean (standard deviation) of 0 (1).	CRSP, SEC Analytics Suite
TE	Annual tracking error, in basis points. Consistent with the common academic definition (e.g., Cremers and Petajisto 2009), the steps to calculate *TE* are as follows: 1) calculate the gross monthly return (return + 1/12 of the annual expense ratio); 2) calculate the monthly difference between the gross return and the S&P 500 index return; 3) calculate the standard deviation of the differences within each calendar year.	CRSP, Bloomberg
Turnover	Minimum of aggregated sales or aggregated purchases of securities, divided by the average 12-month Total Net Assets of the fund.	CRSP
Wordiness	First principal component of combining *WordsPerSentence* and *Length* as provided by SEC Analytics Suite. Standardized to have a mean (standard deviation) of 0 (1).	SEC Analytics Suite
WordsPerSentence	Average number of words per sentence, calculated as the number of words in the cleaned prospectus divided by the total number of sentence termination characters after removing those associated with headings and abbreviations.	SEC Analytics Suite
WordsPerSent_ExpDisc	Average number of words per sentence specifically in the expense disclosure of the cleaned prospectus summary section. Calculated at the annual level as the mean of this value for each expense disclosure obtained from the tag "ExpenseNarrativeTextBlock" in the TXT files of the SEC Mutual Fund Prospectus Risk/Return Summary Data Sets for Form 485 filings related to the fund over the year.	SEC XBRL submissions

Appendix B: Mutual Fund Disclosure Examples

The examples below present the first two items from the summary sections of the prospectuses of two S&P 500 index funds in 2019. As required by the SEC, the first two items in each prospectus contain summary information on the fund objectives and fees. Example 1 from Schwab has a single class, a single annual fee, no waivers or contingencies, and no loads. Example 2 from Deutsche has multiple classes with various combinations of fees and expenses. Our Online Appendix (Appendix OA 1) presents seven additional pages of information from Deutsche's prospectus that are needed to understand the classes and expenses summarized in Example 2. Schwab's and Deutsche's gross returns in 2019 were 31.46% and 31.47%, respectively, compared to the S&P 500 gross return of roughly 31.48%.

These examples are from 2019, which is outside of our sample period. We provide example disclosures for 2019 because historical disclosures are only available in raw text format and less useful for illustrative purposes. While the specific numbers are slightly different in 2017, the classes, fee structures, and inferences are the same.

Example 1: Excerpts from Schwab's S&P 500 index fund prospectus

Schwab® S&P 500 Index Fund

Ticker Symbol: SWPPX

Investment Objective

The fund's goal is to track the total return of the S&P 500® Index.

Fund Fees and Expenses

This table describes the fees and expenses you may pay if you buy and hold shares of the fund. This table does not reflect any brokerage fees or commissions you may incur when buying or selling fund shares.

Shareholder Fees (fees paid directly from your investment)	
	None
Annual Fund Operating Expenses (expenses that you pay each year as a % of the value of your investment)	
Management fees	0.02
Other expenses	None
Total annual fund operating expenses[1]	**0.02**

[1] The information in the table has been restated to reflect current fees and expenses.

Example

This example is intended to help you compare the cost of investing in the fund with the cost of investing in other funds. The example assumes that you invest $10,000 in the fund for the time periods indicated and then redeem all of your shares at the end of those time periods. The example also assumes that your investment has a 5% return each year and that the fund's operating expenses remain the same. The figures are based on total annual fund operating expenses after any expense reduction. The example does not reflect any brokerage fees or commissions you may incur when buying or selling fund shares. Your actual costs may be higher or lower.

Expenses on a $10,000 Investment

1 Year	3 Years	5 Years	10 Years
$2	$6	$11	$26

Example 2: Excerpts from Deutsche's S&P 500 index fund prospectus

Note: Details available later in Deutsche's prospectus and presented in our Online Appendix show that classes R6 and S are not available to most retail investors.

Deutsche S&P 500 Index Fund

INVESTMENT OBJECTIVE

The fund seeks to provide investment results that, before expenses, correspond to the total return of common stocks publicly traded in the United States, as represented by the Standard & Poor's 500 Composite Stock Price Index (S&P 500® Index).

The fund invests for capital appreciation, not income; any dividend and interest income is incidental to the pursuit of its objective.

The fund is a feeder fund that invests substantially all of its assets in a "master portfolio," the Deutsche Equity 500 Index Portfolio (the "Portfolio"), which will invest directly in securities and other instruments. The Portfolio has the same investment objective and strategies as the fund. References to investments by the fund may refer to actions undertaken by the Portfolio.

FEES AND EXPENSES OF THE FUND

These are the fees and expenses you may pay when you buy and hold shares. You may qualify for sales charge discounts if you and your immediate family invest, or agree to invest in the future, at least $100,000 in Class A shares in Deutsche funds or if you invest at least $250,000 in Class T shares in the fund. More information about these and other discounts and waivers is available from your financial advisor and in Choosing a Share Class (p. 34), Sales Charge Waivers and Discounts Available Through Intermediaries (Appendix B, p. 74) and Purchase and Redemption of Shares in the fund's Statement of Additional Information (SAI) (p. II-16).

SHAREHOLDER FEES (paid directly from your investment)

	A	T	C	R6	S
Maximum sales charge (load) imposed on purchases, as % of offering price	4.50	2.50	None	None	None
Maximum deferred sales charge (load), as % of redemption proceeds	None	None	1.00	None	None
Account Maintenance Fee (annually, for fund account balances below $10,000 and subject to certain exceptions)	$20	None	$20	None	$20

ANNUAL FUND OPERATING EXPENSES

(expenses that you pay each year as a % of the value of your investment)

	A	T	C	R6	S
Management fee	0.05	0.05	0.05	0.05	0.05
Distribution/service (12b-1) fees	0.24	0.25	0.99	None	None
Other expenses[1]	0.30	0.30	0.26	0.35	0.29
Total annual fund operating expenses[2]	0.59	0.60	1.30	0.40	0.34
Fee waiver/expense reimbursement	0.00	0.00	0.00	0.05	0.00
Total annual fund operating expenses after fee waiver/expense reimbursement	0.59	0.60	1.30	0.35	0.34

[1] "Other expenses" for Class T are based on estimated amounts for the current fiscal year.

[2]The table and Example below reflect the expenses of both the fund and the Portfolio.

The Advisor has contractually agreed through April 30, 2019 to waive its fees and/or reimburse fund expenses, including expenses of the Portfolio allocated to the fund, to the extent necessary to maintain the fund's total annual operating expenses (excluding certain expenses such as extraordinary expenses, taxes, brokerage, interest and acquired fund fees and expenses) at a ratio no higher than 0.35% for Class R6. The agreement may only be terminated with the consent of the fund's Board.

EXAMPLE

This Example is intended to help you compare the cost of investing in the fund with the cost of investing in other mutual funds. The Example assumes that you invest $10,000 in the fund for the time periods indicated and then redeem all of your shares at the end of those periods. The Example also assumes that your investment has a 5% return each year and that the fund's operating expenses (including one year of capped expenses in each period for Class R6) remain the same. Although your actual costs may be higher or lower, based on these assumptions your costs would be:

Years	A	T	C	R6	S
1	$ 508	$310	$ 232	$ 36	$ 35
3	631	437	412	123	109
5	764	576	713	219	191
10	1,155	981	1,568	500	431

You would pay the following expenses if you did not redeem your shares:

Years	A	T	C	R6	S
1	$ 508	$310	$ 132	$ 36	$ 35
3	631	437	412	123	109
5	764	576	713	219	191
10	1,155	981	1,568	500	431

Appendix C: Examples of "Equity Risk" Disclosures

Below is the text of the "equity risk" risk factor disclosures from Deutsche's and Schwab's 2017 prospectuses. The first column is the equity risk discussion copied from the prospectus summary sections. The second column is the equity risk discussion copied from the prospectus detailed sections.

	Text from Prospectus Summary Sections	Text from Prospectus Detail Sections
Schwab	The prices of equity securities rise and fall daily. These price movements may result from factors affecting individual companies, industries or the securities market as a whole. In addition, equity markets tend to move in cycles, which may cause stock prices to fall over short or extended periods of time.	The prices of equity securities rise and fall daily. These price movements may result from factors affecting individual companies, industries or the securities market as a whole. Individual companies may report poor results or be negatively affected by industry and/or economic trends and developments. The prices of securities issued by such companies may suffer a decline in response. In addition, equity markets tend to move in cycles, which may cause stock prices to fall over short or extended periods of time.
Deutsche	When stock prices fall, you should expect the value of your investment to fall as well. Stock prices can be hurt by poor management on the part of the stock's issuer, shrinking product demand and other business risks. These may affect single companies as well as groups of companies. The market as a whole may not favor the types of investments the fund makes, which could adversely affect a stock's price, regardless of how well the company performs, or the fund's ability to sell a stock at an attractive price. There is a chance that stock prices overall will decline because stock markets tend to move in cycles, with periods of rising and falling prices. Events in the US and global financial markets, including actions taken by the US Federal Reserve or foreign central banks to stimulate or stabilize economic growth, may at times result in unusually high market volatility which could negatively affect performance. Further, geopolitical and other events, including war, terrorism, economic uncertainty, trade disputes and related geopolitical events have led, and in the future may lead, to increased short-term market volatility, which may disrupt securities markets and have adverse long-term effects on US and world economies and markets. To the extent the fund invests in a particular capitalization or sector, the fund's performance may be affected by the general performance of that particular capitalization or sector.	When stock prices fall, you should expect the value of your investment to fall as well. Stock prices can be hurt by poor management on the part of the stock's issuer, shrinking product demand and other business risks. These may affect single companies as well as groups of companies. The market as a whole may not favor the types of investments the fund makes, which could adversely affect a stock's price, regardless of how well the company performs, or the fund's ability to sell a stock at an attractive price. There is a chance that stock prices overall will decline because stock markets tend to move in cycles, with periods of rising and falling prices. Events in the US and global financial markets, including actions taken by the US Federal Reserve or foreign central banks to stimulate or stabilize economic growth, may at times result in unusually high market volatility which could negatively affect performance. Further, geopolitical and other events, including war, terrorism, economic uncertainty, trade disputes and related geopolitical events have led, and in the future may lead, to increased short-term market volatility, which may disrupt securities markets and have adverse long-term effects on US and world economies and markets. To the extent the fund invests in a particular capitalization or sector, the fund's performance may be affected by the general performance of that particular capitalization or sector.

Figure 1: Fund Fee and Complexity Strategies

This figure depicts index fund managers' strategic choices. In Carlin (2009), index fund managers choose strategies within a mixed-strategy Nash equilibrium. We simplify this figure to two strategies for illustrative purposes. Under the "simple" strategy, the manager chooses low fees and simplicity. The "complex" strategy is to choose high fees and complexity.

Uninformed investors cannot understand disclosures so buy randomly across both simple and complex strategy funds or, in practice, likely turn to advisors for assistance. Informed investors are able to understand disclosures and identify the cheapest funds, so they only invest in the simple strategy funds. Because simple strategy funds get their equal share of uninformed investors plus all of the informed investors, they are larger than complex strategy funds. The fraction of uninformed investors is determined endogenously by aggregate complexity across all funds. The model is competitive in that all funds earn equal profits in equilibrium.

This figure expands Carlin (2009) to include the likely complementary role of marketing and advisors. The dotted lines indicate that marketing is not explicitly considered in Carlin (2009). However, it seems likely that managers complement their high-complexity strategy by engaging in aggressive marketing; e.g., paying brokers to steer uninformed investors into the high-fee fund. Moreover, marketing should be more effective when targeting uninformed investors who cannot independently evaluate funds. Managers choosing the low-complexity strategy primarily target informed investors, so they should have weaker marketing incentives.

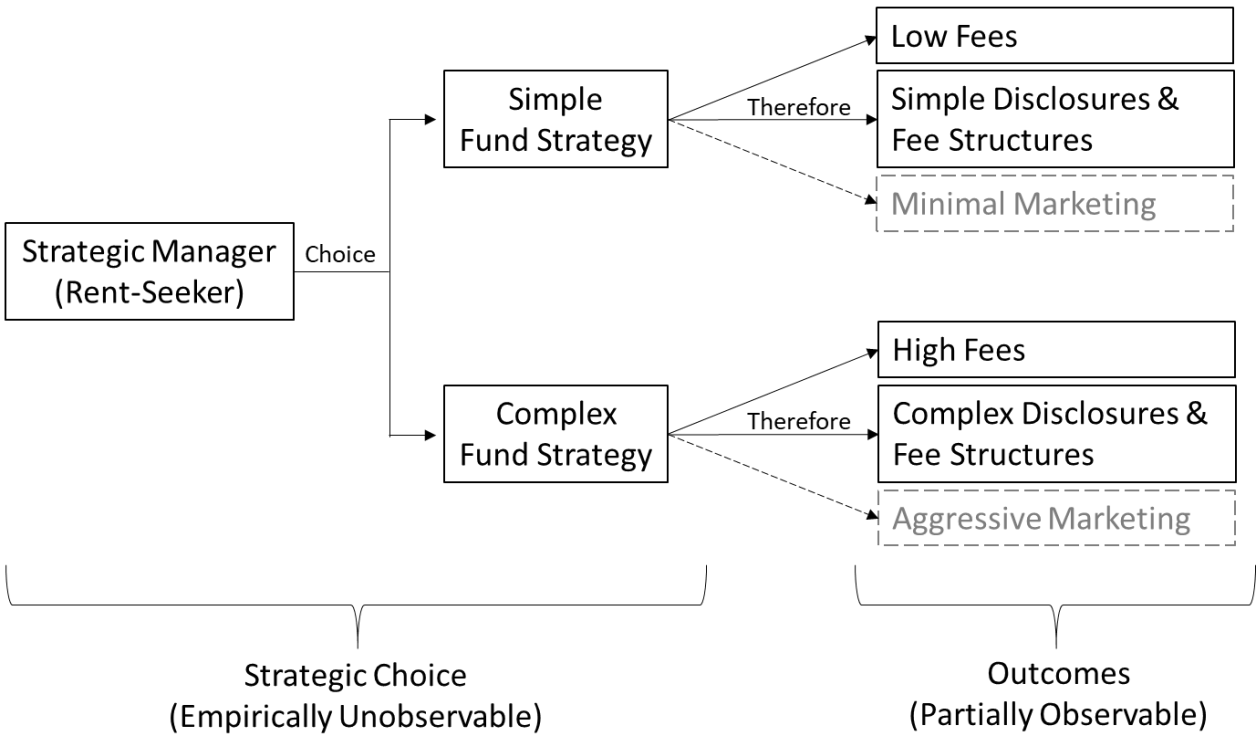


Figure 2: How Funds are Structured

This figure illustrates the structure of a typical mutual fund. Mutual funds are issued by financial institutions such as Schwab. A parent institution can issue many different funds. Each fund can be subdivided into classes with different tickers. All classes within a fund have the same investments and same gross returns, but can have different types and levels of fees. Most fees are paid on an ongoing basis and are expressed in percentage points. "Loads" are typically one-time charges upon the purchase or sale of the fund. Load amounts can differ depending on factors such as the amount purchased or sold, or the length the investor has held the fund. Waivers can reduce fees and loads if certain conditions are met.

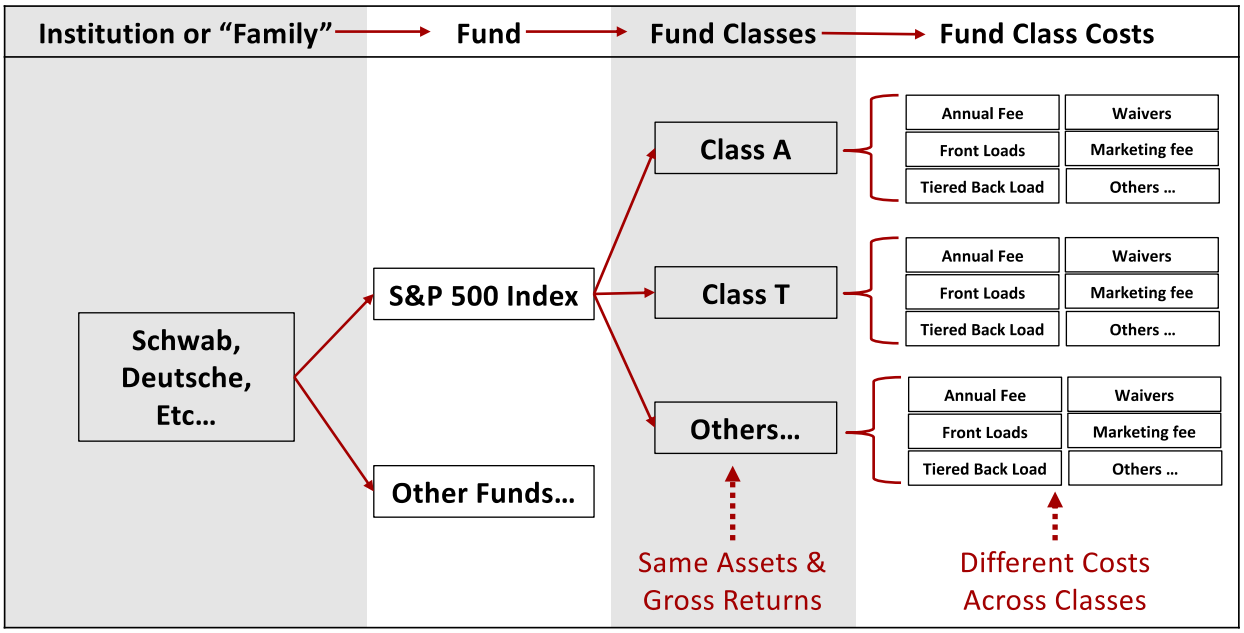
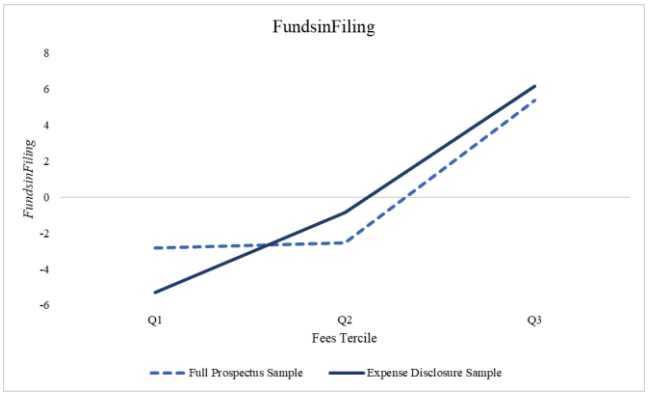
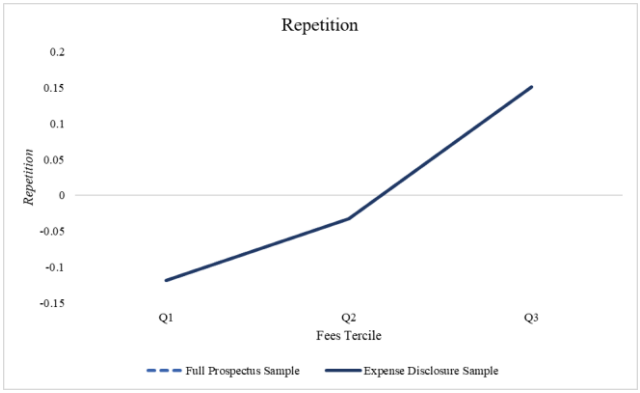
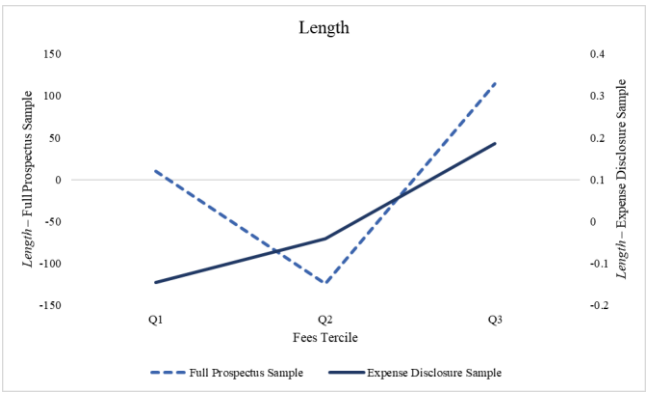


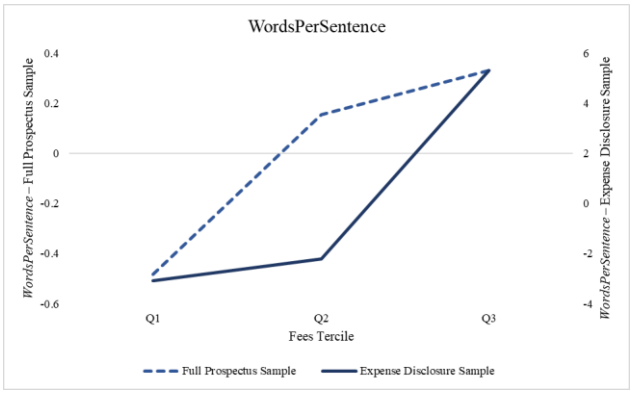
Figure 3: Graphs of Complexity by Terciles of Fees

This figure depicts the average of each of our narrative and structural complexity measures (on the vertical axis) for each tercile of *Fees* (horizontal axis). *Fees* and complexity measures are orthogonalized to year fixed effects to remove time trends. The dotted line measures complexity within the full prospectus sample while the solid line is the expense disclosure sample. The two lines overlap exactly for *Repetition* because the variable is the same in both samples by construction. For brevity, we present only the principal component of our five structural complexity measures, *Structural_Complexity*. All variables are defined in Appendix A.









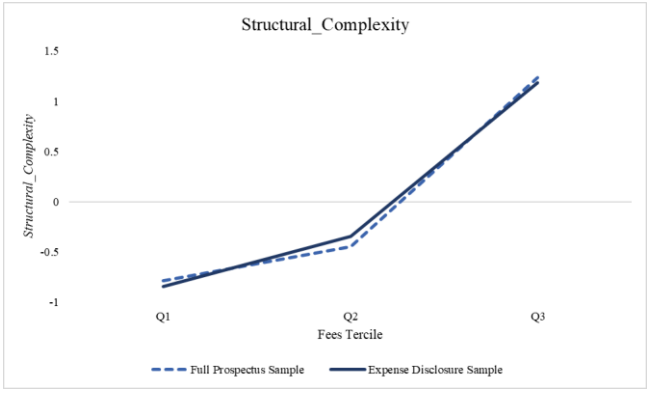


Table 1: Summary Statistics and Descriptive Information

This table presents summary statistics. Panel A presents summary statistics for the pooled sample. To facilitate interpretation, we present summary statistics for non-standardized variable values. The rightmost column tabulates the residual standard deviation in each variable after it is orthogonalized to the year fixed effects used in our regressions. All variables are defined in Appendix A and are winsorized at 1% and 99%. Panel B presents the averages of variables for fee details and fund characteristics, for funds with fees in the lowest tercile of our sample ("low-fee funds") and funds with fees in the highest tercile of our sample ("high-fee funds"). *t*-statistics are in parentheses. Standard errors are clustered by fund. *** indicates significance at 1%; ** at 5%; and * at 10%.

Panel A: Variable summary statistics

	N	Mean	P25	Median	P75	Std. Dev.	Residual Std. Dev.
Fund variables							
Fees	458	0.689	0.200	0.554	1.150	0.526	0.510
TE	452	3.445	1.481	2.467	3.885	3.628	3.368
Size	458	7.056	5.596	7.115	7.910	1.753	1.694
Turnover	458	0.117	0.040	0.060	0.100	0.239	0.237
Stuctural complexity variables							
ShareClasses	458	2.578	1.000	2.000	3.000	1.925	1.819
FrontLoadBreaks	458	1.821	0.000	0.000	5.000	2.704	2.661
RearLoadBreaks	458	1.283	0.000	1.000	1.000	1.787	1.772
FrontLoad	458	0.298	0.000	0.000	1.000	0.456	0.445
NoLoad_12b1	458	0.566	0.000	1.000	1.000	0.495	0.484
Structural_Complexity	458	0.000	-0.798	-0.419	1.031	1.000	0.976
Prospectus narrative variables							
FundsinFiling	286	2.059	1.225	2.120	2.767	0.964	0.942
Repetition	123	0.311	0.074	0.229	0.511	0.259	0.255
Length	458	783.940	372.945	626.207	973.621	617.260	565.265
WordsPerSentence	458	25.387	23.931	25.525	27.123	3.064	2.909
Expense disclosure variables							
FundsinFiling	123	2.235	1.386	2.383	2.866	0.950	0.904
Repetition	123	0.311	0.074	0.229	0.511	0.259	0.255
Length_ExpDisc	123	0.318	0.105	0.238	0.522	0.208	0.207
WordsPerSent_ExpDisc	123	24.929	20.000	24.000	28.333	6.224	6.190

Panel B: Additional descriptive information, by low-fee versus high-fee

		Average for Low-Fee Funds	Average for High-Fee Funds	Difference (Low – High)	t-stat
	Fee details at the fund-class level				
(i)	Max. annualized *Fees* across all classes	0.200	1.311	-1.111***	(-13.37)
(ii)	Min. annualized *Fees* across all classes	0.174	0.774	-0.601***	(-6.15)
(iii)	Max. 12b-1 fee across all classes	0.013	0.767	-0.753***	(-12.25)
(iv)	Min. 12b-1 fee across all classes	0.012	0.107	-0.095***	(-3.54)
(v)	Max. front load across all classes (not annualized)	0.000	3.356	-3.356***	(-7.00)
(vi)	Min. front load across all classes (not annualized)	0.000	0.086	-0.086	(-1.36)
(vii)	Max. rear load across all classes (not annualized)	0.304	2.103	-1.799***	(-4.00)
(viii)	Min. rear load across all classes (not annualized)	0.000	0.000	0.000	(0.00)
	Fund characteristics				
(ix)	*Size*	8.247	6.395	1.852***	(2.96)
(x)	Age (in years)	17.204	8.404	8.800***	(3.59)
(xi)	Prospectus update frequency (per year)	3.956	4.397	-0.441	(-0.67)

Table 2: Analysis of Economic Magnitudes of Fee Dispersion

This table presents the total net assets and weighted average fees for funds with fees in the lowest 20% of our sample (columns i and ii, "inexpensive funds") and the remaining 80% of our sample (columns iii and iv, "all other funds"). Average fees are weighted by net assets at the fund-class level. Column v presents the difference in fees between inexpensive and all other funds, and column vi presents the estimated total fee savings if the investors in all other funds instead held inexpensive funds. Column vii reports the fee savings as a fraction of the total net assets of S&P 500 index funds.

Year	(i) Inexpensive Funds: Net Assets ($M)	(ii) Inexpensive Funds: Weighted Avg. Fees (bps)	(iii) All Other Funds: Net Assets ($M)	(iv) All Other Funds: Weighted Avg. Fees (bps)	(v) =(iv)-(ii) Fee Difference (bps)	(vi) =(v)*(iii) Fee Difference ($M)	(vii) =(vi)/[(i)+(iii)] Fee Diff. as a Percent of Total Investment (bps)
1996	$43	9	$2,766	26.2	17.2	$4.8	0.169
1997	$1,295	18.8	$5,773	30.2	11.4	$6.6	0.093
1998	$3,222	18	$12,392	34.8	16.8	$20.8	0.133
1999	$97,494	18.9	$16,703	36.8	17.9	$29.9	0.026
2000	$117,976	18.2	$21,629	40.3	22.1	$47.8	0.034
2001	$90,222	18.1	$17,951	53.8	35.7	$64.1	0.059
2002	$77,412	18.2	$12,462	55.3	37.1	$46.2	0.051
2003	$88,515	18.1	$17,209	64.7	46.6	$80.2	0.076
2004	$115,955	18.1	$23,937	69.7	51.6	$123.5	0.088
2005	$122,970	18.1	$35,932	64.1	46.0	$165.3	0.104
2006	$122,833	17.9	$40,392	63.2	45.3	$183.0	0.112
2007	$136,387	17.3	$39,495	59.8	42.5	$167.9	0.095
2008	$103,774	16.9	$31,131	57.4	40.5	$126.1	0.093
2009	$103,050	15.1	$25,590	57.6	42.5	$108.8	0.085
2010	$145,495	15	$28,602	60.7	45.7	$130.7	0.075
2011	$153,033	15.4	$33,320	61.9	46.5	$154.9	0.083
2012	$153,817	15.4	$33,342	56.1	40.7	$135.7	0.073
2013	$204,271	14.7	$44,523	59.6	44.9	$199.9	0.080
2014	$257,416	14.6	$50,693	62.5	47.9	$242.8	0.079
2015	$288,410	14.2	$62,529	63.4	49.2	$307.6	0.088
2016	$314,438	14.6	$65,064	62.9	48.3	$314.3	0.083
2017	$390,746	13.8	$71,757	63.7	49.9	$358.1	0.077

Table 3: Prediction 1 – Narrative Complexity

This table presents results of regressing total ownership cost (*Fees*) on narrative complexity variables, as per model (1). Panel A presents results for the full prospectus, and Panel B presents results for the expense disclosure. OLS or robust regressions are used, as indicated at the bottom of each column. Year fixed effects are included in all models. All variables are defined in Appendix A. *t*-statistics are in parentheses. Standard errors are clustered by fund. *** indicates significance at 1%; ** at 5%; and * at 10%.

Panel A: Full Prospectus Sample

	Dependent variable: *Fees*					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
FundsinFiling	0.198***				0.224**	0.225***
	(2.70)				(2.47)	(2.85)
Repetition		0.280***			0.217***	0.253***
		(3.15)			(2.87)	(3.58)
Length			0.056		0.065	0.062
			(0.90)		(0.53)	(0.49)
WordsPerSentence				0.063	0.082	0.057
				(1.04)	(1.28)	(1.21)
Estimation	OLS	OLS	OLS	OLS	OLS	Robust Regression
Adjusted R^2	0.090	0.174	0.020	0.024	0.314	0.383
Observations	286	123	458	458	123	123

Panel B: Expense Disclosure Sample

	Dependent variable: *Fees*					
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
FundsinFiling	0.282***				0.133***	0.100***
	(2.86)				(3.44)	(3.83)
Repetition		0.280***			0.151***	0.157***
		(3.15)			(3.32)	(3.68)
Length_ExpDisc			0.452***		0.338***	0.386***
			(5.94)		(3.59)	(7.27)
WordsPerSent_ExpDisc				0.346***	0.044	0.013
				(3.57)	(0.82)	(0.37)
Estimation	OLS	OLS	OLS	OLS	OLS	Robust Regression
Adjusted R^2	0.162	0.174	0.550	0.302	0.658	0.770
Observations	123	123	123	123	123	123

Table 4: Prediction 2 – Structural Complexity

This table presents results of regressing total ownership cost (*Fees*) on structural complexity variables, as per model (1). Columns (vi) and (vii) combine the five structural complexity measures into a single principal component, as all measures are highly correlated and produce high variance inflation factors when included together. Panel A presents results for the full prospectus, and Panel B presents results for the expense disclosure. OLS or robust regressions are used, as indicated at the bottom of each column. Year fixed effects are included in all models. All variables are defined in Appendix A. *t*-statistics are in parentheses. Standard errors are clustered by fund. *** indicates significance at 1%; ** at 5%; and * at 10%.

Panel A: Full Prospectus Sample

	Dependent variable: *Fees*						
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
ShareClasses	0.355***						
	(5.92)						
FrontLoadBreaks		0.437***					
		(10.65)					
RearLoadBreaks			0.340***				
			(6.83)				
FrontLoad				0.448***			
				(10.07)			
NoLoad_12b1					0.316***		
					(4.64)		
Structural_Complexity						0.454***	0.436***
						(10.53)	(14.96)
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	Robust Regression
Adjusted R^2	0.438	0.715	0.442	0.735	0.373	0.758	0.849
Observations	458	458	458	458	458	458	458

Panel B: Expense Disclosure Sample

	Dependent variable: *Fees*						
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
ShareClasses	0.377***						
	(6.31)						
FrontLoadBreaks		0.509***					
		(8.85)					
RearLoadBreaks			0.349***				
			(4.24)				
FrontLoad				0.521***			
				(8.66)			
NoLoad_12b1					0.408***		
					(5.26)		
Structural_Complexity						0.507***	0.475***
						(7.81)	(10.95)
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	Robust Regression
Adjusted R^2	0.363	0.717	0.310	0.755	0.443	0.711	0.842
Observations	123	123	123	123	123	123	123

Table 5: Narrative Complexity of Specific Disclosures

This table presents results of regressing total ownership cost (*Fees*) on narrative complexity variables, specifically for disclosure items that are unlikely to be affected by structural complexity, marketing, and other unobservable strategies. Panel A presents results for funds' objective disclosures, and Panel B presents results for funds' equity risk disclosures. Appendix C provides examples of equity risk disclosures. Year fixed effects are included in all models in Panel A. All variables are defined in Appendix A. *t*-statistics are in parentheses. *** indicates significance at 1%; ** at 5%; and * at 10%.

Panel A: Analysis of fund objective statement length and words per sentence

	Dependent variable: *Fees*	
	(i)	(ii)
Length_ObjDisc	0.177***	
	(2.73)	
WordsPerSent_ObjDisc		0.051
		(0.49)
Adjusted R^2	0.038	-0.045
Observations	123	123

Panel B: Analysis of equity risk disclosure length, words per sentence, and summarization

	Dependent variable: *Fees*				
	(i)	(ii)	(iii)	(iv)	(v)
Length_RiskDisc	0.170**				
	(2.49)				
WordsPerSent_RiskDisc		0.288***			
		(3.42)			
Repetition_RiskDisc			0.076		
			(0.67)		
Length_Diff				-0.197**	
				(-2.53)	
ExactCopy					0.215***
					(3.03)
Adjusted R^2	0.044	0.210	-0.026	0.075	0.097
Observations	25	25	25	25	25

Table 6: Is High-Fee & High-Complexity a Parent-Level Strategy?

This table presents results of our analysis of complexity and fees among all funds issued by S&P 500 funds' parent companies. Panel A presents results of regressing parent-level narrative and structural complexity on S&P 500 fund narrative and structural complexity in the expense disclosure sample. Panel B presents results of regressing parent-level *Fees* on parent-level narrative and structural complexity. Year fixed effects are included in all models. All variables are defined in Appendix A. *t*-statistics are in parentheses. Standard errors are clustered by fund. *** indicates significance at 1%; ** at 5%; and * at 10%.

Panel A: Regression of Parent-Level Average Complexity on S&P 500 Fund Complexity

	Dependent variable:		
	Length_ExpDisc	*WordsPerSent_ExpDisc*	*Structural_Complexity*
	(i)	(ii)	(iii)
S&P 500 Fund *Length_ExpDisc*	0.825***		
	(8.06)		
S&P 500 Fund *WordsPerSent_ExpDisc*		0.782***	
		(8.32)	
S&P 500 Fund *Structural_Complexity*			0.663***
			(4.91)
Adjusted R^2	0.675	0.606	0.432
Observations	123	123	123

Panel B: Parent-Level Analysis of Complexity and Fees

	Dependent variable: Parent-Level *Fees*		
	(i)	(ii)	(iii)
Length_ExpDisc	0.412***		
	(5.78)		
WordsPerSent_ExpDisc		0.411***	
		(5.17)	
Structural_Complexity			0.475***
			(7.09)
Adjusted R^2	0.405	0.402	0.544
Observations	123	123	123

Table 7: Parent-Level Information

This table presents summary statistics of parent-level characteristics. We present the average of each variable, across all funds of the parents, for parents of funds with fees in the lowest tercile of our sample ("low-fee funds") and the parents of funds with fees in the highest tercile of our sample ("high-fee funds"). *t*-statistics are in parentheses. Rows (i) through (vii) are parent-year observations for 2000 – 2017. Row (viii) contains one observation for each parent company in our expense disclosure sample. Standard errors are clustered by fund. *** indicates significance at 1%; ** at 5%; and * at 10%.

	Variable	Average for Parents of Low-Fee S&P 500 Funds	Average for Parents of High-Fee S&P 500 Funds	Difference (Low – High)	t-stat
(i)	*Fees*	0.654	1.750	-1.097***	(-9.76)
(ii)	Fund *Size*	6.001	5.123	0.879**	(2.32)
(iii)	Public Company Indicator	0.524	0.401	0.122	(0.60)
(iv)	Number of mutual funds	144.286	68.763	75.523**	(2.51)
(v)	Number of passive funds	42.344	11.310	31.033**	(2.00)
(vi)	Number of active funds	101.918	57.416	44.502	(1.40)
(vii)	Number of fund categories	27.429	18.226	9.202***	(3.23)
(viii)	Number of other services offered	3.200	2.778	0.422	(0.43)

Table 8: Pre/Post-2009 Analysis of SEC Regulation Changes

This table presents results of regressing prospectus *Wordiness*, total net assets (*Size*), the probability that the fund exits the market (*Closure*), and *Fees* on an indicator for post-2009 (*Post*) interacted with an indicator for high pre-period narrative complexity (*High_Wordiness*). *High_Wordiness* is an indicator equal to one (zero) for funds in the top (bottom) tercile of narrative complexity using *Wordiness* in the pre-regulation period. Year fixed effects are included in all models and subsume *Post*. *t*-statistics are in parentheses. Standard errors are clustered by fund. *** indicates significance at 1%; ** at 5%; and * at 10%.

	Dependent variable:			
	Wordiness	*Size*	*Closure*	*Fees*
	(i)	(ii)	(iii)	(iv)
High_Wordiness	1.470***	0.220	-0.143	-0.120
	(6.25)	(0.18)	(-1.10)	(-0.55)
Post × *High_Wordiness*	-0.435*	-3.265**	0.418**	0.117
	(-1.90)	(-2.40)	(2.17)	(0.74)
Adjusted R^2	0.379	0.100	0.122	-0.055
Observations	210	300	300	210