PASSIVE IN NAME ONLY: DELEGATED MANAGEMENT AND "INDEX" INVESTING

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Abstract

This paper provides the first detailed empirical analysis of the landscape of US stock market indices. These indices are used both as benchmarks for US mutual funds and in the creation of "passive" index funds. I collect novel data that allows me to explore both of these functions. First, I hand collect detailed information about the universe of indices used as benchmarks for US mutual funds. I document substantial diversity across indices and find that the overwhelming majority of indices in my sample are used as a primary benchmark for only a single fund. I then turn to ETFs, a subset of the mutual fund industry, and hand collect detailed information about the index that each US ETF seeks to track. I find that a substantial fraction of these funds track indices that they, or their affiliates, create. Even controlling for other factors, I find that these funds have, on average, higher expense ratios. My findings shed light on a previously understudied part of the financial markets and have substantial implications for investor protection.

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I. Introduction

Securities indices are central to modern financial markets. Investors rely on indices to evaluate their investment decisions. Mutual fund managers are often rewarded based on their success in outperforming some predetermined index.[1] Academics rely on indices to act as benchmarks in empirical research.[2] In recent years, their importance has only increased. With the rise of index funds – mutual funds designed to track a predetermined index – they are responsible for directing trillions of dollars' worth of investments.[3] They have also begun to take a more active role in corporate governance decisions. Last year, two major index providers – Standard & Poor's[4] (the creator of the S&P 500 index) and FTSE[5] (the creator of the Russell 1000 index) made headlines in the financial press when they announced that they were changing their rules regarding firms that issue non-voting shares.

Less attention has been paid to the indices themselves. Indeed, indices are generally treated as almost *sui generis*. Implicitly, they are treated as passive entities, which simply *are*. With a few exceptions, most scholars and even market participants do not think too hard about where the indices actually come from. As a result, they have become

[1] *See* Linlin Ma, Yuehua Tang, & Juan-Pedro Gómez, *Portfolio Manager Compensation in the U.S. Mutual Fund Industry* J. FIN. 12 (forthcoming 2018) (reporting that in a large sample of US mutual funds, managers were compensated based on performance relative to a benchmark index in over 60% of fund-year observations).

[2] *See* Adriana Z. Robertson & Matthew Spiegel, *Better Bond Indices and Liquidity Gaming the Rest* 1 (Working Paper, Mar. 12, 2018) (noting that "[a]sset-pricing tests, commonly used by academics to test theories about market behavior, rely on indices, as do many of the tests used in the empirical corporate finance literature").

[3] According to the Investment Company Institute, index mutual funds had net assets of almost $3.4 trillion at the end of 2017, over $2.7 trillion of which was in index equity mutual funds. INVESTMENT COMPANY INSTITUTE, 2018 INVESTMENT COMPANY FACT BOOK, 125 (2018), *available at* https://www.ici.org/pdf/2018_factbook.pdf.

[4] Press Release, S&P Dow Jones Indices, S&P Dow Jones Indices Announces Decision on Multi-Class Shares and Voting Rules (Jul 31, 2017) (on file with author).

[5] FTSE Russell. FTSE Russell Voting Rights Consultation – Next Steps. (July 2017).

something of a black box in financial markets. One notable exception to this is a paper on index theory, which seeks to create a taxonomy of types of indices and describe the ways in which they are used.[6] My paper contributes to this literature by providing the first in depth empirical analysis of stock market indices.

In doing so, I seek to correct a pervasive misunderstanding: that stock market indices are "passive" in some meaningful sense. In a companion paper, I make this point in the context of the S&P 500 stock market index.[7] Here I take a step back and make this point in the context of the entire landscape of US stock market indices. I show that there is tremendous amount of diversity across indices, even among indices that purport to have similar aims. Far from being passive, these indices represent the deliberate decisions made by their managers.

While this observation may seem, on some level, obvious, the implications of this observation are far-reaching, and go to the heart of two of the most common uses of these indices: as performance benchmarks, and as the basis for "passive" investing. When an index is used as a benchmark, it is essentially being used as baseline against which the performance of some other investment portfolio can be compared. Logically, of course, any comparison between an investment and a benchmark is as much about the benchmark as it is about the investment in question. While this is true for all indices, including the large indices that dominate the market, it is even more obvious in the context of smaller, less popular indices.

There is no shortage of such indices. I find that on average, there are five funds per benchmark index in the US market, and over 75% of indices are being used as the primary benchmark by only a single fund. Not only is there a large number of these indices, I show that there is tremendous amount of diversity across indices, even among indices that purport to have similar aims. These findings drive home the fact

[6] Gabriel Rauterberg & Andrew Verstein, *Index Theory: The Law, Promise and Failure of Financial Indices*, 30 YALE J. REG. 1 (2013).
[7] *See generally* Adriana Z. Robertson, *The (Mis)uses of the S&P 500* (Working Paper 2018).

that, while benchmarking can be valuable, it must be interpreted with caution.

Many of these indices are also used for "passive" or "index" investing, in which the principal goal of the fund is to track the underlying index as closely as possible. As with benchmarking, the idea that such investments are "passive" reflects the pervasive misunderstanding that I seek to dispel. Rather than being passive in any meaningful sense, index investing simply represents a form of delegated management. Instead of being truly passive, tracking an index almost always implies choosing a managed portfolio. Not only are these indices managed portfolios in the strictly financial sense, by their construction they imply a substantial amount of delegated decisionmaking authority. Seen in this light, the tremendous diversity of indices that I document should not be surprising. Just as there are a large number of "actively managed" mutual funds through which individuals delegate investment decisionmaking, there is also a large number of indices through which individuals engage in the same sort of delegation.

I then investigate one particularly stark example of delegated management: the phenomenon of Exchange Traded Funds that "passively" track an index that is *itself* created by the fund manager, or an affiliate thereof. The idea that an ETF might follow an index that it creates is counterintuitive, and, to my knowledge, is not something that has been previously documented. I refer to these as "affiliated indices," and I investigate potential explanations for this phenomenon. I find evidence consistent with the idea that the funds in question are doing so to take advantage of the popularity of "passive" funds and are passing costs along to investors in the firm of higher expense ratios.

Taken together, my results have substantial implications for investor protection and the regulation of mutual funds. Specifically, my analysis reveals substantial gaps in the current regulatory framework, which funds may be able to use to their advantage and to the detriment of individual investors. My analysis therefore provides a basis for

reevaluating certain aspects of the current regulatory regime, and I close by offering some recommendations, both concrete and conceptual.

The remainder of this paper proceeds as follows. In Part II, I discuss the role of indices in modern financial markets, including their use as benchmarks and as the basis for index investing. I also introduce the concepts of managed portfolios and delegated management. In Part III, I present the first part of my findings, and document the heterogeneity across indices. In Part IV I turn to ETFs and analyze the phenomenon of affiliated indices and some potential explanations for this phenomenon. I discuss the implications of my findings in Part V. Part VI concludes.

II. Indices in Modern Financial Markets

Indices are ubiquitous in modern financial markets. In this section, I provide a brief overview of two of the roles played by indices: as performance benchmarks, and as a basis for "index" investing, including the manners in which they are, and are not, regulated. While indices are not directly regulated in the United States,[8] they are often implicated by the regulatory requirements of *other* entities. I then introduce the concept of a managed portfolio, and argue that indices are best understood as managed, rather than passive, portfolios. Next, I discuss the conceptual issues associated with benchmarking against a managed portfolio. Finally, I introduce the concept of delegated management, particularly in the context of index investing. My discussion in the last two subsections foreshadows my analysis in Parts III and IV, and I return to these issues in Part V when I discuss the implications of my analysis.

Before proceeding any further in this analysis, it is useful to take a step back and ask: What is an index? When you strip everything else away, an index is simply a list with two columns: a date in the first column,

[8] *Fast Answers: Market Indices*, U.S. SEC. & EXCHANGE COMMISSION, https://www.sec.gov/fast-answers/answersindiceshtm.html (last visited Aug. 15, 2018) ("The SEC does not regulate the content of these indices").

and a number – representing either a return or a level – in the second column. From these two columns, one can plot the path – or performance – of the index and can compare it against the performance of any other asset or portfolio. The next natural question to ask is where this list of numbers comes from. Generally, a stock market index is itself constructed from another list, also with two columns. The first contains a list of securities, while the second contains the corresponding weights associated with each security. Any time the index changes – either because the securities on the list change, or because the weights associated with one or more of the securities changes, a new list is created. As such, we can think of an index as a stack of lists, one for each day.

The importance of indices in financial markets has been recognized in the academic literature since at least the mid-1980s, when Shleifer demonstrated that stocks tend to jump after being added to an index.[9] Since that time, dozens of articles have been written exploring this issue and attempting to explain the reason for this effect.[10] Even after more than thirty years, the so-called "index inclusion" effect remains

[9] Andrei Shleifer, *Do Demand Curves for Stocks Slope Down?*, 41 J. FIN. 579 (1986).

[10] Notably among these is an article demonstrating that even a purely administrative change to the weighting of index constituents resulted in a price effect. Aditya Kaul, Vikas Mehrotra & Randall Morck, *Demand Curves for Stocks Do Slope Down: New Evidence from an Index Weights Adjustment*, 55 J. FIN. 893 (2000). For a sampling of other articles in this literature, *see* Messod D. Beneish & John C. Gardner, *Information Costs and Liquidity Effects from 30 Changes in the Dow Jones Industrial Average List* 30 FIN. ANALYSTS J. 135 (1995); Jie Cai, *What's in the News? Information Content of S&P 500 Additions*, 36 FIN. MGMT. 113 (2008); Rajesh Chakrabarti, Wei Huang, Narayanan Jayaraman & Jinsoo Lee, *Price and volume effects of changes in MSCI indices – nature and causes* 29 J. BANKING & FIN. 1237 (2005); Diane K. Denis, John J. McConnell, Alexei V. Ovtchinnikov & Yun Yu, *S&P 500 Index Additions and Earnings Expectations* 58 J. FIN. 1821 (2003); Upinder Dhillon & Herb Johnson, *Changes in the Standard and Poor's 500 List* 64 J. BUS. 75 (1991); Lawrence Harris & Eitan Gurel, *Price and Volume Effects Associated with Changes in the S&P 500 List: New Evidence for the Existence of Price Pressures* 41 J. FIN. 815 (1986); Prem C. Jain, *The Effect on Stock Price of Inclusion in or Exclusion from the S&P 500* 43 FIN. ANALYSTS J. 58 (1987); Anthony Lynch & Richard Mendenhall, *New Evidence on Stock Price Effects Associated with Changes in the S&P 500 Index* 70 J. BUS. 351 (1997).

an active area of research in the finance literature.[11] Indeed, the index inclusion effect is so robust that it is often used by academic economists as a means of studying *other* features of financial markets.[12] Another recent paper has shown that the way indices are typically displayed has systematic effects on financial markets.[13]

A. INDICES AS BENCHMARKS AND THE RISE OF INDEX INVESTING

1. Indices as Benchmarks

While financial market indices have many uses,[14] in the equity market, two uses stand out: for portfolio benchmarking, and for tracking. In the former, the performance of some portfolio (for example, a mutual fund) is evaluated by comparing it to the performance of the benchmark index. In other words, a benchmark is simply a "standard against which the performance of a security or a mutual fund can be measured."[15] Indeed, in the context of the mutual fund industry, the terms "benchmark" and "index" are so closely related that the entry for "benchmark" in the Investment Company Institute's glossary of mutual fund terms contains a cross-reference to the term "index," and the definition of "index" reads, in part, "[a] portfolio of assets that

[11] *See e.g.* Nimesh Patel & Ivo Welch, *Extended Stock Returns in Response to S&P 500 Index Changes*, 7 REV. ASSET PRICING STUD. 172 (2017).

[12] Indeed, this is such a commonly used technique that it has spawned a small literature of its own. *See* Ian Appel, Todd A. Gormley & Donald B. Keim, *Identification Using Russell 1000/2000 Index Assignments: A Discussion of Methodologies* (Working Paper, 2016). Recently, a controversy has erupted over the appropriate use of this technique. *See, e.g.*, Alex Young, *Will the Real Specification Please Stand Up? A Comment on Andrew Bird and Stephen Karolyi*, 15 ECON. J. WATCH 35 (2018) (highlighting concerns about the empirical methodology used in a recently published article and referring to several other recent articles relying on Russell inclusion decisions). *See also* Andrew Bird & Stephen A. Karolyi, *Response to Alex Young*, 15 ECON. J. WATCH 49 (2018) (responding to the criticisms leveled in the aforementioned article). For the purposes of this paper, I take no position on this issue, and I mention it only to highlight an example of the central importance of indices in both academic research and financial markets.

[13] Samuel M. Hartzmark and David H. Solomon, *Reconsidering Returns* (Working Paper, Mar. 2, 2018).

[14] *See generally* Rauterberg & Verstein, *supra* note 6.

[15] Investment Company Institute, Glossary of Mutual Fund and Other Related Financial Terms 1 (2018) *available at* https://www.ici.org/pdf/bro_mf_glossary.pdf.

tracks the performance of a particular financial market or subset of it … and serves as a benchmark against which to evaluate a fund's performance."[16]

It appears that investors take performance relative to a fund's benchmark index into consideration in making investment decisions, and that funds in turn respond to this. Specifically, there is also evidence that funds choose their benchmark indices strategically, and that their performance relative to their reported benchmark matters to investors *above and beyond* the overall performance of the fund.[17]

Recognizing the substantial benefits of relative portfolio evaluation, the SEC requires mutual funds to select a benchmarked index and to report performance relative to that index. Specifically, in addition to their own returns, funds that have annual returns for at least one calendar year are required to the returns of "an appropriate broad-based securities market index."[18] The choice of benchmark, however, is largely left to the discretion of the fund. According to the instructions, the definition of "appropriate broad-based securities market index" is simply an index "that is administered by an organization that is not an affiliated person of the Fund, its investment adviser, or principal underwriter, unless the index is widely recognized and used."[19] Importantly, this definition places restrictions on the identity the index administrator, not on the design or function of the index itself.

Funds are also allowed, and indeed encouraged, to report their performance relative to additional indices. Specifically, a fund is encouraged to compare its performance to "other more narrowly based indexes that reflect the market sectors in which the [f]und invests."[20]

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[16] Id at 1, 5.
[17] Berk A. Sensoy, Performance evaluation and self-designated benchmark indexes in the mutual fund industry 92 J. FIN. ECON. 25 (2009).
[18] SEC Form N-1A 8, *available at* https://www.sec.gov/files/formn-1a.pdf .
[19] Id at 41.
[20] Id.

Moreover, a fund is also permitted to "compare its performance to an additional broad-based index, or to a non-securities index (e.g., the Consumer Price Index), so long as the comparison is not misleading."[21] Note that the instructions do not appear to restrict the order in which the benchmark indices must be presented, despite the fact that the first index may receive a disproportionate amount of investor attention.

2. The Rise of Index Investing

A second prominent use of indices – particularly in the mutual fund context – is for so-called "index investing." In contrast to an actively managed mutual fund, where the fund manager is empowered to buy or sell assets at any time based on an overall investment strategy, index funds (sometimes called "index-based" funds or, alternatively, "passive" funds") seek to track an underlying index as closely as possible.[22] Index investing has taken on an increasingly important role in recent years. One recent report published by the Bank for International Settlements found that "passive funds managed about … 20% of aggregate investment fund assets as of June 2017, up from 8% a decade earlier."[23] This rise has been particularly concentrated in U.S. equity assets, where passive funds now make up 43% of total U.S. equity fund assets.[24]

Recently, the implications of the rise of index-linked investing on financial markets has been the subject of its substantial scholarly work. One branch of this literature has focused on the potential anti-competitive effects of common ownership driven by large institutional investors and index funds, as well potential solutions to this problem.[25]

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[21] Id.

[22] *See* U.S. SEC. & EXCHANGE COMMISSION OFFICE OF INVESTOR EDUCATION AND ADVOCACY, MUTUAL FUNDS AND ETFS, A GUIDE OF INVESTORS 19-20 *available at* https://www.sec.gov/investor/pubs/sec-guide-to-mutual-funds.pdf (providing a short description of both "index-based funds" and "actively managed funds").

[23] Vladyslav Sushko & Grant Turner, *The implications of passive investing for securities markets*, BIS Q. REV. Mar. 2018 at 114.

[24] Id. at 115.

[25] This literature remains contentious. The whale in this area is José Azar, Martin C. Schmalz & Isabel Tecu, *Anticompetitive Effects of Common Ownership*, 73 J. FIN. (forthcoming 2018). It has also led to various spinoff papers. *See e.g.,* Miguel Anton,

A second branch of this literature has emphasized a concern about the effect of index investing on corporate behavior and financial markets. In both cases, the literature is mixed. For example, in the context of corporate behavior, Bebchuck and coauthors have highlighted the governance concerns implicated by index or passive investing,[26] and some scholars have found evidence that index investing affects the relationship between firm investment decisions and investment opportunities.[27] At the same time, other scholars have found evidence that passive ownership actually improves corporate governance[28] and facilitates investor activism.[29] The same is true with respect to stock market implications. Here, scholars have focused on the implications of index investing for stock market price efficiency and liquidity, yielding mixed results.[30]

Florian Ederer, Mireia Gine & Martin C. Schmalz, *Common Ownership, Competition, and Top Management Incentives* (ECGI Working Paper Series in Finance No 511/2017, June 2018); Miguel Anton, Florian Ederer, Mireia Gine & Martin C. Schmalz, *Innovation: The Bright Side of Common Ownership?* (Working Paper, Mar. 10, 2017). For a paper suggesting a solution to these anticompetitive concerns, *see* Eric A. Posner, Fiona M. Scott Morton & E. Glen Weyl, *A Proposal to Limit the Anti-Competitive Power of Institutional Investors*, 81 ANTITRUST L.J. 669 (2017). Note that the initial empirical finding – that common ownership has anticompetitive effects – is not universally accepted. For a paper taking the opposite positions, *see* Patrick J. Dennis, Kristopher Gerardi & Carola Schenone, *Common Ownership Does Not Have Anti-Competitive Effects in the Airline Industry* (Working Paper, Feb. 5, 2018). For a reply to this paper Azar, Schmalz, and Tecu, *see* José Azar, Martin C. Schmalz & Isabel Tecu, *Reply to: 'Common Ownership Does Not Have Anti-Competitive Effects in the Airline Industry'* (Working Paper, May 10, 2018).

[26] Lucian A. Bebchuk, Alma Cohen & Scott Hirst, The Agency Problems of Institutional Investors 31 J. Econ Perspectives 89 (2017).

[27] *See e.g.*, Constantinos Antoniou, Avanidhar Subrahmanyam and Onur Kemal Tosun, *ETF Ownership and Corporate Investment* (Working Paper May 25, 2018) (finding evidence that the investment decisions of firms with higher ETF ownership shares tend to be less sensitive to first investment opportunities, as measured by Tobin's Q).

[28] Ian R. Appel, Todd A. Gormley & Donald B. Keim, *Passive Investors, Not Passive Owners* 121 J. FIN. ECON. 111 (2016).

[29] Ian R. Appel, Todd A. Gormley & Donald B. Keim, *Standing on the Shoulders of Giants: The Effect of Passive Investors on Activism* (Working Paper, Feb. 2, 2018).

[30] *See generally* Jeffrey L. Coles, Davidson Heath and Matthew C. Ringgenberg, *On Index Investing* (Working Paper, Jun. 6, 2018) (finding evidence that index investing

All of this literature has taken as given the behavior of the indices themselves as given. In doing so, they have overlooked the fact that index investing is simply another form of delegated management.[31] As such, it is best understood not as a new phenomenon, but rather as the next step in the movement away from direct shareholder governance, and towards increasingly delegated decisionmaking. I discuss the implications of this in Part V.

B. INDICES AS MANAGED PORTFOLIOS

Despite the ubiquity of indices and the rich literature focusing on their effects, there has been little work done on indices *qua* indices. Indeed, despite the central role indices play in modern financial markets, little is known about how they make decisions regarding which securities to include or exclude.[32] To the extent that financial economists have paid any attention to the decisions made by index provides, it has generally been to note in passing that some indices – notably the Russell 1000 and 2000 – operate via fairly mechanical rules, whereas others involve some amount of discretion.[33] Similarly, despite the fact that indices are both plentiful and ubiquitous, no generally accepted method exists for comparing the performance of one index to another.[34] While the ideal benchmark for the purposes of academic finance may be one that is as

introduces noise into stock prices, but no evidence that it reduces price efficiency or liquidity).

[31] See discussion *infra* Part II.D.

[32] One notable exception to this is work by Rauterberg and Verstein, which provides a systematic overview of how indices are used and proposes a taxonomy of financial indices. Gabriel Rauterberg & Andrew Verstein, Index Theory: The Law, Promise and Failure of Financial Indices, 30 YALE J. REG. 1 (2013). Rauterberg and Verstein also emphasize the subjectivity and human discretion element that goes into indices, highlighting what they call "the myth of objectivity." This paper builds on their theoretical insight by providing the first systematic empirical evidence of the landscape of stock market indices.

[33] See discussion *supra* note 12 and accompanying text.

[34] Robertson & Spiegel, *supra* note 2 at 4 (noting that the authors "are aware of no standard method for comparing one index's accuracy to another," before proposing and implementing a series of tests).

close to a pure buy and hold portfolio as possible,[35] this may or may not be true in other contexts. Even if it is true in theory, in practice, after examining hundreds of indices, I found none that were truly passive. Rather, *all* of them represent managed portfolios.

What do I mean when I say that some index is a managed portfolio? In contrast to a "buy and hold" portfolio, a managed portfolio is one in which some trading occurs.[36] A buy and hold portfolio is one that is truly passive – the portfolio manager simply selects securities and weights at day 1, forms her portfolio, and then sits back and waits. No trading, rebalancing, or other activity of any kind occurs. This is not to say that *no* management or stock-picking occurs. After all, the manager had to decide what stocks to include in her portfolio, and in what proportions, at day 1. The passivity kicks in after day 1, where no further action is taken.

It is important to note that there can be tremendous diversity across managed portfolios. For example, one can distinguish between a purely rules-based managed portfolio and an actively managed portfolio. A portfolio that consists of the 100 largest stocks on the New York Stock Exchange would be a managed portfolio – as stocks change in size, the composition of the portfolio would change. The fact that the changes occur entirely by operation of a preset rule doesn't change the fact that the portfolio is changing. Alternatively, a manager might have discretion to select individual stocks for her portfolio, based on whatever criteria she sees fit, including her own intuition about future performance. The difference between this portfolio and the portfolio of the 100 largest stocks on the NYSE is that while the latter is a managed portfolio, the former is an *actively* managed portfolio.

Based on the preceding discussion, it should be clear that indices are, in general, managed portfolios. Even assuming that the index

[35] Id. at 1 (arguing that "[a]ny good benchmark should represent a passive strategy that can be followed without any special knowledge").
[36] *See* John H. Cochrane, Asset Pricing 134-135 (2d ed. 2005).

methodology stays constant, the composition of securities on the index changes over time according to that methodology. Indeed, after analyzing the entire universe of indices that are used as benchmarks for US mutual funds, I did not find a single index that is truly passive – all of them are, at the very least, managed portfolios.[37]

As it turns out, however, index methodologies *do* tend to change over time, further compounding the degree to which the index portfolio changes over time and exacerbating the gap between being passive and actively managed. To take just one example, the methodology for the S&P 500 changed at least eight times between January 1, 2015 and April 30, 2018,[38] and overall, the methodologies of this family of indices changed 22 times within that period.[39] S&P is not unique in this regard. For example, the methodology employed in constructing the Russell U.S. Equity indices was modified 4 times between July 2017 and May 2018.[40] Together, the indices in these families comprise a disproportionate share of the market for benchmark indices. As shown in more detail below in Part III.A, they represent 18 of the 20 most popular benchmark indices by number of funds, and 15 of the 20 largest by assets under management ("AUM").[41]

Not only do methodologies change over time, they often also explicitly grant the index creator some amount of discretion. Sometimes this discretion is relatively narrow – for example, in interpreting a rule for edge cases. Other times, the discretion in much broader, such as in the case of the Dow Jones Industrial Average, which, as discussed below,[42]

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[37] See *infra* Part III.
[38] S&P DOW JONES INDICES, S&P U.S. Indices Methodology 35-37 (April 2018) (on file with author).
[39] Id.
[40] *See* FTSE Russell, Russell US Equity Indexes: Construction and Methodology Update 1 (Jul 28, 2017) (on file with author); FTSE Russell, Russell US Equity Indexes: Construction and Methodology Update 1 (Oct. 20, 2017) (on file with author); FTSE Russell, Russell US Equity Indexes: Construction and Methodology Update 1 (Dec. 1, 2017) (on file with author); FTSE Russell, Russell US Equity Indexes: Construction and Methodology Update 1-2 (May 3, 2018) (on file with author).
[41] See *infra* Table 2.
[42] See *infra* Part III.D.1.

has no quantitative rules for selecting constituents.[43] Others still contain sufficient ambiguity as to make it difficult for a third party to determine exactly how the index will be constructed going forward.[44] The most extreme examples of these are indices that rely on proprietary methodologies.[45]

This argument – that indices are managed portfolios – is perhaps counterintuitive. Perhaps because of the ubiquity of the idea of "passive investing" – i.e., an investment strategy in which the investor attempts to invest in a way that tracks some index – indices have come to be associated with passive portfolios. Of course, these are false friends: the fact that an investor "passively" follows an index does not imply that the index *itself* is passive.[46]

While this point – that indices are managed portfolios – may be simple, its implications are far reaching. In the next two subsections, I introduce the conceptual implications of this insight in the context of benchmarking and index investing, respectively. I leave a more detailed discussion of the implications of my findings for Part V.

C. BENCHMARKING AGAINST MANAGED PORTFOLIOS

It should be fairly straightforward to see why this insight is relevant in the context of benchmarking. First, given that no index is truly passive, in the sense of being a pure buy and hold portfolio, any comparison between an investment portfolio and an index necessarily implies a comparison with a managed portfolio. Sometimes this may

[43] S&P Dow Jones Indices, Dow Jones Averages Methodology 3 & 5 (April 2017) (on file with author).
[44] See *infra* Part III.D.
[45] See *infra* Part III.C.4
[46] People can also actively trade in "passive" funds, such as ETFs, further muddying the waters of "passive" investing. I leave this possibility aside and focus on the "passivity" of the indices themselves, and the funds that track them.

be precisely the right thing to do. For example, an investor who is herself holding a managed portfolio could be entirely correct in comparing its performance to that of another managed portfolio. In that case, by comparing the performance of her portfolio to the benchmark, she can answer the question of "how did my managed portfolio do compared to this other managed portfolio?" She is, in other words, comparing one type of management to another.

In contrast, an investor who has chosen to invest in a truly passive fashion – by buying securities and simply holding them – and who compares his performance to that of an index is asking something quite different. In fact, he is asking two questions: "How does the performance of my passive portfolio compare to that of a managed portfolio?" and "How does the performance of my portfolio compare to that of *this particular* managed portfolio?" While the second one is the same as above, the first is not. In general, managed portfolios will outperform passive portfolios over long horizons,[47] leading to biased comparisons.[48]

This leads to the second critical issue related to benchmarking – that any comparison against a benchmark is as much about the benchmark as it is about the comparator. While the old adage refers to the comparison of apples to oranges, one could just as well compare oranges to apples. Concretely, when the comparator of interest is a stock portfolio, this implies that it is crucial to understand the details of the benchmark index. Otherwise, any comparison is, at best, useless, and at worst, misleading. I return to this issue in Part V.B.

D. INDEX INVESTING AND DELEGATED MANAGEMENT

The basic idea of delegated management is quite simple: in the abstract, it simply means that rather than making all the relevant decisions alone, one retains a delegee, or an agent, to make decisions

[47] *See* COCHRANE *note* 36 at 132-136 (2d ed. 2005).
[48] *See generally* Robertson, *supra* note 7 (quantifying the extent of that outperformance in the context of the S&P 500).

on one's behalf. In the corporate context, this the familiar story of the separation of ownership and control.[49] Rather than running the company themselves, investors elect board members, who hire managers to run the company's daily activities.[50]

Investors can do something similar at the portfolio level: rather than personally managing their security portfolios, they can retain a manager to do it for them, for example, by buying shares in some sort of fund, such as a hedge fund or an actively managed mutual fund. By doing so, the investors are delegating the decisions around which stocks to buy and sell (and in what quantities), and when to do it, to the fund manager. Alternatively, an investor could purchase an index fund, which tracks some underlying index. Here, the buying and selling decisions are taken out of the hands of the managers.[51] Instead of the fund manager, these decisions simply being made by the index providers. Somebody is still making the decisions, and delegated management is still occurring.

While individuals may be happier not having to manage the day to day features of their financial lives, delegated management almost invariably leads to concerns about agency problems. These problems are well known and well understood. Much of the literature on corporate law and corporate governance is focused on identifying and remedying agency problems, and one of the primary purpose of corporate law is addressing and minimizing these problems.[52] While running a company is more complex than managing a stock portfolio,

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[49] *See* Roberta Romano, *Preface* in FOUNDATIONS OF CORPORATE LAW (2nd ed. 2006) ("The key feature of the public corporation is Adolph Berle and Gardiner Means' insight concerning the separation of ownership and control: managers of the firm, who run the business, are not the owners").

[50] Id.

[51] This is not entirely true. Even in a "passively" managed fund, fund managers still have some discretion (generally to reduce transactions costs and tracking error) but it is relatively minor.

[52] Romano, *supra* note 49 Preface (noting that "[m]uch of corporate law is directed at mitigating agency problems").

the same types of concerns can arise in the portfolio management context.

Not all delegation is delegated management. The management portion of delegated management implies some discretion, or decisionmaking by the agent that is not pre-determined or directly supervised by the principle – here, the investor. If an investor wrote a complete contingent list of investment rules and asked the manager to implement those rules, it would be odd to call that delegated management. The "manager" in this example is simply executing the instructions. While this may be possible in theory, after reviewing the methodology documents of over 600 indices, I did not find a single one that operated in that way. Rather, as discussed in Part III, many either provided for substantial amounts of discretion, or were described in such a way as to make it virtually impossible for a third party to precisely interpret the states criteria.

This observation has substantial implications, both conceptual and concrete. I return to this issue in Part V.A, with a particular focus on the implications for investor protection. Before doing so, I turn to the empirical portions of this paper.

III. The Landscape of Indices

While even many relatively financially sophisticated individuals would be hard pressed to name for than a handful indices, it turns out that there are thousands of different securities indices in the world,[53] hundreds of which focus on US equity securities. In a companion paper, I perform a detailed quantitative analysis on the giant among these –

[53] A search of Morningstar Direct on August 3, 2017 returned over 67,000 indices. Even after aggressively eliminating duplicates – for example, instances where the same index was offered in different currencies – I was left with about 29,000 indices. While a relatively small number of index providers dominate this market (FTSE/Russell, MSCI and S&P in the equity market, and Bank of American / Merrill Lynch, Bloomberg/Barclays, Citi and Markit in the fixed income market), there are also hundreds of smaller providers. In total, 282 index providers appeared fewer than 100 times in the data, and 206 appeared fewer than 10 times.

the S&P 500 – and look at the implications of its security selection decisions. Repeating this analysis for each of these other indices is infeasible for both practical and technical reasons.[54] Instead, in this section, I take a different approach. Rather than delving into the *implications* of security selection, I take a step back and examine the security selection *process* itself. In other words, this section builds on the idea of indices as managed portfolios and explores the differences in *how* these portfolios are managed.

I have two reasons for doing so: (1) to explore *why* there is such a profusion of indices, and (2) to shed light on *how* the indices differ from each other, if at all. In doing so, I hope to shed some light on this previously unexplored landscape.

A. THE SAMPLE

To ensure that my sample was as comprehensive as possible, I began by casting a wide net. Using data from Morningstar Direct, on July 26, 2017, I obtained a list of all equity mutual funds available for sale in the United States. Morningstar Direct is marketed as "an investment analysis platform built for asset management and financial services professionals,"[55] and is also used by academics in the finance literature.[56] This list included open ended equity mutual funds, ETFs, and closed end funds. In order to ensure that I did not miss anything,

[54] Practically, doing so would require a large amount of data cleaning and computing power. Technically, unlike S&P, most index providers in my sample do not make the historical constituents of their indices available.

[55] MORNINGSTAR DIRECT, https://www.morningstar.com/products/direct (last visited Jun. 19, 2018)

[56] For a recent example, see Martijn Cremers & Ankur Paree, *Patient capital outperformance: The investment skill of high active share managers who trade infrequently* 122 J. FIN. ECON. 288 (2016) (classifying as "active share managers" those who manage funds whose holdings differ substantially from their benchmark as reported on Morningstar Direct, and finding that among these funds, those who trade infrequently outperform those who do not).

I also included open- and closed-end funds, as well as ETFs available for sale in the US that were classified by Morningstar Direct as "Alternative" or "Miscellaneous," or whose type was missing. Because this last group introduced a wide variety of different types of funds that were not focused on equities, I then removed funds that had a Morningstar category that clearly indicated that they were not equity funds.[57]

Because I was interested in limiting my attention to the US market, I dropped all funds that Morningstar categorized as focusing on foreign markets.[58] I then went through the remaining indices and eliminated funds that were benchmarked to indices that were clearly either non-US focused or were not equity indices.[59] Finally, because I was

[57] Specifically, I dropped funds in the following Morningstar categories: "Alt - Fund of Funds – Multistrategy," "Alt - Fund of Funds - Other," "Alt - Fund of Funds - Europe," "Managed Futures," "Miscellaneous - Income and Real Property," "Multicurrency," "Option Writing," "Single Currency," "Trading - Leveraged/Inverse Commodities," "Trading--Inverse Commodities," "Trading--Inverse Debt," "Trading--Leveraged Commodities," and "Trading--Leveraged Debt."

[58] Specifically, I dropped all funds in the following Morningstar categories: "Asia Pacific Equity," "China Region," "Diversified Emerging Mkts," "Diversified Pacific/Asia," "Emerging Markets Equity," "Europe Stock," "European Equity," "Greater China Equity," "India Equity," "Japan Stock," "Latin America Stock," "Pacific/Asia ex-Japan Stk," "Asia Pacific ex-Japan Equity," "Foreign Large Blend," "Foreign Large Growth," "Foreign Large Value," "Foreign Small/Mid Blend," "Foreign Small/Mid Growth," "Foreign Small/Mid Value," "Global Emerging Markets Equity," "Miscellaneous Region," "Other Asia-Pacific Equity." I also dropped funds to which Morningstar assigned a country category "Europe."

[59] The funds I dropped were those that were benchmarked to the following indices: "BBgBarc Capital US Agg Bond TR USD" "Barclays US Tr 2Y/10Y Yield Curve TR USD" "Bitcoin Market Price PR USD" "BofAML 3M Trsy Bill +3% Wrap" "BofAML US Treasury Bill 3 Mon TR USD 50.00000% + MSCI World NR USD 50.00000%" "FTSE 3-month U.S.T-Bill + 4% USD" "Hartford Risk-Optim Multif REIT TR USD" "JPY USD" "JPY/USD TR USD" "MSCI US REIT USD" "3-Month LIBOR" "BBgBarc 1-3 Yr US Treasury TR USD" "BBgBarc Global Aggregate TR Hdg USD" "BBgBarc Global Aggregate TR USD" "BBgBarc Municipal 5 Yr 4-6 TR USD" "BBgBarc Municipal TR USD" "BBgBarc US Agg Bond TR USD" "BBgBarc US Corporate High Yield TR USD" "BBgBarc US Govt/Credit TR USD" "BBgBarc US Treasury Bill 1-3 Mon TR USD" "BBgBarc US Trsy Bellwethers 3Mon TR USD" "BBgBarc US Trsy Infl Note 1-10Y TR USD" "BONY China Select ADR TR USD" "BONY Emerging Markets 50 ADR TR USD" "BONY Latin America 35 ADR TR USD" "BofAML US Treasuries 1-5Y Yld USD" "BofAML US Treasury Bill 3 Mon TR USD" "BofAML US Treasury Bills 0-3 Mon TR USD" "BofAML US Treasury Bills TR USD" "BofAML USD LIBID 1 Mon Average TR USD" "BofAML USD LIBOR 3 Mon CM" "BofAML USD LIBOR 6 Mon CM TR USD"

interested in the relationship between funds and their benchmark indices, I then dropped all indices for which no benchmark index was recorded.

After eliminating duplicates, this left a total of 897 indices. With the help of a research assistant, I then obtained the methodology document associated with each index. In a few cases, no formal methodology document was available. In such cases, if a prospectus for an associated ETF was available, I obtained methodology information form the prospectus. In other cases, a description of the index was available on the index provider's website.[60] I then read through each methodology

"Citi Treasury Bill 1 Mon USD" "Citi Treasury Bill 3 Mon USD" "DJ US Select REIT TR USD" "FTSE EPRA/NAREIT Developed Europe NR USD" "FTSE EPRA/NAREIT Developed Ex US NR USD" "FTSE EPRA/NAREIT Developed Ex US TR USD" "FTSE Developed Europe All Cap NR USD" "FTSE EPRA/NAREIT Dv ex NA NR USD" "FTSE EPRA/NAREIT Global Ex US TR USD" "FTSE EPRA/NAREIT Global REITs NR USD" "FTSE NAREIT All Equity REITs TR USD" "FTSE NAREIT All REITs TR" "FTSE NAREIT Equity REITs TR USD" "ICE LIBOR 1 Month USD" "ICE LIBOR 3 Month USD" "MSCI ACWI Ex USA IMI NR USD" "MSCI ACWI Ex USA NR USD" "MSCI Brazil 25-50 GR USD" "MSCI Brazil 25-50 NR USD" "MSCI India NR USD" "MSCI Japan GR USD" "MSCI Japan NR USD" "MSCI Korea 25-50 NR USD" "MSCI Mexico IMI 25-50 GR USD" "MSCI Mexico IMI 25-50 NR USD" "MSCI US REIT GR USD" "MSCI US REIT NR USD" "MVIS Russia NR USD" "S&P Dev Ex-US BMI Energy Sector NR USD" "S&P Dev Ex-US BMI Financl Sector NR USD" "S&P Dev Ex-US BMI HealthCare Sec PR USD" "S&P Dev Ex-US BMI IT Sector NR USD" "S&P Dev Ex-US BMI Industrial Sec NR USD" "S&P Dev Ex-US BMI Materia Sector NR USD" "S&P Dev Ex-US BMI Telecom Svc Se NR USD" "S&P Dev Ex-US BMI Utilit Sector NR USD" "S&P Dev ExUS BMI ConsDiscret Sec NR USD" "S&P Developed Ex US Property NR USD" "S&P Developed Ex US Property TR USD" "S&P Developed Property TR USD" "S&P Developed Small TR USD" "S&P Dvlp Ex US Consumer Staple GR USD" "S&P Global Ex US Property NR USD" "S&P Global Ex US REIT NR USD" "S&P Global REIT NR USD" "S&P Global REIT TR USD" "US Dollar" "USTREAS Federal Funds" "Wilshire US REIT TR USD" "Wilshire US RESI TR USD" "WisdomTree Gbl Ex Us Real Estate TR USD" "DJ Gbl Ex US Select RESI NR USD" "AUD/USD TR USD" "Double Long Euro TR USD" "Double Short Euro TR USD" "EUR/USD TR USD" "FTSE China 50 NR USD" "FTSE China 50 USD TR USD" "FTSE Developed Europe All Cap TR USD" "MSCI Europe NR USD" "MSCI Europe Small Cap NR USD" "MSCI Europe/Financials NR USD" "WisdomTree Gbl ex-US Hdg Real Es TR USD"

[60] After all this, there were 12 for which were not able to obtain formal documentation. Where possible, I made inferences about these indices based on other information. For example, several were used as underlying indices for ETFs. In such cases, I relied on the

document. Based on this review, I identified 82 of these as indices that are primarily composed of non-stock assets,[61] and another 211 that are primarily or exclusively composed of non-US equities or are designed to cover regions that extend beyond the United States.[62] This leaves a total of 603 indices, which benchmark 3,208 mutual funds (for a total of 9,021 fund-classes).

Table 1 presents summary statistics on the number of funds, as well as the aggregate AUM benchmarked to each index. Table 2 presents the most popular indices, measured both by largest number of funds that use it as a benchmark and by the aggregate AUM of the funds benchmarked to it.

Table 1: Summary Statistics – Indices (Full Sample)

	mean	st.dev.	p10	p25	p50	p75	p90	N
Number of Funds	5.32	38.45	1	1	1	1	3	603
Aggregate AUM (millions)	16,130	170,401	5	36	267	1,641	9,166	603

Table 2 highlights the dominant position of the S&P 500 in this market. Out of a total of 3,208 funds, 842 (26%) are benchmarked to the S&P 500. This dominance is even greater in AUM terms, where the figures are almost $4 trillion, or 41% of the total. Of course, that still leaves over $5.7 trillion, or almost 2,500 funds, benchmarking to some *other* index. Moreover, as Table 1 demonstrates, there is a long tail of indices. The median index – and even the 75th percentile index – is

ETF documentation to code the index. My results are not sensitive to the exclusion of these indices.

[61] For example, some of these indices primarily track assets like ETFs, MLPs, or REITs. Others are indices of hedge funds, or of other indices.

[62] For these purposes, I treat equities listed on US exchanges are US equities. As such, an index that includes foreign equities that are traded on US exchanges, including in the form of ADRs, is included in my sample. In contrast, an index that includes securities listed on "developed country exchanges," is excluded, since it includes foreign equities listed on foreign exchanges. I also exclude indices designed to track equities that represent regions that extend beyond the United States, including "World," "Developed Countries," and "North America." I also identify and remove a few indices that exclude US firms that were missed in prior screens.

being used by only a single fund,[63] and even the 90th percentile is only being used by 3 funds, highlighting the tremendous skew in the data. That being said, even the smaller indices are associated with non-trivial amounts of money. The aggregate AUM associated with the median index is $267 million, and there are 193 indices that are associated with over $1 billion in AUM. While they are clearly not as large as the S&P 500, these amounts are large enough that they should not be ignored.

Table 2: Most Popular Indices (Full Sample)

Most Popular Indices by Number of Funds		Most Popular Indices by AUM	
Index Name	Number of Funds	Index Name	Aggregate AUM (billion)
S&P 500	842	S&P 500	$3,989
Russell 2000	234	CRSP US Total Market	$797
Russell 1000 Value	188	Russell 1000 Value	$603
Russell 1000 Growth	183	Russell 1000 Growth	$532
Russell 2000 Value	134	Russell 2000	$328
Russell 2000 Growth	118	Russell Mid Cap Value	$204
Russell Mid Cap Growth	82	Russell Mid Cap Growth	$203
Russell Mid Cap Value	81	Russell 3000	$186
Russell 3000	80	Russell 2000 Value	$181
Russell 1000	79	Russell 1000	$178
S&P MidCap 400	56	S&P MidCap 400	$155
Russell 2500	54	Russell 3000 Growth	$138
Russell Mid Cap	48	Russell 2000 Growth	$131
Russell 3000 Value	43	CRSP US Mid Cap	$110
Russell 3000 Growth	40	Russell Mid Cap	$101
Russell 2500 Growth	30	CRSP US Small Cap	$97
Russell 2500 Value	27	CRSP US Large Cap Growth	$83
NASDAQ 100	22	Russell 3000 Value	$83
S&P SmallCap 600	22	NASDAQ 100	$76
DJ Industrial Average	16	S&P Completion	$73
Total number of funds	3,208	Total AUM	$9,726

[63] This figure actually understates this phenomenon. In fact, 480 indices were being used by a single fund, representing 79.5% of the total. An addition 56 indices were used by only 2 funds, meaning that almost 89% of indices were benchmarking no more than 2 funds.

Because indices can act both as benchmarks and as an underlying index for the purpose of "index" investing, I divide my sample of mutual funds into index funds and non-index funds.[64] Then, recognizing that an index fund could potentially track an index other than its primary prospectus benchmark, I obtained the prospectus for each index fund from the SEC's Edgar Mutual Fund database and hand collected the underlying index for each fund.[65] Out of 916 index funds, I was able to locate prospectuses for 893 in this way. 22 of the remaining 23 were Exchange traded notes, and I obtained their prospectuses by other means, such as through the Morningstar website. I was unable to identify the marketing material for the final fund, so it was omitted from the index fund subsample.[66] I omitted two additional funds – one because it did not disclose an underlying index, and one because the underlying index did not satisfy the criteria laid out above. I was therefore left with a final sample of 913 index funds. The set of non-index funds consisted of the remaining 2,294 funds.

To investigate the characteristics of indices used as benchmarks for actively managed mutual funds separately from the characteristics of indices used for "index investing," I repeat the analysis in Tables Table 1 and Table 2, this time splitting the sample between the two groups. I note that while I am relying on the Morningstar Direct data for the non-index fund subsample, I use my hand collected data for the index fund subsample. As a result, the data used in the two subsamples does

[64] Specifically, I classify as "index funds" all funds that are coded as index funds or as ETFs by Morningstar Direct. All other funds are classified as non-index funds.

[65] The process for obtaining the prospectus data from Edgar was as follows. First, I extracted a list of all the funds coded as index funds (see *supra* note 64). I then searched for the fund by name on the Edgar website and obtained the most recent prospectus. However, recognizing that the data was collected from Morningstar Direct in July 2017, and the searches on Edgar were conducted in the middle of 2018, when there was a discrepancy between the index obtained using Edgar and the index provided by Morningstar Direct, I repeated the search on Edgar, and relied on the information as of December 31, 2017.

[66] This was named the "Invesco QQQ Trust."

not aggregate to the data used in the full sample. The results are presented in Tables Table 3 and Table 4.

Table 3: Summary Statistics – Indices (Subsamples)

Panel A: Non-Index Funds Only								
	mean	st.dev.	p10	p25	p50	p75	p90	N
Number of Funds	26.37	90.2	1	1	2	6	74	87
Aggregate AUM (millions)	60,942	272,490	21	267	1,141	9,114	147,450	87
Panel B: Index Funds Only								
	mean	st.dev.	p10	p25	p50	p75	p90	N
Number of Funds	1.64	3.78	1	1	1	1	2	557
Aggregate AUM (millions)	7,944	74,452	4	34	233	1,380	8,006	557

Table 3 shows that the skew is present in both subsamples. However, there are substantial differences between the two groups. Panel A shows that there are 87 different benchmark indices used by the 2,294 non-index funds in my sample, an average of about 26 funds per index. In contrast, the median number of funds per index is only 2, and even the 75th percentile index is the benchmark for only 6 mutual funds. Arguably, the most striking feature of this distribution is its skewness: the skewness of the number of funds is over 6.7, and the skewness of the AUM is over 7.8.

In contrast, the most striking feature of the results in Panel B is the relatively low number of funds per index across the board. The average number of funds per index is only 1.6 (with a median of 1). Indeed, even the 75th percentile in the first row is one, indicating that over 75% of indices are being tracked by a single index fund. These distributions are also highly skewed, with a skewness of about 14 and 18, respectively.

Table 4: Most Popular Indices (Subsamples)

Panel A: Non-Index Funds Only			
Index Name	Number of Funds	Index Name	Aggregate AUM (billion)
S&P 500	769	S&P 500	$2,434
Russell 2000	198	Russell 1000 Value	$542
Russell 1000 Value	182	Russell 1000 Growth	$471
Russell 1000 Growth	176	Russell 2000	$259
Russell 2000 Value	132	Russell Mid Cap Growth	$193
Russell 2000 Growth	116	Russell Mid Cap Value	$192
Russell Mid Cap Growth	80	Russell 2000 Value	$170
Russell Mid Cap Value	80	Russell 3000	$148
Russell 3000	74	Russell 1000	$147
Russell 1000	73	Russell 3000 Growth	$138
Russell 2500	52	Russell 2000 Growth	$120
Russell 3000 Value	43	Russell 3000 Value	$83
Russell Mid Cap	43	Russell Mid Cap	$73
Russell 3000 Growth	40	Russell 2500	$54
Russell 2500 Growth	30	Russell 2500 Growth	$52
S&P MidCap 400	27	S&P MidCap 400	$48
Russell 2500 Value	27	NASDAQ Composite	$21
Russell Micro Cap	14	Russell 2500 Value	$19
S&P 1500	9	S&P 500 Sec/Utilities	$16
S&P SmallCap 600 & S&P 500 Value (*tied*)	8	S&P 500 Growth	$16
Total number of funds	2,294	Total AUM	$5,302
Panel B: Index Funds Only			
Index Name	Number of Funds	Index Name	Aggregate AUM (billion)
S&P 500	72	S&P 500	$1,545
Russell 2000	35	CRSP US Total Market	$797
S&P MidCap 400	29	CRSP US Mid Cap	$110
NASDAQ 100	20	S&P MidCap 400	$107
S&P SmallCap 600	15	CRSP US Small Cap	$97
DJ Indusial Average	12	CRSP US Large Cap Growth	$83
Russell 1000 Growth	7	NASDAQ 100	$76
Russell 1000 Value	6	S&P Completion	$73
Russell 3000	6	CRSP US Large Cap Value	$73
Russell 1000	6	Russell 2000	$69
DJ US Real Estate	6	DJ US Total Stock Market	$63
Russell Mid Cap	5	Russell 1000 Value	$61
S&P 500 Growth	5	Russell 1000 Growth	$61
S&P 500 Value	5	S&P SmallCap 600	$56
NASDAQ Biotechnology	5	NASDAQ US Div Achievers Select	$39
S&P Regional Banks Select Indust	5	Russell 3000	$38
DJ US Financial	5	CRSP US Small Cap Value	$34
S&P Oil&Gas Explor&Pro Sel Indust	5	S&P Financial Select Sector	$32
DJ US Oil&Gas	5	Russell 1000	$31
DJ US Basic Materials	5	Russell Mid Cap	$28
Total number of funds	912	Total AUM	$4,424

Table 4 demonstrates that while there is substantial overlap between the dominant indices in both subsamples, that overlap is not complete. In particular, Panel A demonstrates the relative importance of growth and value indices (discussed in more detail below[67]) among the non-index funds, as well as the dominance of Russell funds, which, after the S&P 500, make up the next 13 most popular indices, as measured by either number of funds or AUM. While these indices also make up a substantial portion of Panel B – the index funds – there is markedly more variety among these indices, even among only the twenty most popular indices. As discussed in more detail in the next subsection, this level or variety is even more striking among the large number of smaller indices in my sample.[68]

B. CATALOGUING THE METHODOLOGY DOCUMENTS

Before even considering the substance of the indices themselves, the index methodology documents themselves demonstrate a striking amount of heterogeneity. Some are extremely long and detailed, sometimes referring back to several other documents. For example, the methodology document governing the Russell US indices (including several of the indices – such as the Russell 2000 – listed in Tables Table 2 and Table 4) is 50 pages long and contains cross-references (complete with links) to 10 other documents.[69] The documents contain extremely detailed descriptions, complete with examples, of how the indices are constructed. While a modest amount of ambiguity remains in certain respects,[70] overall the amount of detail in impressive.

At the other end of the spectrum, some of the methodology documents are only a couple of pages and provide almost no detail at all. For

[67] *See infra* Part III.C.3.a).
[68] *See infra* 0.
[69] FTSE Russell, Russell U.S. Equity Indexes Construction and Methodology v2.9 (October 2017) (on file with author).
[70] Discussed *infra* Part III.D.

example, the "NASDAQ US Dividend Achievers Select Index Methodology" (which appears in Panel B of Table 4) is less than 3 pages long, almost a page of which is taken up by a listing of the eight different versions of the index. The discussion of the eligibility criteria contains less than 40 words, and is reproduced in its entirety below[71]:

Eligibility Criteria

To be eligible for inclusion in the Index a security must meet the following criteria:

- be included in the NASDAQ US Broad Dividend Achievers™ Index (DAA) excluding limited partnerships and REITs; and
- additional proprietary eligibility are applied.

Despite this less than voluminous description, the index is being used as an underlying index for funds with about $39 billion in aggregate AUM.

The NASDAQ US Dividend Achievers Select Index is not the only one to contain a reference to another index. Indeed, I found that many indices did so. For example, it was common for one index to use the constituents of another index as a starting point. Perhaps unsurprisingly, this was particularly common within an index family. So, for example, several S&P indices referred back to the constituents of the S&P 500 as a starting point,[72] or for members of the Russell family to refer to the Russell 3000, 2000 or 1000.[73] Perhaps more surprising are the indices that refer to the constituents of another index that not a member of the same index family. For example, each of the six Oppenheimer indices in my sample use an S&P index as its

[71] NASDAQ, NASDAQ US Dividend Achievers Select Index Methodology (Apr. 2017) (on file with author)

[72] Examples include the S&P 500 Momentum Index, S&P DOW JONES INDICES, S&P MOMENTUM INDICES METHODOLOGY (Jul. 2017) (on file with author), the S&P 500 Dividend Aristocrats Index, S&P DOW JONES INDICES, S&P 500 DIVIDEND ARISTOCRATS METHODOLOGY (Feb. 2017) (on file with author), and the S&P 500 Catholic Values Index, S&P DOW JONES INDICES, S&P 500 CATHOLIC VALUES INDEX METHODOLOGY (Jul. 2017) (on file with author)

[73] FTSE RUSSELL, *supra* note 69. In fact, the Russell 2000 and 1000 are themselves subsets of the Russell 3000. *See also* the Russell "Pure Style," where the methodology refers back to the "parent" indices. FTSE RUSSELL, RUSSELL PURE STYLE INDEX SERIES v2.1 (Aug. 2017) (on file with author).

starting point.[74] This is despite the fact that Oppenheimer does not appear to have any formal affiliation with S&P.

To more systematically investigate the heterogeneity across indices, I coded all the indices in my sample for a variety of factors. These factors are primarily intended to help to categorize the indices according to how they may be used or perceived by market participants. In other words, this classification is intended to capture what the index purports to be, according to its methodology document. These characteristics are summarized in Table 5 for the full sample, and in Table 6 by index and non-index funds.

First, I coded whether or not in index is an "industry" or "sector" index, in the sense that it is restricted to a particular industry or sector. Surprisingly, 227 of the 603 indices – nearly 40% – satisfied this criterion, despite the fact that only 340 of the funds (representing a total AUM of about $400B) benchmarked to these indices. I also identified a further 21 indices (corresponding to 21 funds, and a total AUM of about $3.4B) that I call "exclusive industry indices" – rather than focusing on a particular industry or sector, these indices *exclude* securities from a particular industry.

[74] Specifically, three use the S&P 500 Index (the OFI Revenue Weighted ESG Index, OPPENHEIMERFUNDS, OFI REVENUE WEIGHTED ESG INDEX 2 (Oct. 2017) (on file with author), the OFI Revenue Weighted Financials Sector Index, OPPENHEIMERFUNDS, OFI REVENUE WEIGHTED FINANCIALS SECTOR INDEX 2 (Oct. 2017) (on file with author), and the OFI Revenue Weighted Large Cap Index, OPPENHEIMERFUNDS, OFI REVENUE WEIGHTED LARGE CAP INDEX 2 (Oct. 2017) (on file with author), one uses the S&P MidCap 400 Index (the OFI Revenue Weighted Mid Cap Index, OPPENHEIMERFUNDS, OFI REVENUE WEIGHTED MID CAP INDEX 2 (Oct. 2017) (on file with author), one uses the S&P SmallCap 600 Index (the OFI Revenue Weighted Small Cap Index, OPPENHEIMERFUNDS, OFI REVENUE WEIGHTED SMALL CAP INDEX 2 (Oct. 2017) (on file with author) and one uses the S&P 900, (the OFI Revenue Weighted Ultra Dividend Index, OPPENHEIMERFUNDS, OFI REVENUE WEIGHTED ULTRA DIVIDEND INDEX 2 (Oct. 2017) (on file with author), which is itself composed of the constituents of the S&P 500 and the S&P MidCap 400, S&P Dow Jones Indices, *supra* note 38 at 3.

Table 5: Index Characteristics (Full Sample)

Characteristic		Number of Indices	Number of Funds	Aggregate AUM (billion)
Industry	Industry Index	227	340	$410
	Exclusive Industry	21	21	$3
Size*	Broad	259	560	$1,859
	Mega	12	16	$14
	Large	180	1554	$5,847
	Medium	92	963	$1,733
	Small	60	99	$381
	Micro	8	30	$6
	Other	14	14	$8
Style	Value	178	1151	$2,594
	Dividend	60	70	$169
	Beta	11	11	$4
	Momentum	87	89	$27
	Earnings	62	67	$43
	Size	32	34	$6
	Volatility	51	59	$49
	Quality	84	87	$40
	At least One	306	1296	$2,812
Specialized	Specialized Index	171	184	$130
	Proprietary Index	84	85	$82
Total		603	3208	$9,727 $9,727

*Some indices were intended to capture more than one size segment (for example, small and medium). While these were coded separately, for the purposes of this table, they are included in all of the relevant size segments. As a result, the figures in this table may not correspond to those in the text.

Next, I coded the indices for size, including mega, large, medium, small, and micro-cap, as well as broad indices and combinations of sizes (such as large and medium-cap, or medium and small-cap). Broad indices were the most common, followed by large cap (259 and 180 indices, respectively). Interestingly, while these two size categories also represented a large number of funds (560 and 1,554, respectively), proportionately, there was a much larger number of medium size funds (962) than there were indices (92), indicating that on average, the medium sized indices are begin used as benchmarks for far more funds. Roughly the same amount of money was benchmarked to both broad and medium-sized indices ($1.9 trillion and $1.7 trillion, respectively), while substantially more was benchmarked against large indices ($5.8 trillion), chiefly because of the importance of the S&P 500 (representing about $4 trillion of that).

Table 6: Index Characteristics

		Non-Index Funds Only			*Index Funds Only*		
	Characteristic	Number of Indices	Number of Funds	Aggregate AUM (billion)	Number of Indices	Number of Funds	Aggregate AUM (billion)
Industry	Industry Index	28	46	$48	207	293	$363
	Exclusive Industry	0	--	--	21	21	$3
Size*	Broad	34	215	$428	238	344	$1,431
	Mega	1	1	<$1	12	15	$14
	Large	23	1243	$3,652	169	310	$2,195
	Medium	15	791	$1,190	88	171	$543
	Small	7	16	$29	56	83	$352
	Micro	5	26	$5	4	4	$1
	Other	3	3	$6	11	11	$1
Style	Value	21	936	$2,016	168	214	$578
	Dividend	4	5	$7	59	65	$162
	Beta	0	--	--	11	11	$4
	Momentum	1	1	$5	86	88	$21
	Earnings	3	3	$1	60	64	$42
	Size	0	--	--	32	34	$6
	Volatility	4	4	$1	49	55	$48
	Quality	2	2	$1	82	85	$39
	At least One	28	944	$2,024	293	351	$788
Specialized	Specialized Index	7	7	$6	169	178	$124
	Proprietary Index	1	1	<$1	84	84	$82
Total		87	2,294	$5,302	557	912	$4,424

*Some indices were intended to capture more than one size segment (for example, small and medium). While these were coded separately, for the purposes of this table, they are included in all of the relevant size segments. As a result, the figures in this table may not correspond to those in the text.

I also coded indices for "style," something that I borrow from the mutual fund and hedge fund literature. A style represents a particular investment strategy. Balancing parsimony with granularity, I focus on 8 such styles: value/growth, momentum, size, beta, dividends, volatility, earnings, and "quality." The first four represent the four most prominent asset pricing factors, while the final one appears to be related to one of the more recently added pricing factors.[75] I included the remaining three for two reasons. First, in my initial review of the methodology documents, they were quite common, leading me to suspect that they might be popular across the indices more broadly. This suspicion appears to be borne out by the data, as Table 5 makes clear. Second, while there is no clear theoretical reason why investors should care about these three factors, they all have a sufficiently clear and uncontroversial meaning that I felt that they could be coded consistently. I discuss each style in more detail in the next section.

In the full sample, by far the most popular of these was value/growth, representing 178 indices, which were associated with 1,151 funds (with a total AUM of about $2.6 trillion). This disproportionate popularity was particularly striking in the non-index subsample, where fully 81 indices (representing almost a quarter of the indices in the subsample) representing 936 funds (over 40%) and over $2 trillion of AUM (38% of the total). The other styles were less popular, and each was associated with between 11 and 87 indices (or between 11 and 89 funds, and AUM of between $3.9 billion and about $170 billion). There was substantial overlap between styles – for example, I coded 50 indices as both value/growth and momentum, corresponding to 51 funds and an aggregate AUM of over $17 billion. In total, I found that 306 indices purported to correspond to at least one of the eight styles, representing 1,296 funds, and a little over $ 2.8 trillion.

In general, I make no judgement as to whether or not a style index is a "good," or "successful" style index. For example, if an index purports to be a growth index, I do not pass judgment as to whether or not its methodology is likely to capture the "growth" factor as it is commonly

[75] See discussion *infra* Part III.C.3 for more detail.

understood in the finance literature. However, I do include indices that purport to use standard value/growth proxies – such as price / book ratios – in this category.

Finally, I recorded information about "specialized" or "bespoke" indices. These include indices that rely on a confidential or proprietary methodology, as well as those that employ a highly specialized strategy. I coded 171 indices as "specialized" in some way, which corresponded to 184 funds (for a total AUM of $130 billion). While the overwhelming majority of these specialized indices are being used by index funds, 7 are being used to benchmark non-index funds.

In addition to recording these index types, I read each methodology document with an eye towards recording their material characteristics. In particular, I was interested in aspects of the methodologies that made it hard for a third party to replicate the index based on publicly available data. I discuss this in more detail below in Section III.D.

C. INDEX HETEROGENEITY

The differences in the presentation of the methodology documents, while substantial, is just the tip of the iceberg. My investigation of the methodology documents uncovered a large amount of heterogeneity even within indices that are designed to capture the same fundamentals. For the purposes of this discussion, I consider all indices in my sample – those that are used by index funds, as well as those used by non-index funds.

1. Industry

One domain in which one might expect to find relatively little heterogeneity is in the classification of industries for the purpose of industry indices. While it is no doubt the case that some firms straddle multiple industries, this problem arises under any classification scheme. In the Unites States, SIC codes, which have since been supplanted by NAICS codes, already exist for this purpose. SIC codes

and NAICS codes are routinely used by both academic researchers and governmental agencies to classify firms.[76]

Interestingly, despite the dominance of SIC and NAICS codes in other areas, most industry indices do not rely on these classification schemes. Instead many rely on proprietary sector or industry classifications, and there is no consistent definition across index provides. For example, consider the retail sector. It turns out that NASDAQ, NYSE, MVIS, and S&P each have an index of the US retail market.[77] Surprisingly, each of these indices appears to rely on a different classification method – the NASDAQ index relies on "ICB Codes,"[78] the NYSE index uses an "NYSE proprietary screening,"[79] the S&P index uses the "Global Industry Classification Standard (GICS),"[80] and the MVIS is silent as to its classification methodology.[81] With the exception of the MVIS classification scheme, which I cannot observe at all, each of these classification schemes is proprietary. The upshot of this is that, not only could the definition of, for example, "retail," differ across indices, it is difficult to predict *how* this definition might vary.

2. Size

There is also substantial disagreement about the definitions of size across indices. For example, within the Russell family, the large-cap index is the Russell 1000, which captures the 1000 largest stocks, while the S&P's large cap index – the S&P 500 index – uses 500 stocks. As of May 31, 2018, the total market cap of the median security on the S&P

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[76] *See generally* Executive Office of the President, Office of Management and Budget, North American Industry Classification System 3 (2017), *available at* https://www.census.gov/eos/www/naics/2017NAICS/2017_NAICS_Manual.pdf.

[77] These are the NASDAQ US Smart Retail Index, the Dynamic Retail Intellidex Index, the MVIS US Listed Retail Index, and the S&P Retail Select Industry Index, respectively.

[78] NASDAQ, NASDAQ US SMART SECTOR INDEX FAMILY METHODOLOGY (Jul. 2016) (on file with author).

[79] NYSE ARCA, INTELLIDEX METHODOLOGY, VERSION 2.0 (Aug. 2016) (on file with author).

[80] S&P DOW JONES INDICES, S&P SELECT INDUSTRY INDICES METHODOLOGY (Sep. 2016) (on file with author).

[81] MVIS, INDEX GUIDE, MVIS GLOBAL EQUITY INDICES, VERSION 5.61 (Sep. 2017) (on file with author).

500 was $20.6 billion,[82] compared to a much more modest $10.6 billion on the Russell 1000.[83] The same is true with respect to medium and small cap stocks. On the same date, the total market cap of the median constituent on the S&P's mid cap index – the S&P MidCap 400 – was $4.3 billion,[84] compared to $8.2 billion for the Russell Midcap Index.[85] In the small cap space, these figures were $1.3 billion for the S&P SmallCap 600,[86] and $1.9 billion for Russell's small cap index, the Russell 2000.[87] While I made every effort to code consistently, I recognize that my coding will inevitably be a rough proxy.

An even bigger issue arises in the context of "broad" indices. Rather than attempting to act as the arbiter of what constitutes a sufficiently broad swath of the equity market, I classify any index that does not specifically target a size segment as a "broad" index. Nevertheless, I found very different size thresholds among the indices I classified as "broad."

3. Style

Perhaps the most heterogeneity exists in the style domain. Even at a fairly basic level, different indices approached the problem of how to create a style tilt in different ways. For example, some indices generated their desired style tilt entirely through weighting: while all securities in the consideration set were included, they were weighted according to the index's style score. Others chose to retain a more

[82] S&P DOW JONES INDICES, *supra* note 38 at 1.
[83] FTSE RUSSELL, RUSSELL 1000 INDEX FACTSHEET 1 (May 31, 2018) (on file with author).
[84] S&P Dow Jones Indices, S&P MidCap 400 Factsheet 1 (May 31, 2018) (on file with author).
[85] FTSE Russell, Russell Midcap Index Factsheet 1 (May 31, 2018) (on file with author).
[86] S&P Dow Jones Indices, S&P SmallCap 600 Factsheet 1 (May 31, 2018) (on file with author).
[87] FTSE RUSSELL, RUSSELL 2000 INDEX FACTSHEET 1 (May 31, 2018) (on file with author).

standard weighting scheme (such as value weighting), while selecting securities based on a style score. Naturally, some do both.[88]

a) Value / Growth

As discussed above, the most popular style among the eight I coded for, by any metric, was value/growth. This is not particularly surprising: the value anomaly is among the most robust and well-known asset pricing anomaly.[89] Since it was made famous by Fama and French 1993,[90] it has become a staple of both academics[91] and investors. For example, a large-scale representative study of US individuals conducted in December 2016 found that 58% of Americans expected value stocks to have different level of risk from that of growth stocks, and 53% expected them to have different returns going forward.[92] In the academic finance literature, a "value" stock is generally defined as a stock with a relatively high book-to-market ratio. In other words, these are the stocks of companies that have a market capitalization that is relatively low compared to the accounting value of the company's assets. Conversely, a growth stock is generally defined as a stock with a relatively low book-to-market ratio. These are the stocks of companies that have a market capitalization that is relatively high compared to the accounting value of the company's assets.[93]

Because value and growth are two sides of the same conceptual coin, I coded them into the same category. In order to ensure that I did not

[88] On example of this is the S&P Low Volatility family of indices, which includes the S&P 500 Low Volatility Index. S&P DOW JONES INDICES, S&P LOW VOLATILITY INDICES METHODOLOGY (Aug. 2017) (on file with author).

[89] Clifford S. Asness, Tobias J. Moskowitz, & Lasse Heje Pedersen, *Value and Momentum Everywhere* 68 J. FIN. 929 (2013).

[90] Eugene F. Fama & Kenneth R. French, *Common risk factors in the returns on stocks and bonds* 33 J. FIN ECON. 3 (1993).

[91] Sebastien Betermier, Laurent E. Calvet & Paolo Sodini, *Who Are the Value and Growth Investors?*, 72 J. FIN. 5 (2017).

[92] James J. Choi & Adriana Z. Robertson, *What Matters to Individual Investors, Evidence from the Horse's Mouth* Table 15 (NBER Working Paper No. 25019, September 2018).

[93] The term growth follows from this low book-to-market ratio, since this low ratio can be interpreted as implying that the market expects the price to rise relatively quickly, thereby bringing this ratio up towards the median.

miss any indices that used different terminology, I also included those that described themselves as relying on price-to-book variables. Even allowing for this, there was a tremendous amount of heterogeneity across the different indices in this category. Despite the fact that there is a standard definition of value / growth in the academic literature, there is substantial heterogeneity in the *way* that the scores are computed across indices.

For example, the StrataQuant family of indices, which includes 9 indices benchmarking an aggregate total of over $8.7 billion in AUM, scores eligible securities based on what is calls "value" and "growth" factors.[94] One of the value factors – price to book value – follows the standard definition of the value, and a second – price to cash flow – is at least consistent with the idea of comparing price to some fundamental. The third and final value factor – return on assets – is more puzzling, and appears to be capturing something distinct from the traditional definition of value. Even more perplexing are the "growth" factors. Theoretically, growth is simply the other end of value – rather than being separate concepts, a security with a very low value score could simply be interpreted as a growth stock. This is not what StrataQuant does. Instead, it defines five different growth factors: 3-, 6- and 12-month price appreciation, price to sales ratio, and 1-year sales growth. The first three are likely to be capturing momentum rather than the traditional "growth" factor, and the fourth is likely to be highly correlated with the price to cash flow measure used as a value factor. Conceptually, the fifth factor appears to be some hybrid of the other four. There is nothing necessarily *wrong* with selecting stocks based on these criteria; indeed, as discussed in the next subsection, momentum is a highly robust factor. The point is simply that many of these factors are capturing something quite different from the standard value / growth factors.

[94] NYSE, STRATAQUANT INDEX FAMILY VERSION 2.2 (Sep. 2015) (on file with author).

StrateQuant is hardly unique in this regard. For example, the Intellidex methodology, used by, *inter alia*, the Dynamic Large Cap Value Intellidx, also constructs separate value and growth factors based on different metrics.[95] In the case of Intellidex, these metrics are (1) price/forecasted earnings, (2) price/book, (3) price/sales, (4) price/cash flow, and (5) dividend yield for the value factor, and (1) long-term projected earnings growth, (2) earnings growth, (3) sales growth, (4) cash flow growth, and (5) book value growth for the growth factor. Again, only some of these metrics align with the traditional understanding of growth and value in the finance literature.

While this general pattern holds across a wide variety of the indices I examined, one outliers stands out. The Morningstar US Market Factor Tilt Index simply uses the Fama-French 1993 factors.[96] As a result, this is likely to be far closer to the traditional definition of "value."

b) Momentum

The second most popular style, at least in terms of number of indices or funds, was momentum. Interestingly, despite the fact that momentum rivals value in terms of robustness as an asset pricing anomaly,[97] a far smaller dollar amount (less than $27 billion) was associated with these indices.

As with value and growth, in order to ensure that the measure was not underinclusive, I included certain indices that did not explicitly refer to themselves as capturing "momentum," as long as they described themselves as relying on the path of historical returns.[98] Because momentum is best measured by observing the path of past returns, including these indices allows me to more consistently capture the same conceptual style.

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[95] NYSE ARCA, *supra* note 79.
[96] Morningstar, Construction Rules for the Morningstar US Market Factor Tilt Index (Dec. 2015) (on file with author).
[97] Asness et al, *supra* note 89.
[98] I did not include indices that used something like price appreciation in constructing what they called a value or growth factor. As a result, for example, the StrataQuant indices would not be included in this.

While there was somewhat less heterogeneity among the momentum indices, they were far from consistent. For example, rather than simply using 6- or 12-month returns, the MSCI USA Momentum Index normalizes each of these two measures by the "annualized Standard Deviation of weekly local price returns over the period of 3 years."[99] It then standardizes each of these two measures[100] and average them to compute a security-level score. Other indices are harder to evaluate because of a lack of specificity in the methodology document. For example, the Dorsey Wright Technical Leaders Index document states only that eligible securities "are ranked using a proprietary relative strength (momentum) measure. Each security's score is based on intermediate and long term price movements relative to a representative market benchmark."[101]

c) Dividends

Another very popular style related to dividends. Indeed, as measured by aggregate AUM, this was the second most popular style. From a theoretical level, this is somewhat puzzling. Financial economists have long questioned the economic value of dividends.[102] While some explanations for the phenomenon (both rational and behavioral) exist,[103] it is not clear that they would predict that about $170 billion

[99] MSCI, MSCI MOMENTUM INDEXES METHODOLOGY 4-5 (Jun. 2017) (on file with author).
[100] Standardizing consists of subtracting the mean and dividing by the standard deviation. The values are then winsorized at +/- 3. Id at 5.
[101] NASDAQ, Dorsey Wright Technical Leaders Index Family Methodology 4 (Apr. 2017) (on file with author).
[102] *See, e.g.*, Laurie Simon Bagwell & John B. Shoven, *Cash Distributions to Shareholders*, 3 J. ECON. PERSPECTIVES 129 (1989) (noting that "[e]conomists have long been puzzled by why firms pay dividends"); H. Kent Baker and Gary E. Powell, *How Corporate Managers View Dividend Policy*, 38 Q.J. BUS. & ECON. 17 (1999), (noting that "[d]ividend policy is one of the most controversial subjects in finance"); H. Kent Baker, Gary E. Powell and E. Theodore Veit, *Revisiting the dividend puzzle*, 11 REV. FIN. ECON. 241 (2002) [hereinafter Baker et al., *Revisiting*] (noting that [d]espite exhaustive theoretical and empirical analysis to explain their pervasive presence, dividends remain one of the thorniest puzzles in corporate finance").
[103] *See* Baker et al., *Revisiting*, *supra* note 102 (surveying various explanations that have been proposed).

be benchmarked to dividend-related indices, particularly in light of the fact that less than 1/6 of this value is benchmarked to momentum, something that is unambiguously associated with returns.

While the heterogeneity is, perhaps unsurprisingly, less extreme in this context, the indices are still not entirely consistent. For example, indices rely on different horizons of past dividend payments. Whereas the Wisdom Tree Indices use the past 12 months,[104] some of the NASDAQ indices use the past 10 years.[105]

d) Volatility

Like dividends, the existence of indices relating to volatility is something of a puzzle. As a general matter, finance theory teaches that an asset's (or a portfolio's) volatility – i.e., variance – should not, on its own, be relevant to investors. Instead, what ought to matter is how well that asset (or portfolio) does when the investor really needs the money. If asset A has a high volatility, but tends to do well at times when and investor really needs the money, we would expect her to prefer it to asset B, which has a relatively low volatility but tends to do poorly when she really needs the money.[106] While this statement seems accurate, there may be instances in which investors do care about volatility *per se*. For example, Moreira and Muir argue that portfolios that scale monthly returns by the inverse of their previous month's variance can, among other things, be attractive to certain types of investors.[107]

While volatility is among the most standard measures in finance, even here there was substantial heterogeneity. Some indices took a fairly

[104] WisdomTree, WisdomTree Rules-Based Methodology, Domestic and International Dividend Indexes 3 (Jun. 2017) (on file with author).
[105] Two examples of this are the NASDAQ US Broad Dividend Achievers Index, NASDAQ, NASDAQ US BROAD DIVIDEND ACHIEVERS INDEX METHODOLOGY 2 (Nov. 2013) (on file with author) and the NASDAQ US Dividend Achievers Select Index NASDAQ, *supra* note 71 at 2.
[106] Choi and Robertson find that a "[c]oncern that when I especially need the money, the stock market will tend to drop" a very or extremely important factor for over 35% of individuals and is at least a moderately important factor for almost 61%. Choi & Robertson, *supra* note 92 at Table 1.
[107] Alan Moreira & Tyler Muir, *Volatility-Managed Portfolios*, 72 J. FIN. 1611 (2017).

standard approach. For example, the S&P low volatility indices – S&P 500 Low Volatility Index, the S&P MidCap 400 Low Volatility Index, and the S&P SmallCap 600 Low Volatility Index – select a pre-determined number of stocks from the appropriate parent index based on realized volatility over the past year.[108] These securities are then weighted by the reciprocal of this volatility measure, so that the least volatile securities receive the most weight.

In addition to "low" volatility indices there are also so-called "minimum volatility" indices. These indices seek to minimize the volatility of the index portfolio, subject to certain constraints. These tend to rely on proprietary "optimizers," making their construction relatively opaque. Two examples of such indices are the S&P 500 Minimum Volatility Index and the MSCI USA Minimum Volatility Index. The former relies on the "Northfield Open Optimizer,"[109] and the latter on the "Barra Optimizer."[110]

e) Earnings and "Quality"

Indices related to earnings were also fairly popular, at least measured in terms of aggregate AUM. Included in the group are indices that purport to capture factors related to revenue, sales, operating cashflows, as well as earnings generally.

Perhaps related to earnings was a somewhat amorphous factor generally described as "quality." Unfortunately, quality is not a term that is used in the finance literature, and it lacks a precise definition. Based on my reading of the methodology documents, it appears to capture some combination of revenue growth and / or stability, profitability, levels of cash on hand, and debt ratios. As such, I include indices that refer to these features. Because quality and earnings can

[108] S&P Dow Jones Indices, S&P Low Volatility Indices Methodology (Aug. 2017) (on file with author).
[109] S&P Dow Jones Indices, S&P Minimum Volatility Index Methodology (Jul. 2017) (on file with author).
[110] MSCI, MSCI Minimum Volatility Index Methodology (Sep. 2017) (on file with author).

both relate to revenue, there is some overlap between the two groups. Nevertheless, it is clear that quality is intended to capture more than just earnings, and indeed in some cases, it is likely to be related to the profitability factor in the Fama-French 5 factor model.[111]

Given the fact that quality is fairly amorphous, it is perhaps unsurprising that there is a substantial amount of heterogeneity in the way these indices are constructed. For example, for the purposes of the MSCI USA Quality Index, quality was measured by a combination of (1) return on equity (trailing 12 month earnings per share divided by latest book value per share), (2) debt to equity ratio (total debt divided by book value in the last fiscal year), and (3) earnings variability (the standard deviation of year-over-year earnings growth per share over the last five years).[112] In contrast, the S&P 500 quality indices, including the S&P 500 Quality Index, measure quality through a combination of (1) accruals ratio, (2) financial leverage ratio, and (3) return on equity.[113] While there is some overlap between these metrics, they are clearly distinct. Even more distinct is the definition employed by Northern Trust in its indices.[114] While the scoring model is proprietary, according to the methodology, its three "core components" are "Management Expertise (eg. corporate finance activities), Profitability (e.g. assess the reliability and the sustainability of financial performance), and Cash Flow."[115]

[111] Eugene F. Fama & Kenneth R. French, *A five-factor asset pricing model* 116 J. FIN ECON. 1 (2015).
[112] MSCI, MSCI QUALITY INDEXES Methodology 9 (Jun. 2017) (on file with author).
[113] S&P Dow Jones Indices, S&P Quality Indices Methodology 16 (Jul 2017) (on file with author).
[114] These include the Northern Trust Quality Large Cap Index, the Northern Trust Quality Dividend Index, the Northern Trust Quality Dividend Defensive Index, and the Northern Trust Quality Dynamic Index. The aggregate AUM benchmarked to these four indices is almost $2.8 billion.
[115] Northern Trust, Northern Trust Quality Dividend Indexes, Index Methodology 4 (on file with author); Northern Trust, Northern Trust Quality Large Cap Index, Index Methodology 3 (on file with author).

f) Size and Beta

Along with value / growth, the other two factors in the classic Fama-French asset-pricing model, are size and "market beta." These two factors, however, were far less popular along all three dimensions (number of indices, number of funds, and aggregate AUM). Indeed, they were seventh and eighth out of eight, respectively. The fact that size is relatively unpopular is not particularly surprising from a theoretical perspective. While there has historically been a "size" premium – higher returns associated with smaller companies – there is some question as to whether this premium still exists.[116] Another possibility is that indices that focus on particular size *segments* could be acting as substitutes for indices that focus on a size as a style factor.

The fact that "beta" is relatively unpopular is more interesting. In principle, an asset's "beta" captures the component of that risk associated with that asset that is priced. In other words, the only way for asst A to have systematically higher returns than asset B is if asset A has a higher beta.[117] In most practical applications, beta is computed with reference of some proxy for "the market." As such, investors might find it useful to have access to an index that is designed to have a particular level of market risk. On the other hand, there is also evidence that high beta assets (not portfolios) tend to underperform, something that has been attributed to the fact that individual investors have difficulty taking leveraged positions.[118] Another possibility is that investors have less need for indices designed around any particular beta, since one can always construct one from the return on any index with a known beta. Finally, it may be that, compared to other style

[116] See Mathijs A. van Dijk, *Is size dead? A review of the size effect in equity returns*, 35 J. BANKING & FIN 3263 (2011).
[117] *See e.g.*, Richard A. Brealey, Stewart C. Myers & Franklin Allen, Principals of Corporate Finance 881 (11 ed., 2014).
[118] Andrea Frazzini & Lasse Heje Pedersen, *Betting Against Beta* 111 J. FIN. ECON. 1 (2014).

factors, beta is less well known among the investing public, depressing demand for such indices.

4. "Specialized" or "Bespoke" Indices

Finally, there are what I term the "bespoke" or "specialized" indices. In this category, I also include indices that rely on proprietary methodologies, since there is no way of determining how they are constructed. These are generally used by only one or two funds and tend to have far less AUM benchmarked against them. However, while the values tend to be small on average, they add up. In total, the 171 indices I coded as "specialized," act as benchmarks for $130 billion in AUM. Unsurprisingly, there is an enormous amount of variety across these indices. Some of these are clearly designed to appeal to the values of certain groups of investors, such as the "S&P 500 Catholic Values Index," the "Barclays Women in Leadership Index," or the "SSGA Gender Diversity Index." Others are included because they focus on a particular niche, such as the "Solactive Guru Index," the "iBillionaire Index," or the "WeatherStorm Forensic Account Long-Short Index." Still others are aimed at "responsible" investing. A final group is here primarily because they are constructed using proprietary methodologies, making them virtually impenetrable to outsiders.

D. TRANSPARENCY VERSUS OPACITY

The discussion in the prior section also revealed another dimension of heterogeneity: the substantial variation in the amount of detail provided by the indices. This heterogeneity manifested itself in very different ways, including the selection criteria used by the index, the degree to which the underlying data required to construct the index was publicly available, and the description of an applicable governance or oversight body. Even *within* these categories, the amount of detail, or lack thereof, varied substantially across indices, and often even *within* index families. In this section, I briefly address this issue.

1. Selection Criteria

We have already seen that the selection criteria varied substantially across indices. Perhaps more surprisingly, however, was the degree to

which the amount of information provided about these selection criteria varied across indices. Some indices provided a detailed discussion of the selection criteria. For example, the methodology employed in constructing the CRSP family of indices – including the CRSP US Total market Index – is extensively documented, including extensive formulae, variable descriptions, and even figures.[119]

Others, in contrast, were far more circumspect. For example, the Dow Jones Industrial Average – another prominent index – selects constituents from a universe consisting of the securities on the S&P 500 using a selection process not based on quantitative criteria.[120] Instead, "a stock typically is added only if the company has an excellent reputation, demonstrates sustained growth and is of interest to a large number of investors."[121] Similarly, the 84 indices employing "proprietary" methodologies are necessarily opaque to outsiders not privy to those proprietary methodologies.

Other indices use selection criteria that are hard to replicate for other reasons. For example, while the "economic moat" rating employed by Morningstar is described in great detail in the "Morningstar Equity Research Methodology" document,[122] it relies in large part on assessments made by analysts,[123] and which cannot be easily replicated by following the description in the documentation. By contrast, as discussed above, the Russell 1000 and 2000 indices are constructed using fairly clear cutoff rules.[124]

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[119] CRSP Center for Research in Security Prices, CRSP Indexes CRSP U.S. Equity Indexes Methodology Guide (Dec. 2016) (on file with author).
[120] S&P Dow Jones Indices, Dow Jones Averages Methodology 5 (Apr. 2017) (on file with author).
[121] Id.
[122] Morningstar, Construction Rules for the Morningstar Wide Moat Focus Index (Jun. 2016) (on file with author).
[123] Morningstar, Morningstar Equity Research Methodology 3 (Mar. 2017) (on file with author).
[124] See discussion *supra* Part II.A.

2. Underlying Data

Even a completely transparent or mechanical selection criteria can lead to an opaque index if the *data* required to determine whether the criteria are met is either not clearly defined. While it is straightforward to obtain data on stock prices and listing from large stock exchanges for listed companies, the same is not true with respect to much of the data relied upon in creating indices.

Examples of such a lack of clarify can include vague references to things like "earnings" without defining exactly which of the many available measures of earnings are being used. Alternatively, because financial variables change over time, it is often crucial to know the reference date of the data in question. While some indices clearly indicate these references dates, others do not. Finally, the sources of the data in question may not be obvious. For example, while the CRSP methodology identifies the source of all data used in constructing its Value and Growth Style indices,[125] others do not.

3. Rule Changes

Another crucial feature of the index methodologies is the ability to *change* the methodology over time. At the limit, if an index's rules are changing all the time, the index is, for practical purposes, an actively managed portfolio, and the rules themselves are meaningful only in an *ex post* sense. That is, rather than being useful for understanding what the index's constituents might look like in the future, the methodology would only provide insights into what the constituents look like in the present (or perhaps in the past).

Among the sample of indices that I studied, it is the norm that the methodology documents provide that the entity or group responsible for administering the index (often referred to as the index committee) is empowered to change the rules from time to time. This power is not just hypothetical. For example, as discussed in Part II.B, these rules change frequently among the two largest families of indices.[126] Given

[125] CRSP Center for Research in Security Prices, *supra* note 119 at 49-50.
[126] *See* discussion *supra* notes 38 - 41 and accompanying text.

that these are among the most rigorously documented and professionally managed indices in my sample, there is little reason to believe that other indices change less frequently.

IV. ETFs and Affiliated Indices

One particular kind of "index" investing is in the context of Exchange Traded funds, commonly known as ETFs. The overwhelming majority of US ETFs are index-based,[127] meaning that their primary objective is to track an underlying index.[128] While the general perception is that ETFs are "passive," we have already seen that the perception of *any* index as passive is flawed. In the ETF context, however, this passivity can become even more tenuous. As I discovered upon reading the fund prospectuses, for a substantial fraction of funds in the US market, the index that the ETF "passively" follows is *itself* created by the fund manager, on an affiliate thereof. If any sort of index investing is delegated management, here, the delegation to the index provider is essentially indistinguishable from delegation to the fund manager. While such funds may be formally tracking the index in question, in practice, it is hard to see the difference between this and a fund that simply makes its own investment decisions directly.

A. ABOUT ETFS

Like mutual funds, ETFs are a form of pooled investment vehicle, and are generally registered as investment companies under the

[127] As I discuss in more detail in Part IV.C, out of the 571 funds in my final sample of US ETFs, 18 described themselves as "active," and did not track an index. *See infra* Part IV.C.

[128] *See* U.S. SEC. & EXCHANGE COMMISSION OFFICE OF INVESTOR EDUCATION AND ADVOCACY, MUTUAL FUNDS AND ETFS, A GUIDE OF INVESTORS 19 *available at* https://www.sec.gov/investor/pubs/sec-guide-to-mutual-funds.pdf ("Index-based mutual funds and ETFs seek to track an underlying securities index and achieve returns that closely correspond to the returns of that index with low fees").

Investment Company Act of 1940.[129] As such, they are subject the SEC regulation, including disclosure and reporting requirements. In a standard open-ended mutual fund, investors buy their shares directly from the fund. When they wish to sell, they sell their shares back to the fund at their net asset value ("NAV"), which is generally calculated at the end of the day.[130] In contrast, ETFs do not sell shares directly to investors. Instead, ETF shares are listed on national stock exchanges, where investors can buy and sell them throughout the day that their market prices.[131] Financial intermediaries, known as authorized participants, are the only entities allowed to buy shares directly from the fund, or redeem them to the fund, and their trading ensures that the prices remain close to the value of the underlying assets in the fund.[132]

B. WHY USE AN AFFILIATED INDEX?

There are several potential reasons why a fund might decide to follow an affiliated index. One benign possibility is cost-saving. Perhaps the fund manager can create an index that is just as good, in some meaningful sense, as a well-known "brand name index." If that is the case, rather than paying a licensing fee to the provider of the brand name index, the fund manager might simply make her own index. This saving can either be passed on to investors, retained by the fund manager, or divided between them. To the extent that any of this is passed on to investors, this explanation suggests that funds that rely on affiliated indices should exhibit lower expense ratios than other comparable funds. This explanation makes the most sense if investors are sophisticated, and fully understand both the terms of the prospectus and the context of the market.

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[129] 15 USC §§ 80a-1 *et seq.*
[130] *See* U.S. SEC. & EXCHANGE COMMISSION OFFICE OF INVESTOR EDUCATION AND ADVOCACY *supra* note 128 at 4-5.
[131] Id. at 6.
[132] Id.

On the other hand, if investors are unsophisticated, and either do not understand or do not carefully read the prospectus documents, things may not be so benign. For example, suppose that investors have internalized the idea that ETFs are a good investment option because they tend to have lower management fees and fewer agency costs than actively managed funds. Recognizing this, fund managers may create affiliated index-linked ETFs to cater to these investors. While these investors are sensitive to management fees, they do not pay attention to the details of the fund, including the fact that the fund is following an affiliated index. Managers may be able to take advantage of this by increasing their total compensation through other means, perhaps by charging the fund a high licensing fee for the privilege of using its index. In this case, we would expect affiliated indices to display the same management fees as other ETFs, but to find other ways to pass costs on to investors. These costs would show up in the fund's expense ratios.

Finally, investors may be totally unsophisticated. For example, as before, suppose investors don't understand much about the market or the products, but they have heard that ETFs are a good investment because they are passive, and therefore desirable. Fund managers may wish to cash in on this popularity of ETFs, as well as this perception that they represent passive investments. If investors are driven primarily by this misplaced demand for "passive" funds, and not by other features of the fund (including management fees), managers may take advantage of this popularity to charge higher management fees.

While the first explanation is benign, the latter two are more troubling. Both imply that investors are being misled into purchasing investment products that are not what they thought they are getting. The relative plausibility of these three explanations will likely depend on one's view of the sophistication of retail investors. Fortunately, because the three families of explanations have different empirical implications, we can use these implications to construct tests of the underlying theories. This is what I do in the remainder of this section. In the next section, I discuss the data that I rely on, and in subsection IV.D, I perform my empirical analysis. Ultimately, I find evidence most consistent with the

second explanation – that managers are taking advantage of the popularity of ETFs, and that investors are primarily concerned with management fees.

C. THE SAMPLE AND CODING METHODOLOGY

In order to get a handle on the phenomenon of affiliated index-linked ETFs, I began with all funds in the CRSP mutual fund database, which was obtained through WRDS.[133] I retained all funds flagged as ETFs or ETNs. To ensure that I was capturing funds that focused on equities, I eliminated funds that had less than 90% of their portfolios invested in common stock, as well as those that focused on non-US investments.[134] Because of the amount of investment required to hand collect the data, prospectus data was collected only at a single point in time. For consistency, I therefore eliminated all results for which there was no data available as of December 30, 2016. This left me with a total of 603 ETFs.

I then searched the SEC's EDGAR database to obtain prospectus data for each fund on my list. There were 17 funds for which I was unable to find a match in EDGAR, despite attempting various versions of the fund name. I also omitted 15 funds from my final database because they specialized in exclusively non-US investments. After all of this, my final universe of US equity ETFs consisted of 571 funds.

To ensure consistency, I personally hand collected, read, and coded each prospectus in my sample. I collected information on a variety of

[133] I used CRSP rather than MorningstarDirect for this analysis because the CRSP data on fund fees and performance is much easier to work with than the MorningstarDirect data. The main benefit of the MorningstarDirect data is that it contains information on primary benchmark index. Because I hand collected the index data in this section, this benefit was not material, making CRSP the preferred data source.

[134] Specifically, I eliminated funds with the following Lipper objective types: "CHINA REGION FUNDS" "EMERGING MARKETS FUNDS" "EUROPEAN REGION FUNDS" "INDIA REGION FUNDS" "INTERNATIONAL FUNDS" "INTERNATIONAL REAL ESTATE FUNDS" "INTERNATIONAL SMALL-CAP FUNDS" "JAPANESE FUNDS" "LATIN AMERICAN FUNDS" "PACIFIC EX JAPAN FUNDS" and "PACIFIC REGION FUNDS."

topics, including the (1) name of the index that the fund sought to sought to track, (2) the index provider and whether or not the index provider was affiliated with the fund, including the advisor or subadvisor, and (3) whether the fund characterized itself as passive, and if so, how.

Out of the 571 funds in my final sample, 81 were following an index that was created by an affiliate of the fund. Despite this fact, all 81 of these funds described themselves as passive in their prospectuses. In addition to these 81 funds, I recorded 18 funds that explicitly described themselves as "active" or "actively managed" ETFs, which did not track any particular index.

D. AFFILIATED INDICES AND ETF FEES

Having uncovered this puzzling phenomenon, I next explore the reasons behind it. In doing so, I return to the discussion in section IV.B, in which I developed several testable predictions based on three competing explanations. Under the first, most benign, explanation, we would expect to find that expense ratios are lower on average, or at least not higher, among affiliated index-linked funds (controlling for other factors) than among the other funds. Under the second, intermediate interpretation, we would expect to find that expense ratios are higher, on average among affiliated index-linked funds, but that management fees are about the same, on average. Finally, under the third, most pessimistic explanation, we would expect to see higher management fees, and behavior that is similar to that of active funds.

I therefore estimate a series of OLS regressions of the form:

$$y_{it} = \alpha + \beta_1 \times Affiliate_i + \Psi_{it} + \varepsilon_{it}$$

where y_{it} is one of either expense ratio, management fee, or turnover ratio of fund i at time t, $Affiliate_i$ is an indicator variable equal to 1 if fund i tracks an affiliated index, and Ψ_{it} is a vector of controls. For robustness, I run the analysis in a variety of possible ways. I use

annual data on expense ratio, management fee and turnover ratio for years 2015 through 2017.[135] The results are presented in Table 7. Column (1) contains the results using style x year fixed effects, which is the most robust specification, as the control allows the relationship between style and the outcome variable to vary by year. Column (2) contains the results using style fixed effects and year fixed separately, and Column (3) contains the results using only style fixed effects. In all specifications, standard errors are clustered by fund, and standard errors are in parentheses.

The first thing to notice is that the results in all three panels are very stable, both in terms of magnitude and statistical significance, across specifications. This suggests that the results are not being driven by the specific pattern of controls that I am using.

The results in Panel A indicate the expense ratios are higher among affiliated index-linked funds. At the same time, the results in Panels B and C indicate that the management fees and turnover rations are indistinguishable between the two groups.

The first result, that expense ratios are *higher*, is inconsistent with the first explanation, and the fact that management fees are *not* higher, is in tension with the third explanation. At the same time, the fact that the management fees are the same, statistically speaking, while the expense ratios are higher, is consistent with the third explanation. This explanation is bolstered by the fact that the turnover ratio is also the same between the two groups. The reason for this is simple: in addition to management fees, trading costs add to the expenses associated with running a fund. The more a fund trades (i.e., the higher its turnover ratio), the more trading costs it incurs. The fact that turnover is not higher at affiliated index-linked funds suggests that this is not what is going on.

[135] I limit my window to the period from 2015 through 2017 because my affiliated index data is from the second half of 2017, using funds that existed at the end of 2016. Because the data must be hand collected, collecting the data for multiple years was infeasible.

Table 7: Relationship between Affiliated Index and Fund Characteristics

	(1)	(2)	(3)
Panel A – Dependent Variable: Expense Ratio			
Affiliated	0.000668**	0.000666**	0.000660**
	(3.15)	(3.19)	(3.17)
Style Fixed Effects	NO	YES	YES
Year Fixed Effects	NO	YES	NO
Style x Year Fixed Effects	YES	NO	NO
Standard Errors	Cluster by Fund	Cluster by Fund	Cluster by Fund
N	1481	1481	1481
R-squared	0.235	0.232	0.231
Adjusted R-squared	0.190	0.216	0.216
Panel B – Dependent Variable: Management Fee			
Affiliated	-0.0106	-0.0117	-0.0121
	(-0.33)	(-0.37)	(-0.38)
Style Fixed Effects	NO	YES	YES
Year Fixed Effects	NO	YES	NO
Style x Year Fixed Effects	YES	NO	NO
Standard Errors	Cluster by Fund	Cluster by Fund	Cluster by Fund
N	1481	1481	1481
R-squared	0.254	0.213	0.212
Adjusted R-squared	0.210	0.197	0.197
Panel C – Dependent Variable: Turnover Ratio			
Affiliated	-0.0495	-0.0491	-0.0483
	(-0.88)	(-0.90)	(-0.88)
Style Fixed Effects	NO	YES	YES
Year Fixed Effects	NO	YES	NO
Style x Year Fixed Effects	YES	NO	NO
Standard Errors	Cluster by Fund	Cluster by Fund	Cluster by Fund
N	1476	1476	1476
R-squared	0.038	0.035	0.033
Adjusted R-squared	-0.019	0.015	0.014

t statistics in parentheses. * p<0.05, ** p<0.01, *** p<0.001

We can test this more directly by adding turnover ratio as a control in the original regression. Moreover, because management fees – at least to the extent that they are actually paid – are *also* included in the expense ratio, I also include that as a control variable. The results are presented in Table 8.

Table 8 confirms that both management fee and turnover ratio are positively associated with expense ratio. However, the results also show that even controlling for these factors, affiliated index-linked funds *still* have higher expense ratios. In fact, the coefficients on the "Affiliated" dummy are actually larger, both in terms of magnitude and statistical significance, then the ones in Panel A of Table 7.

Specifically, columns (1) through (3) show that, controlling for turnover ratio, affiliated index-linked ETFs have higher expense ratios than other ETFs. Similarly, columns (4) through (6) show that, controlling for management fees, affiliated index-linked ETFs *also* have higher expense ratios than other ETFs. Finally, columns (7) through (9) control for *both* turnover ratio and management fees at the same time, and show that affiliated index-linked ETFs *still* have higher expense ratios. Importantly, the coefficient on "Affiliated" hardly changes as we move from column (1) to column (9), despite the fact that the variables that are added are themselves statistically significant. Similarly, varying the fixed effects (i.e., moving between columns (1) through (3), (4) through (6), and (7) through (9)) also has almost no effect on the point estimates or the standard errors. In fact, the largest point estimate – 0.000750 – is actually on the regression with the *most* controls, since it has style x year fixed effects as well as controls for *both* turnover ratio and management fees. Together, these factors suggest that the results are indeed robust.

These results represent additional support in favor of the second explanation – that investors are attracted to ETFs and are sensitive to management fees, but do not necessarily notice the other costs that are associated with affiliated index-linked ETFs.

Table 8: Relationship between Affiliated Index and Expense Ratio

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable: Expense Ratio									
Affiliated	0.000726***	0.000723***	0.000716***	0.000705***	0.000704***	0.000700***	0.000750***	0.000748***	0.000743***
	(3.72)	(3.77)	(3.74)	(3.90)	(3.95)	(3.93)	(4.38)	(4.44)	(4.42)
Turnover Ratio	0.00121***	0.00121***	0.00121***				0.00102***	0.00103***	0.00103***
	(3.74)	(3.81)	(3.82)				(3.66)	(3.75)	(3.76)
Management Fee				0.00348**	0.00330**	0.00329**	0.00311**	0.00295**	0.00295**
				(3.10)	(3.17)	(3.17)	(3.04)	(3.11)	(3.11)
Style FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Year FE	NO	YES	NO	NO	YES	NO	NO	YES	NO
Style x Year FE	YES	NO	NO	YES	NO	NO	YES	NO	NO
Standard Errors	Cluster by Fund	Cluster by Fund	Cluster by Fund	Cluster by Fund	Cluster by Fund	Cluster by Fund	Cluster by Fund	Cluster by Fund	Cluster by Fund
N	1476	1476	1476	1481	1481	1481	1476	1476	1476
R-squared	0.371	0.367	0.367	0.428	0.414	0.413	0.521	0.510	0.510
Adjusted R-squared	0.333	0.354	0.354	0.393	0.402	0.402	0.492	0.499	0.499

t statistics in parentheses. * p<0.05, ** p<0.01, *** p<0.001

V. Implications

Having established these empirical results, I now tie these results back to the discussion in Part II. In particular, I discuss two sets of implications of these findings, both of which relate to investor protection. The first set of implications relate to the use of indices for index investing. Here, I provide a mixture of conceptual implications and concrete policy proposals aimed at better aligning the current regulatory regime with market realities. The second set of implications relate to the use of indices for benchmarking.

A. RECOGNIZE THAT INDEX INVESTING IS DELEGATED MANAGEMENT

One clear implication of the analysis in Parts III and IV has to do with the "index" investing. Every one of the over 600 indices in my comprehensive sample – and the over 550 in my index fund subsample – gave the index provider at least *some* amount of discretion. Even the most mechanical indices – those that follow strict quantitative rules – allow for some discretion on the part of the index committee. In the context of a fund that tracks the index, this discretion implies that the index provider's decisions will have a flow through effect on the investor's portfolio. This in turn implies that, far from being passive, index investing is properly understood as a form of delegated management.

To be sure, the amount this delegation varies significantly across indices. While some relied largely on quantitative rules, others were more relied on judgments of certain individuals, which is hard for a third part to anticipate.[136] Moreover, many indices rely on information that third parties, such as investor and prospective investors, cannot readily obtain,[137] making it difficult to argue that the investor knows

[136] Some examples of the former include the CRSP family of indices, *see supra* note 119 and accompanying text, and the Russell indices, *see supra* note 124 and accompanying text. Some examples of the latter include the Dow Jones Industrial Average, *see supra* notes 37-38 and accompanying text; *supra* note 120 and accompanying text, and the Morningstar Wide Moat index, *see supra* notes 122-123 and accompanying text.
[137] *See e.g.* discussion *supra* Part III.D.2.

precisely what the index will do in the future. Others still have features that are deliberately opaque, and which make it impossible for a third party – including an investor or potential investor – to determine how exactly it is constructed. For example, billions of dollars are indexed to indices that are explicitly relying on proprietary features,[138] something that can only be referred to as delegated management. Hundreds of billions more are indexed to indices that are, for practical purposes, executing strategies similar to what you would find in an "actively" managed fund.[139]

Even if the rules are fairly precise and allow for little discretion, in the sense that everything is fully specified, indices need to allow room for the rules to change, or to resolve circumstances as they arise. In theory, this need not imply delegated management. For example, the way the index is going to deal with these could be announced in advance, giving the investor the opportunity to remove her funds if she is unhappy with the decision. In practice, however, this is highly implausible. For this to work, the investor would have to keep a close watch on her portfolio, and, more importantly, on what the index manager is doing. Because these changes happen rather frequently even for the most popular indices,[140] she would then have to investigate the implications of these changes. While this might be possible in theory, doing so runs counter to the very concept of "passive" investing. The whole point of "passive" investing is that the investor doesn't have to pay attention to her portfolio. If an investor is monitoring the underlying index the time, she may not necessarily be delegating the management of her portfolio, but she is also not meaningfully engaged in what would conventionally be called passive investing.

There is nothing inherently wrong with delegated management. While scholars have expressed concerns about the corporate governance

[138] See discussion *supra* Part III.C.4.
[139] See discussion *supra* Part III.C.4.
[140] See discussion *supra* Part III.D.3.

implications of institutional investors,[141] for many investors, being able to delegate management of their portfolio to a third party is a boon. A well-diversified portfolio – something that many portfolio managers offer –generally has far less risk than the type of concentrated portfolio that many individual investors, if left to their own devices, tend to hold.[142] Moreover, individual investors tend to exhibit trading patterns and other behaviors that systematically reduce the returns on their investments,[143] something that they may be able to avoid by engaging in delegated management.

Moreover, the form of delegated management implied by investing in an "index fund" may also be better – from the perspective of the investor – than other forms of delegated management, such as that of an actively managed mutual fund. Index funds tend to have far lower management fees,[144] and thus tend to offer superior returns to investors. The point is not that there is anything wrong with the delegated management implied by an index fund, only that it is still delegated management.

1. Proposal: Recognize that the Underlying Index Represents a Fundamental Attribute of an Index Fund

Nevertheless, this delegation may have other consequences, particularly as it relates to investor protection.[145] While a mutual fund cannot deviate from its fundamental policies, as stated in its

[141] *See* Bebchuck et al *supra* note 26.
[142] Brad M. Barber & Terrance Odean, *The Behavior of Individual Investors*, *in* THE HANDBOOK OF THE ECONOMICS OF FINANCE 1533, 1560-1563 (2013) (surveying evidence that individuals fail to optimally diversity their portfolios)
[143] See generally id.
[144] *See* Investment Company Institute, ICI Research Perspective 1 (April 2018) *available at* https://www.ici.org/pdf/per24-03.pdf (noting that, in 2017, the average expense ratio was 0.78% for actively managed equity mutual funds, compared to 0.09% index equity mutual funds).
[145] This delegated management may also have corporate governance implications. This is likely to be most relevant in the context of delegation to very large indices like the S&P 500. I discuss this implication in a companion paper. *See generally* Robertson, *supra* note 7.

registration statement, without a shareholder vote,[146] there is no restriction on an index's ability to change its methodology. This asymmetry leaves investors in "index" funds with fewer protections, and potentially facing higher risks, than investors in actively managed mutual funds.

This risk is particular acute in the context of index funds that track a specialized index, which is not being used by any other entities. Whereas an index that is being used by many market participants may have an incentive to maintain the integrity of the index, this incentive is dulled when the index has only one user. This may be even more extreme in the case of ETFs that follow affiliated indices, where the *same* entity (or an affiliate thereof) is managing both the index and the fund. As a result, the protections afforded to investors by the Investment Company Act of 1940 in the context of delegation to *managers*, no similar protections exist in the context of delegation to an *index provider*.

Fortunately, there is a simple solution to this problem. Once we recognize that delegating to an index is no different from delegating to a fund manager, we can craft a solution based on the existing rules: Any time the underlying index makes a change that, if made by the fund manager in a comparable actively managed fund, would trigger a vote, the fund manager is required to hold a vote on retaining the index. This simple change would harmonize the protections offered to investors in the two types of funds.

An additional benefit of this proposal is that it does not rely on the creation of an entirely new regulatory apparatus for indices. Instead,

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[146] 15 USC § 80a-13(a)(3) (prohibiting investment companies from deviating from certain investment policies, as well as "any policy recited in its registration statement pursuant to section 80a–8(b)(3) of this title," unless authorized to do so by the vote of a majority of its outstanding voting securities). *See also* 15 USC § 80a-8(b)(3) (consisting of "all policies of the registrant not enumerated in paragraphs (1) and (2), in respect of matters which the registrant deems matters of fundamental policy").

it simply relies on the existing regulatory regime for mutual funds, making it simple to implement. Indeed, the proposal would not place any direct obligations on the underlying indices. Instead, the obligation would be on any fund that chose to track an index. This obligation would then flow through to the index provider through market forces: index providers generate revenue by licensing the use of their indices to market participants, including index funds. Because any index that refused to cooperate with fund managers would be opening the fund up to potential liability, fund managers would simply require that the index provider provide, at the very least, information sufficient to determine whether a shareholder vote is required, and, if application, to hole the relevant vote.

Structuring the obligation in this way would have three major benefits. First, by implicating only those indices that are tracked by index funds, the rule avoids the risk of being over inclusive. As discussed above, there are tens of thousands of different financial market indices.[147] A rule that applied to all indices would be like using a sledgehammer to crack a walnut. In contrast, this approach is narrowly tailored to fill a specific regulatory gap and solve the problem at hand. Second, such a rule would implicitly shift the obligation to monitor the underlying indices from individual fund investors to the fund's managers. Because these individuals are vastly better suited for this role, the shift is likely to be efficiency enhancing, and therefore increase total wellbeing. Finally, by virtue of this shift in monitoring obligations, fund managers are likely to demand more and better disclosures form index providers. Even if these disclosures never become available to the broader market, the fact of the scrutiny alone is likely to have a disciplining function on index providers.

2. Proposal: Increase Index Fund Disclosures Around the Underlying Index

The results in Part IV raise additional consumer protection concerns, at least when it comes to investing in ETFs. Specifically, the results support the idea that funds may be taking advantage of the popularity

[147] *See supra* note 53 and accompanying text.

of ETFs – and the idea that they have low management fees – while passing costs along to investors in other ways. One potential avenue for this is licensing fees. For example, it rather than paying licensing fees to a third party, a fund that tracks an affiliated index is essentially paying a licensing fee to itself. In both cases, this licensing fee would count as an expense of the fund and would show up in the fund's expense ratio. However, while in the former case the fee represents an arm's length transaction, the latter is, at best, a transfer among affiliates, raising the possibility that the prices may be set strategically. To the extent that investors are more sensitive to a fund's management fees than they are to its expense ratio, it might not be surprising for funds to take advantage of this by charging themselves higher licensing fees than they would be prepared to pay to third party index providers.

I emphasize that while this story about licensing fees is consistent the with the results in Part IV, I have no specific evidence of such behavior. All the same, the potential for such behavior is problematic. One possible solution to this problem is to simply ban the use of affiliated indices by index funds, forcing them to instead use third party indices. While this might take care of the problem, prohibition is a blunt instrument, and is not an idea solution. As with anything else in financial markets, doing so runs the risk of both stifling innovation and generating unintended consequences.

Instead, the consumer protection concerns about the underlying index can be addressed through more and better disclosure. At present, such disclosures are not specifically required. As I found upon reading the prospectus documents, if they exist at all, are often incomplete, hard to locate, and difficult to interpret. Indeed, the disclosure requirements of index funds, including index ETFs, are identical to those of actively managed funds. And yet the information about the underlying index is of crucial importance to investors in index funds in a way that it is not for investors in active funds. The required disclosures should reflect this.

Specifically, any fund that has, as its objective, to track a particular underlying index, should be required to provide clear, consistent, and prominent disclosures about that index. These disclosures should include (1) the identity of the index provider, and (2) whether any person or entity affiliated with the fund in any way (i) is affiliated with the index provider, (ii) was involved in designing the index, (iii) has any ongoing ability to influence the index, or (iv) has been involved in any changes to the index, and if so, what those changes were.

In addition, the section should also include a simple disclosure of the licensing fees paid by the fund to the index provider. The reason for this is simple: just as actively managed mutual funds must disclose their management fees, index funds should disclose the fee that they are paying to the entity that is responsible for selecting investments – the index provider. This amount should be expressed both in terms of the contribution of these fees to the fund's expense ratio, and as a percentage of the fund's assets under management. These index disclosures should be placed in their own section immediately following the "Principal Investment Strategy" section.

This solution would help to limit the risk to investors without stifling financial market innovation. Funds would be free to create their own indices and to charge whatever licensing fees they wished, as long as these. Similarly, this solution would place no restrictions on investor choice as it relates to index funds. Instead, it would simply ensure that they are fully informed about one of the most important features of such funds.

B. RETHINK THE USE OF INDICES AS BENCHMARKS

A second set of implications of the analysis in Part III has to do with the use of indices as performance benchmarks. As discussed in Part II.C, any comparison of a portfolio against a benchmark is as it is about the much about the benchmark itself as it is about the portfolio. Of course, there is nothing inherently wrong with this – it is just a fundamental feature of the way comparisons work, and is true for any

benchmark, not just in financial markets.[148] As long as one has a clear understanding of the material features of the benchmark index, such comparisons can be quite useful.

Problems arise, however, when one does not have a clear understanding of the underlying benchmark. At best, such a comparison would be useless, in that they would provide no useful insights into how to interpret the performance of the portfolio of interest. This could be the case if the investor was aware of the fact that she does not understand the benchmark. In that case, a rational investor would realize that the index provides her with no useful information. Because she is always free to disregard information that she does not believe is useful, the investor could simply ignore the benchmark. As a result, while reporting the returns on the benchmark does not help the investor, at least she is not harmed by it.

The situation, however, assumed that the investor was fully rational, and knew that she did not understand the benchmark well enough for it to be useful. If this is not the case, providing the benchmark could actually be misleading, leading an investor, or potential investor, to an erroneous conclusion. Unfortunately, the more the investor (or potential investor) *believes* the benchmark to be relevant, the more likely she is to find herself in the latter case.

The analysis in Part III suggests that, by the sheer number of different indices being used as benchmarks, and the sheer amount of diversity across these indices, at least some investors are likely to find themselves in the latter position. While it may be plausible for an investor to have a reasonable understanding of the working of a small

[148] For example, consider a literal benchmark: a marking on a tool bench. Such a marking can be useful in measuring the length of another other object – for example, a piece of wood – only to the extent that one has a clear idea of the length of the benchmark itself.

number of indices,[149] the idea that she would have a solid understanding of a large number of them is implausible. Even assuming she could access the required information, since the vast majority – nearly 80% – of indices in my full sample are being used by only a *single* fund, it is unlikely that she would find it worthwhile to invest the time required to understand it. Even among the non-index fund subsample – the mutual funds that are *not* index funds – the median index is being used by only two funds, demonstrating that this is not a concern that is unique to index funds.

the non-index Moreover, because of the diversity across indices, she cannot simply transfer her knowledge about one index to another, as doing so is as likely to result in error as it is to be helpful. Finally, for the same reasons that index investing should be understood as delegated management, the assumption that the investor would be able to access the required information is unlikely to hold.

VI. Conclusion

In this paper, I shed new light on the landscape of US stock market indices. I documented substantial heterogeneity across the universe of indices used as benchmarks for US mutual funds and showed that most were used as the primary benchmark index by only a single fund. I then showed that a substantial proportion of ETFs track indices of their – or their affiliates' – own making. My findings shed light on a previously understudied corner of the financial markets and have substantial implications for investor protection.

[149] I use the term "may" with caution. In fact, even the S&P 500, arguably the most prominent index of the US stock market, and the most popular index in my sample by a significant margin, is poorly understood. *See* Robertson, *supra* note 7.