

# Active Investing and the Efficiency of Security Markets

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## Abstract

This paper surveys the vast body of literature on the relationship between active investment management and the efficiency of public security markets in the United States, considering both peer-reviewed academic studies and commentary from investment practitioners. The literature broadly indicates that active investment management simultaneously generates value-added for investors—through the bundle of services offered—and makes public security markets more efficient, thereby aligning the incentives of investors in actively-managed funds with the positive externalities that they create for all investors, including investors in passively-managed funds and both index and rules-based ETFs.

Importantly, active managers counteract many of the “misbehaviors” (biases) of other investors. Further, the benefits of active management are amplified in small- and mid-capitalization U.S. stocks, relative to large-capitalization stocks—since active managers, in aggregate, overweight smaller-capitalization issues relative to their representation in capitalization-weighted market benchmarks. In turn, the improved market efficiency afforded by active management especially enhances the ability of small- and mid-sized companies to raise capital for investments in the real economy. And, the improved efficiency serves to appropriately discipline capital expenditures by all corporations through a more efficient stock price and its resulting impact on the cost-of-capital for corporate investments.

Other services provided by active managers to public security markets, beyond providing improved market efficiency (such as the provision of liquidity to other investors), are also discussed. Finally, recent trends in active investment management are presented, followed by some conjectures about the future of active management.

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# Active Investing and the Efficiency of Security Markets

## I. Introduction

The Efficient Market Hypothesis (EMH)—often ascribed as the “brain child” of the University of Chicago’s Economics and Finance brain trust—has reigned as the supreme accomplishment of financial economics over the past several decades.<sup>1</sup> But, what, exactly, does the EMH paradigm imply for security markets in equilibrium in such a purely rational world? And, how does it apply in a world that seems, to many recognized economists, to be populated by a significant proportion of economic agents with common human fallibilities that lead to common investing behaviors that challenge the pure rationality assumption?<sup>2</sup>

To lend insight on these fundamentally important, yet perplexing, questions, this article reviews academic research and investment practitioner commentary, and presents trends in investment markets that both support and challenge the notion of purely efficient markets. Specifically, the role of active investment management is explored in the context of the EMH. In addition, the bundle of services provided by active managers is discussed, along with the relation of these services to a world where the EMH (or a variant thereof) holds or, alternatively, to a world where the EMH may not govern markets for extended periods —such as during the dot-com bubble of the late 1990’s, during the financial crisis of 2007 to 2009, or during the Eurozone crisis of 2011. To conclude, this paper explores trends in passive management and their implications for the relevance of the EMH—that is, the assumption that public security markets are well-functioning with few or no disruptions or dislocations.

### I.1. The Efficient Market Hypothesis: A Brief Overview

The EMH is a very compelling theory that serves as a useful starting point for thinking about how financial markets operate. At its core, the EMH says that there are no “free lunches” in financial markets. Under the common interpretation of the EMH, a given level of expected return from a security or portfolio, in excess of the risk-free rate, must be accompanied by a corresponding level of risk that is not diversifiable; this relationship between expected return and systematic risk must hold across all assets in the economy (stocks, bonds, real estate, human capital, etc.).

However, there are several questions raised by this simple exposition of the EMH. For example:

1. Does the relation between expected return and risk stay reasonably constant over time, or can it vary substantially? If it changes over time, is it possible for a sophisticated intermediary to add value for uninformed investors by analyzing the current state of the relation?
2. Is the return/risk relation the same for all economic agents? Or does an economically-

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<sup>1</sup> Eugene Fama of the University of Chicago was awarded the Nobel Memorial Prize in Economic Sciences in 2013, largely due to his work on the foundations of the EMH. See Fama (2013) for an overview of his work.

<sup>2</sup> Widely cited -- and very interesting and readable -- papers on this topic include Hirshleifer (2015) and Lo (2004).

significant subset of investors see the world differently, bringing a more nuanced view of the relation and how it applies to each asset?

### 3. How does the *cost* of information gathering and interpretation affect the EMH?

The first question has been addressed by several papers which conclude that the expected return to risk relation changes substantially over time.<sup>3</sup> Importantly, some of these papers express the view that a time-varying return/risk relation is still consistent with a perfectly efficient market. The question of whether sophisticated active managers are able to exploit such time-varying expected returns and risk for the benefit of their investors is addressed in Section II.1.

The second and third questions have been the subject of influential studies recognizing that investors (being human) are not all alike, and that different investors choose different strategies (such as active versus passive).<sup>4</sup> The single most widely-recognized paper addressing this idea is Grossman and Stiglitz (1980; GS). The “GS-EMH model” lays out a compelling case (mathematical equilibrium-based) that different investors have different optimal strategies, and that different equilibrium fee levels are appropriate for investors with differing levels of abilities for interpreting information or with differing costs of gathering information. The GS-EMH model stipulates that active management can exist in equilibrium, even in otherwise perfectly competitive markets, as long as there is a cost to gathering and processing information and that this cost varies among investors. The key to this result is that investors who are most efficient in gathering and interpreting information (i.e., those who have the lowest marginal cost) will choose to be active investors or fund managers, and will be rewarded with the highest abnormal returns or market-based fee levels. Those who are less efficient will optimally choose another approach, either investing passively, or hiring one or more of the talented active managers and paying their fees.

## **I.2. The Behavioral Markets Hypothesis: A Brief Overview**

Numerous papers have credibly challenged the EMH (as well as the GS-EMH) and its many assumptions about the rationality of investors, in an alternative view that may be termed the “Behavioral Markets Hypothesis” (BMH). The BMH should not be viewed as a wholesale refutation of the EMH; instead, most adherents to the BMH believe that markets are mostly efficient, but that there are important departures from efficiency that can be exploited by savvy investors (i.e., those with lower information gathering and/or processing costs, as described in the prior section).

For irrational behavioral tendencies to affect the behavior of markets, these behaviors must be common among a significant fraction of investors. If the irrational behaviors are uncommon, they are easily exploited by rational investors, which results in the irrational investors either

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<sup>3</sup> Several papers published in the late 1980s model time-varying expected returns of securities, based on time-varying levels of risk-aversion or systematic risk. See, for example, Fama and French (1989).

<sup>4</sup> Often-cited studies in this area include Mayers and Rice (1979) and Dybvig and Ross (1985). These papers divide investors into two groups -- “informed” and “uninformed” -- and explore the equilibrium consequences of this bifurcation.

“learning their lesson” and changing their behavior or going bankrupt and abandoning active investing.<sup>5</sup> By contrast, if a large number of investors are irrational, rational investors may not be willing to “swim against the tide” for fear of going bankrupt themselves before markets are corrected to rational pricing.<sup>6</sup>

Some of the common irrational investing behaviors that scholars have identified as important are:

1. Disposition: selling winners too early and holding on to losers too long, to avoid the mental pain of admitting error.
2. Overconfidence: overinterpreting successes as a sign of skill, even when they are partly (or largely) due to luck, leading to over- or underinvestment in assets from mistaken optimism or pessimism.
3. Availability: overreacting to news that is easy to digest or assemble, and neglecting more complex or difficult-to-interpret news, or segments of the market where news is less readily available.
4. Confirmation: over reacting to news that conforms to previously-held views, and dismissing news that does not.

While these are among the most important (and market-affecting) of common investor (mis-) behaviors, there are several other documented behavioral anomalies that can affect market prices.<sup>7</sup>

### **I.3. Active and Passive Management Through the Lens of the EMH versus the BMH**

What if the Grossman-Stiglitz version of the EMH (GS-EMH) holds? What does this say about the equilibrium level of active and passive investment? In essence, it says that -- at least in the long-run -- the proportion of active investors will be closely related to the marginal cost of gathering and processing information compared to the marginal revenue from conducting such activities.<sup>8</sup> If the gap between marginal revenues and costs is wide and durable, we should expect a reasonably large proportion of active management to survive in the long-run (with the assumption that fixed-cost investments will be necessary by each active manager to maintain

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<sup>5</sup> Of course, this depends on the “birthrate” of irrational investors relative to rational investors; P.T. Barnum’s “There’s a sucker born every minute” may apply here.

<sup>6</sup> In a seminal paper, Shleifer and Vishny (1997) lay out a model where rational investors face the risk of going bankrupt in the short-run if they invest too heavily to profit in the long-run from anomalies in the marketplace. In other words, rational investors do not fully exploit market anomalies because they cannot sufficiently borrow money based on the expected long-term profits from exploiting anomalies, as they would be able to do in a frictionless market.

<sup>7</sup> For an excellent survey of the behavioral finance literature as it applies to the behavior of investors, see Daniel and Womack (2001).

<sup>8</sup> In the short-run, fixed set-up costs and search costs may keep markets in an out-of-equilibrium state, even after fees are charged.

competitive marginal revenues and costs).

As an illustration, suppose that there is a new technology that enables investors to do a superior job of gathering and analyzing value-relevant information, but that this technology is only available to a limited number of fund management companies—perhaps because implementing the technology is difficult and costly.<sup>9</sup> In such a scenario, under the GS-EMH model, these most-efficient management companies would dominate among actively-managed funds in terms of market share. Such managers may be willing to make the fixed cost investment that allows them to generate superior information about the proper level of security prices at a lower marginal cost, relative to not possessing the technology. As a result, they would be able to fend off new entrants without the new technology—who have higher marginal costs of information production—as well as to compete successfully with passive investors, who do not even consider making the fixed-cost investment. Such active managers will be able to recover a fair rate-of-return to their fixed-cost investment through active fees.

What if, instead, the Behavioral Markets Hypothesis (BMH) holds? In such a case, the equilibrium proportion of active managers should be substantially greater than in the GS-EMH world. The BMH would imply that the marginal revenues from pursuing information-gathering and processing are greater than under the GS-EMH, due to the higher level of mispricings created by investors with common biases. In the BMH world, we should expect to see more active managers entering the market, paying the (potentially substantial) fixed-costs required and still surviving.

Which model does a better job describing real-world markets: GS-EMH or BMH? Or do public security markets oscillate between one and the other over time? While these questions are daunting ones that this study does not attempt to answer, the role of active management can be discussed in the context of each hypothesis. Accordingly, the next section reviews the empirical evidence, after discussing the general bundle of services provided by active managers in both the GS-EMH and BMH worlds.

## **II. The Benefits of Active Management for U.S. Markets**

### **II.1. An Overview of Active Management**

Active managers provide a broad bundle of services to investors – beyond investment performance narrowly defined (after-fee average returns, relative to a properly chosen benchmark or peer group of active managers) — some of which apply to a world where the GS-EMH holds, either exactly or approximately, and some of which apply to a world (i.e., the BMH) where it does not hold. Setting aside the notion that active management offers investors a chance to earn returns in excess of those of market indices—which depends on both the level of market efficiency as well as the level of competition among active managers—actively-managed funds may also help investors meet other investment objectives, such as underweighting or overweighting certain sectors or individual securities, altering asset allocations in response to market conditions, and otherwise managing risks. These attributes may be particularly valuable

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<sup>9</sup> Real-world examples could include a superior quant model, co-location of a high-frequency trader with an exchange, or the invention of a new computer CPU with initially limited supply.

to subsets of investors who face consumption needs and risks, or otherwise have preferences that deviate from those of the “representative investor.”

Investors may prefer an active management approach because they have decided, based on their life circumstances, that they need a different allocation from that available in an index fund solution.<sup>10</sup> For instance, investors who have a higher level of risk-tolerance, maybe because they have a greater level of overall wealth or because they plan to work to a later age, could rationally allocate more of their wealth to higher-risk funds, such as equity funds that overweight technology stocks. Other investors, who may be concerned about potential medical or other large expenses, may rationally allocate a larger proportion of assets to less risky funds, such as short-term bond funds, given the uncertainty about the timing of such investors’ cash withdrawal needs. While, in both cases, it may be theoretically possible for such investors to simply change their portfolio allocations by shifting assets among appropriately chosen well-diversified equity, fixed-income, and cash-investment index funds, a combination of the available indexing strategies may not offer the risk/reward profile desired. At the same time, investors may have neither the knowledge nor the time to make the adjustments needed to reflect changes in their personal risk/reward profiles or in the risk/reward profiles of the funds in which they invest.<sup>11</sup>

In contrast to index funds, which seek to replicate the return on a specified index through the purchase of the components of the index, actively-managed funds have the discretion to increase or reduce exposure to asset classes, sectors, or securities within the bounds of their investment mandates.<sup>12</sup> For instance, active managers can, and actually do, hold increased levels of cash, or securities with a lower exposure to general market returns, during a protracted downturn.<sup>13</sup> As another example, actively-managed funds had the flexibility to underweight “dot-com” large capitalization growth stocks, which generally benefitted their investors during the 2001-2002 correction. In contrast, many broad index funds were forced to continue a capitalization-weighted investment strategy, which meant very large portfolio weights in some speculative technology stocks. In general, actively-managed funds provide investors with a greater ability to reduce downside risk than do index funds, including the avoidance of potential extreme negative returns, as well as to exploit unusual periods of depressed stock prices—leading to the potential for a better expected return to risk relation for their investors.

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<sup>10</sup> A clear example is target-date funds, which actively manage the asset allocation as time-to-retirement approaches.

<sup>11</sup> Consider investors with time-changing health conditions, or who support a dependent with time-changing needs. These investors will likely find it difficult to meet their risk/reward requirements using only widely-available index funds and could well lack the time or energy needed to update the allocation over time as needed. By contrast, an actively-managed solution, such as a lifecycle fund or a sector fund that actively responds to changing health-care costs may better fit these investors’ risk/return profile needs. The actively-managed solution may also be a component of a customized plan made by an investment adviser working on behalf of this type of investor.

<sup>12</sup> Index funds may also seek to replicate the return of a weighted average set of indexes. They may also purchase either all of the components of the index or only a representative sample. However, their ability to dynamically overweight or underweight sectors or securities in response to changing market conditions or investor preferences is greatly constrained, relative to active funds.

<sup>13</sup> See, for example, Kacperczyk, van Nieuwerburgh, and Veldkamp (2014).

## II.2. Do Active Managers Help to Eliminate Long-Term Market Anomalies?

Rephrasing the discussion in Section I.2, under the BMH, if there is a substantial proportion of irrational investors, they may push market prices away from their fundamental values or they may act slowly in pushing prices toward their proper values. A large body of literature that studies the trades by individual investors in brokerage accounts finds common patterns of irrational behaviors, some of which result in reduced returns.<sup>14</sup>

If individual investors are more “behaviorally-challenged” than professional investors, funds may be pushed by the force of money flows from and to their investors to make trades that push market prices away from their fundamental values (or, to at least slow the convergence of price to fundamental value). Then, index funds and active funds may exhibit some of the same anomalies that have been documented to occur in the trading of individual securities in brokerage accounts of individuals. For example, both active and index funds may be pushed to sell winners too soon and losers too late, buy stocks with recent good returns, and overweight stocks that are familiar to small investors—through the investment actions of their individual investors. Notably, however, index funds generally have little choice but to buy or sell their securities pro-rata, while active funds can take actions to reduce the impact of investor flows. As an example, active funds can sell more liquid securities in their portfolios in reaction to a short-lived spike in investor outflows from their funds—thus, actively maximizing the insurance value of pooled liquidity to their investors (see, also, Section II.3 below).

### II.2.A. Who Causes Market Anomalies?

The evidence indicates that individual investors invest in potentially market-distorting ways in their brokerage accounts (e.g., Barber and Odean (2013)). But, are the aggregate trades of individuals, *when they trade managed funds*, also sufficient to move markets and create anomalies? The empirical evidence indicates that they are. For instance, Ben-Rephael, Kandel, and Wohl (2011) provide empirical evidence that U.S. investors allocate more money to equity mutual funds during periods prior to equity market downturns, and less prior to upturns. And, Coval and Stafford (2007) and Wermers (2003) provide evidence indicating that money flows from investors compel U.S. domestic-equity mutual funds to make trades that can move prices away from fundamentals.

### II.2.B. Who Corrects Market Anomalies?

Active investment managers have the freedom to over- or under-weight asset classes, investment sectors, or individual securities to exploit and correct such anomalies. But do they actually do so? And, if they do, does correcting anomalies contribute to the alphas generated by active fund managers?

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<sup>14</sup> An authoritative survey is Barber and Odean (2013).

The empirical evidence indicates that active managers often exploit and correct market mispricings, whatever the origin of such deviations from fundamental values. These studies include the following:

1. Wermers (2000) and Daniel, Grinblatt, Titman, and Wermers (1997) find that the hypothetical returns on stock portfolios held by active mutual funds significantly outperform their benchmarks.<sup>15</sup>
2. Grinblatt, Titman, and Wermers (1995) find that actively-managed mutual funds exploit price momentum in stocks and gain abnormal returns from doing so.
3. Wei, Wermers, and Yao (2015) find that contrarian active mutual fund managers achieve higher alphas when they trade against other active mutual fund managers.
4. Wermers and Yao (2010) study U.S. stock anomalies as a function of the active/passive balance of ownership in individual stocks; they find that stocks with a higher level of passive ownership and a lower level of active ownership exhibit a greater level of widely documented anomalies, such as the accruals (earnings quality) anomaly described by Sloan (1996).

Significantly, active managers, in helping to eliminate market anomalies that are plausibly created by the misbehavior of some investors, provide a significant positive externality to public securities markets. That is, all investors, both active and passive—as well as the real economy—benefit from the efforts and cost expenditures of active managers.<sup>16</sup> In other words, investors in actively-managed funds are not the sole beneficiaries of this societal value-added. And, because actively-managed funds, in aggregate, overweight small- and mid-capitalization stocks, relative to value-weighted market indexes, the benefits of active management in providing more efficient markets may be expected to be magnified in small- and mid-cap stocks—where they are presumably most needed. In this light, the average “alpha” provided by active managers (meaning the excess return above the relevant benchmark index), even gross of management fees, does not adequately capture the value of the active management industry to capital markets.<sup>17</sup>

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<sup>15</sup> These papers use periodically-disclosed portfolio holdings of U.S. equity mutual funds, sourced from the SEC, in addition to quoted prices from the University of Chicago’s CRSP stock database to compute hypothetical monthly portfolio returns during the 1975 to 1994 period.

<sup>16</sup> In terms of the real economy, Van Binsbergen and Opp (2018) provide evidence that existing stock market anomalies result in a significant misallocation of capital investment: overpriced stocks result in managers applying a mistakenly low cost-of-capital to their investment projects, resulting in overinvestment, while underpriced stocks result in underinvestment.

<sup>17</sup> Economic theory indicates that such positive externalities should, ideally, be rewarded through “internalizing the externalities” (Laffont (1988)). In practice, examples of such actions might include eliminating or reducing taxes on capital gains distributions from mutual funds, which much more heavily penalize investors in actively-managed funds. (Indeed, this is a major source of the competitive advantage of ETFs over non-ETF actively-managed mutual funds.)



### **II.3. Active Managers as Liquidity Providers**

Active managers clearly can play a role in providing intraday liquidity to other traders, given their ability to make discretionary trades. By contrast, index funds must implement the pro-rata trades imposed on them by the money flows of their investors. In addition, index funds must make these trades with dispatch to avoid tracking-error—a principal metric used by many investors to measure index fund investing success. As a result, while index funds can trade carefully and smoothly throughout the day in accordance with their forecasts of that day's flows from investors, there are limits to their freedom to provide liquidity without increasing tracking-error risk. Active managers are also limited by the flows of their investors, but the discretionary nature of their trading gives them much more freedom to pick and choose which securities they buy or sell at any given time during the day.<sup>18</sup>

What does the empirical evidence say about the liquidity provision by active managers to passive managers? With regard to high-frequency liquidity provision (such as during intraday trading), empirical evidence indicates that stocks held more heavily by actively-managed funds are more liquid than those held more heavily by passively-managed funds. However, critics argue that the opposite causation is true—i.e., that more liquid stocks attract active managers.

Wermers and Yao (2010) conduct econometric tests to sort out this causality, and find that active managers, in aggregate, provide liquidity to passive managers, where liquidity is defined as the aggregated price impact of index fund trading. Specifically, the paper looks at the ownership of stocks by actively-managed and passively-managed funds and finds evidence of synchronized trading and a large price impact by passive funds. Specifically, trades by passive funds are much more often in the same direction than trades made by active funds, a result of the highly correlated flows of passive funds and the ensuing forced trades of all stocks within an index.

Additional empirical evidence is provided by Da, Gao, and Jagannathan (2010), who show that actively-managed funds can be either liquidity-absorbing impatient traders or liquidity suppliers, depending on the relative proportions of these two competing trade motivations.

### **II.4. Active Management as a Conduit for Incorporating Information into Market Prices**

For markets to continuously and promptly reflect a close estimate of the true net present value of traded securities, new value-relevant information must make its way into market prices in a speedy way. While the EMH and its alternative, the BMH, may disagree on the speed and precision with which the price-formation process happens, they agree that the evolution of information in the marketplace is the basis for the actions of investors.<sup>19</sup>

While it is possible that prices can adjust without trading, someone must pose the threat of trading to cause prices to change, a threat that is predicated on prompt gathering of news

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<sup>18</sup> A fund family that is famous for achieving some of their alpha through the active provision of liquidity is the Dimensional Fund Advisor (DFA) family of funds. See Light (1993) and Keim (1999).

<sup>19</sup> As an example, the EMH postulates that investors should react almost instantaneously to an earnings surprise announcement by a corporation, while the BMH allows that many investors may react slowly and/or either under- or over-react to the news. Under either paradigm, news plays a central role in investor trading and price formation.

bulletins and interpretation of their price-relevance.<sup>20</sup> Clearly, there is no incentive for passive investors to expend any resources on news-gathering and processing, as they have no discretionary ability to act on their information, nor are they directly rewarded by investor flows for price changes of the indexes that they attempt to track.<sup>21</sup>

This leaves active investors as the conduit for the incorporation of costly news into prices—as modeled by Grossman and Stiglitz (1980) (as discussed in Section I.1). Several empirical academic papers document that active institutional investors, or at least some subset of active institutions, do exactly that. Using Reuters News Analytics, Hendershott, Livdan, and Schurhoff (2015) and Irvine, Lipson, and Puckett (2007) find that some active institutions are able to predict imminent news stories and profit during the days prior to the release of the news to the public by trading ahead of the release.

Huang, Tan, and Wermers (2019) combine a sample of 2.2 million time-stamped news articles from several news sources (including Reuters, Dow Jones, Associated Press, Business Wire, and Press Release Newswire) with the time-stamped trades of over 1,000 institutions (including mutual funds, pension funds, and hedge funds). For the 2000 to 2010 period, they investigate the role of institutions in analyzing and trading around “unanticipated news bulletins,” defined as news that was either not expected to occur at all (such as the sudden death of a corporate CEO) or that was expected to occur at some vague, unknown time in the future (such as the introduction of a new pharmaceutical). The study concludes that some institutions are able to trade quickly (often within 30 minutes) in response to the tone or content of the news, and that these institutions earn short-term alpha from doing so.<sup>22</sup> Further, the paper finds that the evidence of institutions trading ahead of news (as found in the Hendershott, et al., and Irvine, et al., papers mentioned above) occurs mostly when the news is anticipated, such as a regularly-scheduled corporate news release about the level of quarterly earnings.

Overall, the peer-reviewed evidence indicates that actively-managed funds play an important role in either predicting the content of an anticipated news story or in quickly reacting to the content of an unanticipated news story and that they are rewarded by trading at favorable prices when they do so. Therefore, investors can rely on active managers to provide news monitoring and interpretation in return for the fees paid. (Of course, some active managers provide more value-added in this dimension than others). In addition to the pure alpha-generating ability of these activities, the evidence indicates that investors in actively-managed funds can be reassured that their portfolio managers are quickly addressing the risks of bad news outcomes.

At the same time, the incorporation of news into market prices benefits the entire marketplace. Thus, active managers, by providing a conduit of news to market prices, generate a large positive

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<sup>20</sup> In the scholarly literature, Milgrom and Stokey’s (1980) “no-trade theorem” is perhaps the earliest model of the potential for price changes in markets without trading after private information is received (through news or otherwise) and processed by some or all investors.

<sup>21</sup> An exception is the duty of passive investors to monitor their portfolio companies to fulfill their fiduciary responsibilities in terms of proxy voting.

<sup>22</sup> However, there is only weak evidence that institutions can predict the first unanticipated news bulletin on a particular corporate subject—at least as indicated by their trading of stocks during the days and minutes leading up to the first news release.

externality that benefits all investors in the financial markets, both passive and active. This evidence provides a specific channel through which active managers benefit markets, which was discussed in Section II.2.<sup>23</sup>

## **II.5. The Consequences of Increased Passive Management**

The above-mentioned paper by Wermers and Yao (2010) conducts further tests to determine the relation between the balance of passive and active ownership of a particular stock to the tendency of the stock to exhibit commonly-documented anomalies. First, this paper finds evidence of synchronized trading and a large price impact by passive funds. Specifically, across stocks, trades by passive funds are much more often in the same direction relative to trades made by active funds, due to the highly correlated flows of passive funds and the ensuing forced trades of all stocks within an index. Further, trading by passive funds generates significant price reversals during subsequent months.

In addition, Wermers and Yao (2010) quantify the informational role of passive funds by examining their impact on the cross-sectional return predictive power of a large set of stock characteristics that have been shown to predict returns by past research. These predictors are combined into eight variables, including value, investment and financing activities, earnings quality, intangible investments, price and earnings momentum, information uncertainty, profitability, and liquidity. They find that the presence of active funds as owners of stocks tends to reduce the predictive power of these variables, but that the presence of passive funds as owners tends to increase their predictive power.

## **III. Trends in the Level of Active vs. Passive Management in Different Market Sectors**

The discussion of market efficiency and its potential drivers provides context for the evolution of U.S. public security markets. This section examines trends in the relative importance of active and passive management in both U.S. and world public security markets over time, and provides commentary on how this time-varying balance may be affecting the efficiency of those market sectors and on the potential for future increases in either passive or active management in these sectors.

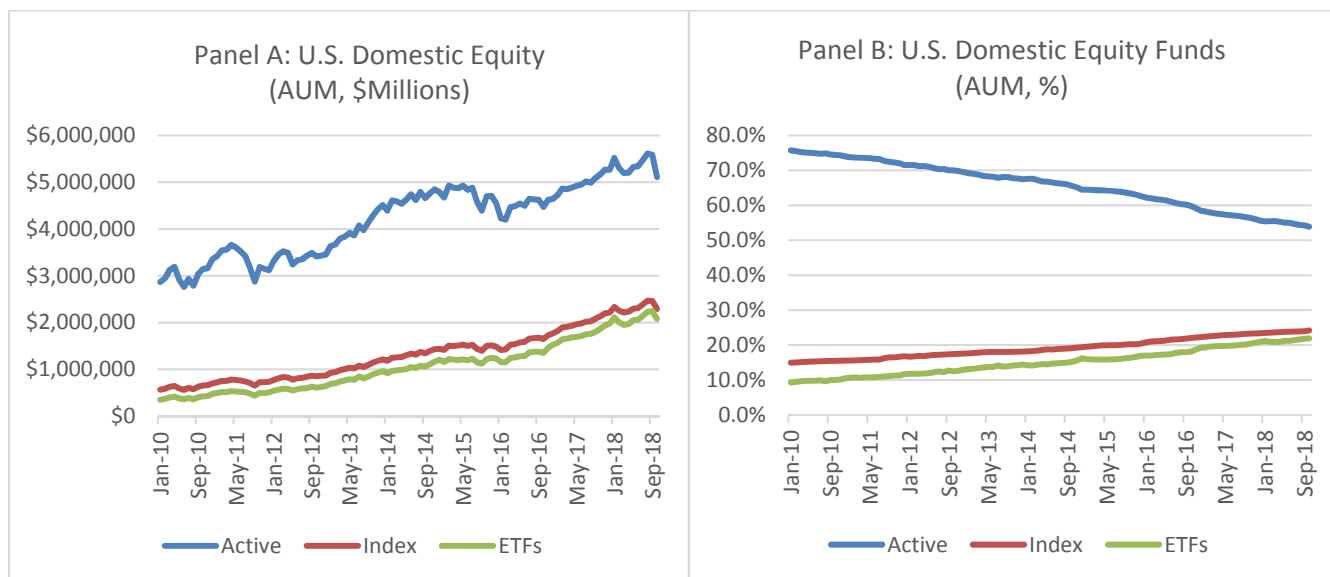
### **III.1. U.S.-Domiciled Domestic Equity Funds**

Figure 1 shows the changing balance of active versus passive management in the U.S. public equity sector—using open-end mutual fund data and ETFs as a proxy for the entire market. Note that the assets under management in all three segments (open-end passive, open-end active, and ETFs) have increased substantially in value since 2010, in tandem with the upward moving stock market (Panel A). However -- noting that the vast majority of ETFs followed passive indexes during most of the time period under consideration -- the allocation to open-ended index funds

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<sup>23</sup> This channel is clearly consistent with the GS-EMH but could also be consistent with the BMH if institutional trading on news or on other information, such as changes in trading volume or market liquidity, does not immediately correct security prices.

plus ETFs has almost doubled, from 24.3% at the end of January 2010 to 46.1% at the end of October 2018 (Panel B). The early years of the introduction of ETFs were comprised almost solely of broad-index ETFs; therefore, ETFs were almost perfect substitutes for open-end index mutual funds (albeit, with tax advantages and intra-day pricing). During later years, rules-based ETFs became a much more significant fraction of total ETF assets – rules-based ETFs can be considered as “quasi-active” strategies that are more of a substitute for actively managed open-ended mutual funds (albeit, without the security selection and other discretionary advantages of the latter).<sup>24</sup>



**Figure 1. Aggregate assets under management (AUM) for U.S.-domiciled domestic equity mutual funds and exchange-traded funds (ETFs).**

Panel A shows levels (\$); Panel B shows proportions (%).

(Data source: Investment Company Institute)

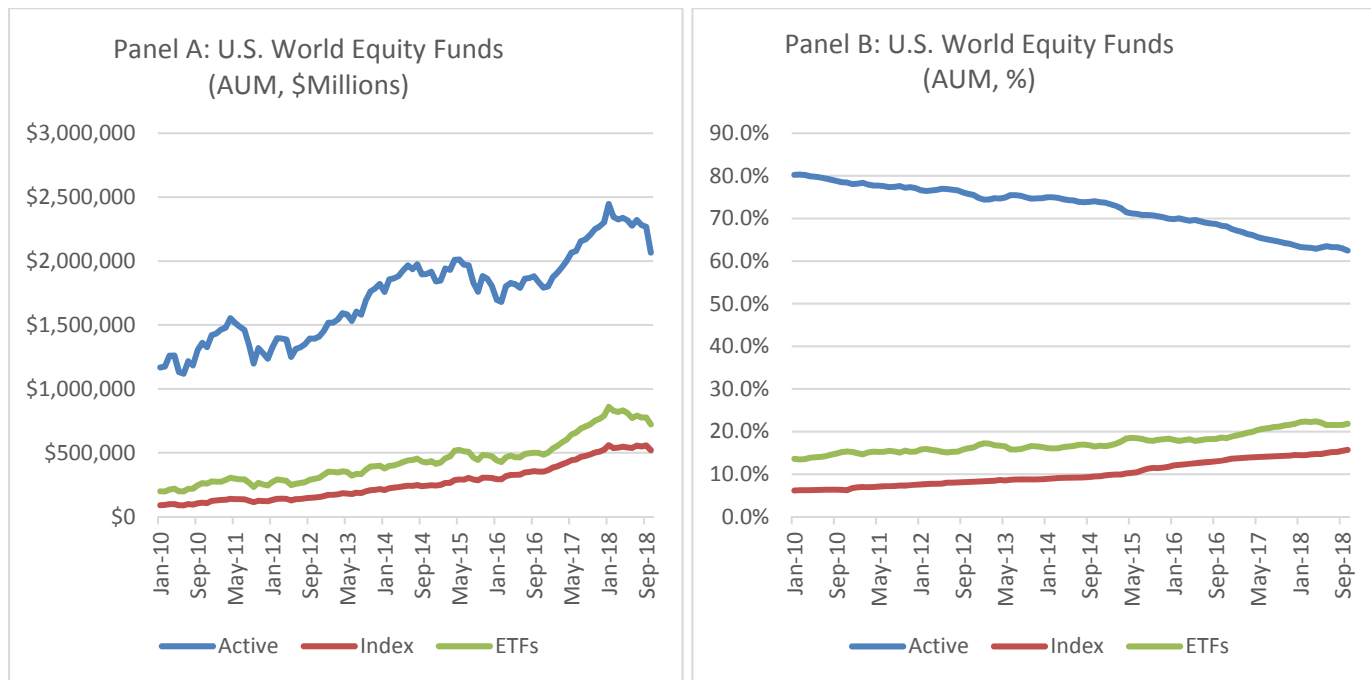
### III.2. U.S.-Domiciled World Equity Funds

Figure 2 shows the changing balance between actively- and passively-managed U.S.-domiciled mutual funds classified as investing in the world stock sector. Here, the allocation to open-ended index funds plus ETFs has increased from 19.8% at the end of January 2010 to 37.5% at the end of October 2018 (Panel B). The general trend is similar to that of U.S. stock funds but with a slower rate of substitution of passively-managed funds for actively-managed funds.<sup>25</sup> That is,

<sup>24</sup> The almost 100% correlation between the monthly assets under management of domestic equity index open-end mutual funds and domestic equity index ETFs over the time period shown in the figure reflects that ETFs have mainly served as a substitute for passive open-end funds during the time period shown, although some of this high correlation is attributable to the rising U.S. stock market.

<sup>25</sup> Potential reasons for the slower decline of actively-managed world equity funds include greater frictions for gaining access to world equity index funds, perhaps as the result of institutional constraints (for example, bank-

the shift from active to passive management has followed a fairly steady trend, with an acceleration toward passive at about the year 2016. Again, in the world equity sector, ETFs and index funds appear to be close substitutes, as both have gained a similar market share relative to actively-managed world equity funds.



**Figure 2. Aggregate assets under management (AUM) levels U.S.-domiciled world equity mutual funds**

Panel A shows levels (\$); Panel B shows proportions (%).

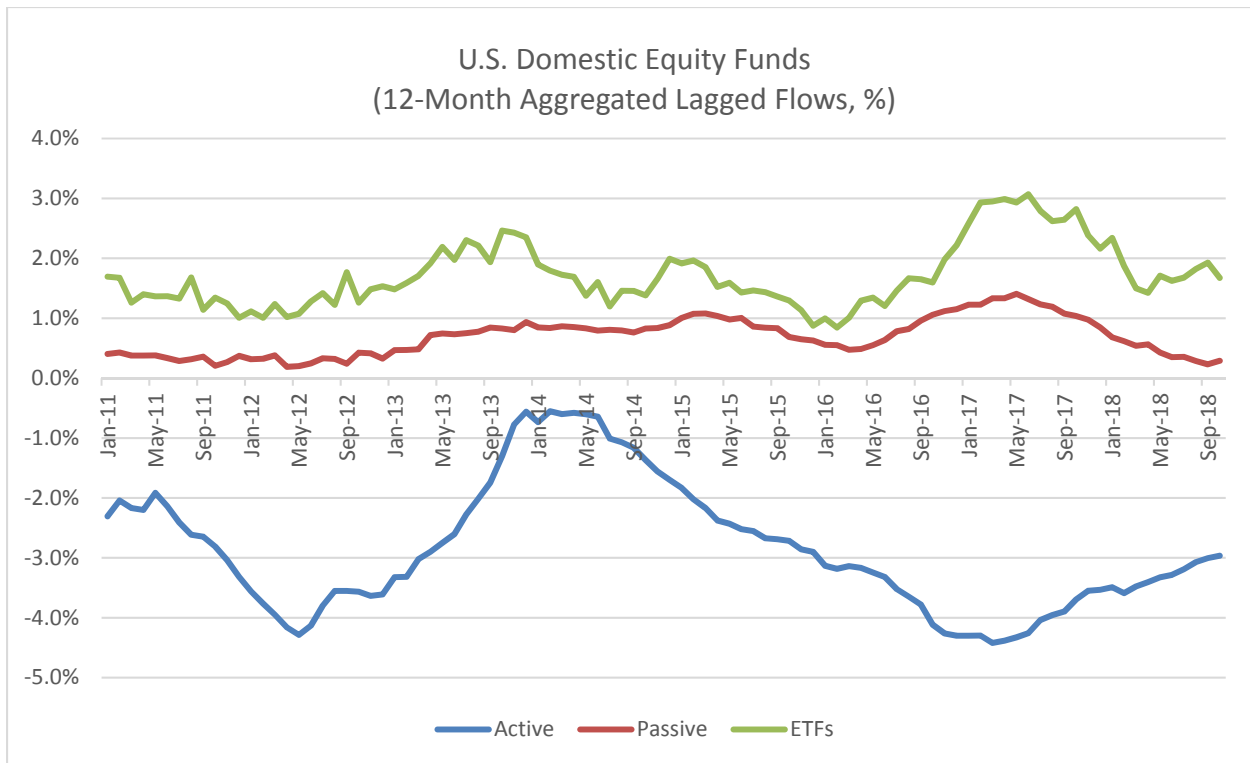
(Data source: Investment Company Institute)

### III.3. Investor Flows

The data in Figures 1 and 2 measures changes in total assets, which reflect the effects of both investment returns and investor contributions and withdrawals. Perhaps more revealing information regarding investor preferences is the investor flows data, which removes the effect of investment returns and focuses on investor purchases and sales.<sup>26</sup> Figure 3 shows monthly percentage changes in flow levels for the preceding year, as of each date.

offered mutual fund families may not include a full range of index funds) or a greater difficulty in managing index funds that track less-liquid country indexes. In addition, actively managed funds may offer higher value in more segmented (and potentially less efficient) world markets, relative to the U.S. market. See Banegas, Gillen, Timmermann, and Wermers (2013) for evidence of the value of active management in European markets among European-domiciled mutual funds.

<sup>26</sup> Investor flows are a reasonable, but not perfect, gauge of investor preferences. Some investors may only rebalance among their mutual funds periodically (perhaps yearly), and some investors are constrained in their choice of funds (for example, they may be limited to a small group of funds in their defined-contribution plans, or by an investment



**Figure 3. Aggregate Investor Percentage Money Flows Over the Prior 12 Months.**

Monthly percentage flows are computed as each sector’s monthly dollar flows, divided by the aggregate AUM (in dollars) across all three sectors (note that the sum of these time-series does not equal zero, since aggregate flows across all sectors are non-zero). Then, the sum of the 12-months’ of percentage flows, ending at the end of the indicated month, are presented (for U.S.-domiciled domestic equity mutual funds and domestic equity ETFs).

(Data source: Investment Company Institute)

Figure 3 indicates that recent losses in market share of actively-managed domestic equity funds have largely been offset by flows into ETFs. In addition, the monthly correlation between dollar (not percentage) flows into the Active and Passive open-ended mutual fund sectors is -8.4%, while the correlation between Active and ETF dollar flows is -27.3%, over the February 2010 to October 2018 period. These correlations suggest that the strongest challenge to active management is the rise of ETFs, at least during recent years.

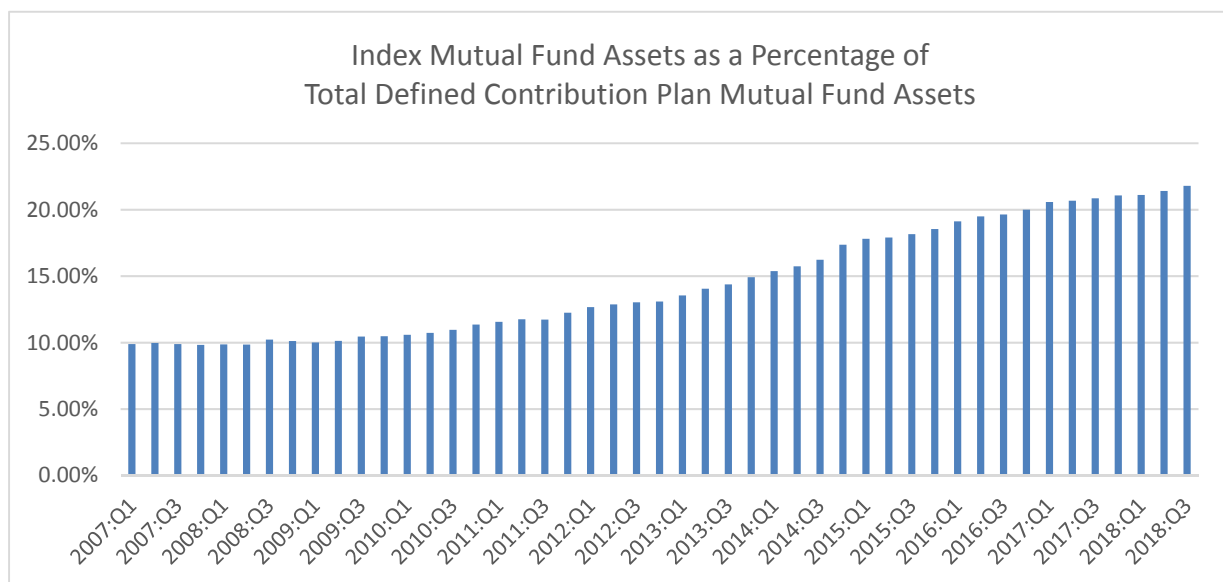
#### III.4. Trends in Defined Contribution Plans

One of the biggest contributors to the rapid growth of U.S.-domiciled mutual funds has been the rapid expansion of defined contribution (DC) plans in the U.S. since the 1980s. To what extent has the DC marketplace contributed to the shift over time from active to passive funds? The

mandate stipulated by their defined-benefit sponsor.)

analysis here is relatively simple, since DC plans are not (yet) allowed to offer ETFs to their participants (other than through special access portals, such as brokerage windows).

Figure 4 shows the share of index open-ended mutual funds, as a proportion of total mutual fund assets in employer-sponsored defined-contribution plans—a useful proxy for the preference of DC plan fiduciaries and their investors for overall defined contribution plan index vs. total assets.



**Figure 4. Percentage of defined contribution plan mutual fund assets invested in index mutual funds**

(Data source: Investment Company Institute)

The proportion of index funds assets within DC plans increased rapidly from 2012 through the third quarter of 2018. This brings up an important question: who is driving this shift, the plan fiduciaries, the plan participants, or both? Some evidence is provided by Sialm, Starks, and Zhang (2015), who find that the fiduciaries of defined contribution plans tend to adjust the investment options offered to their participants much more regularly than their participants, in aggregate, switch their choice of existing plan options. Against the backdrop of recent litigation focusing attention on defined contribution plan option fees, adjustments by fiduciaries are a substantial driver in the flow of money from actively-managed to passively-managed funds in the United States.<sup>27</sup>

<sup>27</sup> Interestingly, the relative shares of total index fund assets-under-management that are (1) held in IRAs, (2) held in employer-sponsored DC plans, and (3) held by other investors has remained somewhat steady at about 17%, 28%, and 55% over the 2007 to third quarter 2018 period—indicating that the shift from active to passive has been a broad, secular shift among all U.S. investors. Source of data: Investment Company Institute.

To summarize, indexed funds have gained popularity in all markets, but especially in the U.S. The availability of intraday traded ETFs has contributed to this popularity, as well as the tendency of DC plan fiduciaries to change plan menus to consist of more indexed options.

#### **IV. Future Potential Trends and Remaining Questions**

This final section discusses conjectures regarding active and passive management that have not been adequately covered in the literature, highlighting attractive areas for future research that provide further evidence on the active/passive equilibrium and its impact on market efficiency.

##### **IV.1 Scale Economies of Active vs. Passive Management**

A neglected aspect of the impact of index funds on markets is the potentially glaring difference in scale economies between active and passive management. In economics, economies-of-scale exist when the average long-run total cost per unit produced declines as units of production increase (diseconomies occur when such long-run average total costs increase per unit of production). How does this translate to the world of investment management, and, more importantly, how does it differentially affect active and passive management and, thus, their respective long-run potential impact on markets?

Index funds are scalable, with increases in assets requiring relatively small additions to fixed capital by the investment adviser and having only a limited impact on the adviser's marginal cost—at least in principle.<sup>28</sup> It is much less clear that actively-managed funds have significant economies of scale beyond a certain level of assets under management—mostly because investment talent tends to be in short supply and dispersed among different management teams. In addition, many investment firms appear to generate superior returns, at least in part, by having a particular firm culture in place. Scaling up such a culture may be a friction that prevents management companies from increasing assets in their actively-managed funds by hiring talent from competing firms. On the other hand, if the technology of active management continues to drop in price (i.e., the cost of data, analytical approaches, and computer hardware), there may be substantial economies of scale at even relatively high levels of assets under management. An additional consideration is that limits on percentage ownership of stocks by mutual funds penalizes active managers—who seek to significantly overweight attractive stocks—much more than their passive counterparts—who limit holdings to the index weighting. This consideration increases the diseconomies of active management, relative to index funds.

Setting these conjectures aside, if actively-managed funds do, indeed, have much lower economies of scale (that is, their costs of scaling up is higher), relative to index funds, what can

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<sup>28</sup> Trading operations and most administrative functions likely have strong economies of scale for an index fund that tracks a broad and liquid index. However, other costs, such as investor education or litigation costs may increase in proportion to asset under management. Recent competition has reduced broad index mutual funds to near-zero fees, indicating either that there are strong economies of scale or that broad index funds serve as a loss leader to attract assets to a fund family (or, perhaps both). If the latter, it suggests a strong complementarity in index funds and actively-managed funds -- as investors may demand both in their portfolios, and are compelled to invest in both through the same management company, when possible.



we expect in the industry landscape in the future? In such a scenario, a few management companies would be able to capture nearly all of the broad index fund business, with specialized index funds (such as “smart beta” quasi-active multi-factor funds) being introduced by new entrants as well as by established firms.<sup>29</sup> In such a world, will index fund providers (and management companies that offer both index and active products) be able to establish pricing power through their market concentration, bringing an end to near-zero fees for broad-based index funds?

Active funds, on the other hand, could continue to experience competitive pressure on their fees, unless investors are better educated by fund companies and financial advisors about the broader bundle of services that active managers provide (as described in Section II above). Under these assumptions, could the spread in fees between actively-managed and passively-managed funds shrink further, at least for those that benchmark against broad-based indexes? And, will the spread shrink because index fund fees increase from near-zero due to increasing market power or because actively-managed fund fees decline as information-gathering costs fall with the implementation of new technologies? These are issues that deserve further attention from economists and industry professionals.

## **IV.2. Public vs. Private Investment Opportunities**

Some sectors of securities markets have experienced a great contraction in the number of publicly traded securities, while others have greatly expanded. The number of U.S. equities has contracted from 9,113 stocks at the end of 1997 to 5,780 at year-end 2018, a decline that occurred as the U.S. population increased from 219 million to 324 million and the total market capitalization of U.S. stocks rose from \$10.8 trillion to \$29.9 trillion.<sup>30</sup> By contrast, the number of U.S. corporate bonds has expanded substantially over the same period.

In equity markets, the decreased number of public securities and the increased number of index funds (and multi-factor “smart beta” funds) may have affected the need for active managers. The increased number of passive products, in combination with the decreased number of securities with which to construct such products, may mathematically translate into a set of index products that better spans the needed combinations of idiosyncratic and factor risks of individual securities. These mathematics would argue that less active management is needed as time has evolved, as the larger number of index products may better enable more sophisticated investors to precisely tailor a (time-varying) portfolio that meets their life situation rather than employing an active manager.

Yet, less-sophisticated investors may increasingly demand active management to exploit these numerous innovations in investment opportunities. As an example, how could an individual investor be expected to decide how to optimally allocate money to multiple factor products that

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<sup>29</sup> See Bogle (2018) for a discussion about the potential threats of excessive index ownership to effective corporate governance, which might lead to limits on the growth of index funds.

<sup>30</sup> Doidge, Kahle, Karolyi, and Stulz (2018) and Center for Research in Security Prices (CRSP) Stock Index Database. Perhaps a better-framed question is whether the assets under management of active managers, relative to the total market capitalization of publicly traded equities, is a harbinger of the future of active management. See, for example, Pastor, Stambaugh, and Taylor (2015).

exploit value, momentum, low-volatility, accruals, asset growth, profitability, investment intensity, etc.? These innovations in exploiting the drivers of investment returns are truly remarkable, but—analogueous to new devices that are created in the field of electronic circuits—it takes a wise and experienced person or team to determine how to best combine the innovations to build a high-quality finished product. Among the complexities are how to measure and react to the correlations between factors, which can vary significantly over time. Without a professional manager, investors would very likely be exposed to excessive risks through suboptimal combinations of factor exposures.

At the same time, active managers have begun to invest more heavily in private investment opportunities, such as commercial-use buildings or residential real estate, oil field leases, or private investment in public equities (PIPEs). These non-securitized investments are generally intractable for index fund investment, due to the lack of liquid market prices.<sup>31</sup> And, professional active management is especially useful in determining the value of such investments, which often have limited or no public information on their fundamentals. Mutual fund forms of private investments have become increasingly offered to investors, as evidence that active management may be moving further in this direction.

### **IV.3 Other Potential Future Trends**

Other potential trends that would be good topics for further thought and study by economists and other industry professionals:

- A. Investors may return to active managers if they offer meaningful performance-based fees. While some level of fixed fee seems appropriate in competitive markets, to compensate for the non-performance-related bundle of services offered by active managers (such as market downturn protection and liquidity management), sharing some of the risk of performance relative to benchmark between the management company and the investor may make active management more attractive. On the negative side, funds with performance-based fees may take on more risk after a period of poor performance.<sup>32</sup> Currently, perhaps as few as 10% of U.S.-domiciled mutual funds carry a performance-based fee.
- B. Larger actively-managed fund families may continue to gain share at the expense of smaller fund families as economies of scale in research and economies-of-scope in trading become larger as technology improves. Merger and acquisition activity could be high as a result. If the active sector continues to consolidate, further fee decreases made possible by economies of scale gains may follow.

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<sup>31</sup> Pricing such assets with a model rather than a market price especially makes an index fund exploitable by sophisticated traders. By contrast, active managers can use more liquid assets to selectively meet redemptions.

<sup>32</sup> This risk-taking behavior appears to be related to the structure of performance-related fees that are used by such funds. See Elton, Gruber, and Blake (2003) for further details.

- C. New entrants may increasingly be small fund management companies that provide new investment ideas that can be traded efficiently. Mid-size management companies may, thus, be caught in the middle, and their numbers may continue to decrease.
- D. Index funds may move to further lower costs through more extensive use of derivatives or synthetics, rather than trading in cash securities.
- E. One key to the speed and direction of changes in active and passive market shares will be the choices offered by DC plans by their fiduciaries. While litigation and the performance of actively-managed funds over the past decade of highly correlated securities and sectors has pushed DC plans to increase their offerings of passively-managed funds, plan participants may exert pressure in the opposite direction (through their investment choices in plans with both active and passive offerings) in order to have options to tailor their own portfolios to their beliefs and life circumstances.

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