

# **Challenging the Conventional Wisdom on Active Management: A Review of the Past 20 Years of Academic Literature on Actively Managed Mutual Funds**

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September 11, 2018<sup>1</sup>

## **Executive Summary**

Just over 20 years have passed since the publication of Carhart’s landmark study on mutual funds (Carhart, 1997). Its conclusion—that the data did “not support the existence of skilled or informed mutual fund portfolio managers”—helped form the ‘conventional wisdom’ that active management does not create value for investors. In this paper, we review the academic literature on active mutual fund management since the publication of Carhart (1997) to assess the extent to which current research still supports the conventional wisdom.

We begin by noting important changes in the mutual fund industry over the past two decades. In the United States, assets have shifted away from actively managed funds and towards passively managed index funds and ETFs; specifically, less than 8% of the assets in equity funds were

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<sup>1</sup> This research was supported by the Investment Adviser Association’s Active Manager Council.

passively managed in 1997, but over 40% were passively managed in 2017. Over the same period, the average fee paid by investors in active funds decreased by about 20%. Actively managed mutual funds today face a significantly more competitive environment than they did 20 years ago. These changes in the industry alone suggest that a reevaluation of the conventional wisdom is needed.

Next, we revisit the findings that support the conventional wisdom, particularly research showing that:

- (1) The average fund underperforms after fees.
- (2) The performance of the best funds does not persist.
- (3) Some fund managers are skilled, but few have skill in excess of costs.

Each of these components of the conventional wisdom has support in the academic literature. Sharpe (1991) claims that, mathematically, the average active investor is guaranteed to underperform after fees, and several papers show empirically that the average actively managed mutual fund underperforms. Carhart (1997), among others, shows that active funds that have outperformed in the past cannot be expected to outperform in the future. Fama and French (2010) find that many managers beat the market before costs, but that few do so after costs. These well-known studies provide support for the general conclusion that active management in mutual funds does not create value for investors.

However, our review of the current academic literature on mutual funds also finds a substantial body of research that disagrees with the conventional wisdom. Regarding average performance, Berk and van Binsbergen (2015) find the average active fund outperforms an equivalent index fund by 36 basis points per year, while Cremers, Petajisto, and Zitzewitz (2012) and Linnainmaa (2013) show that standard approaches to estimating average fund performance can be biased against finding that active management adds value. Considering performance persistence, Bollen and Busse (2005) and Kosowski, Timmermann, Wermers, and White (2006) both find some evidence of persistence among top-performing funds.

Several studies identify groups of funds that appear to have skill in excess of costs. For example, Cremers and Petajisto (2009) show that funds with ‘high active share,’ meaning funds with holdings that greatly differ from their benchmark, tend to outperform their benchmark. They also show that the performance of funds with low active share drives the results of previous studies indicating that the average actively managed fund underperforms. Similarly, Amihud and Goyenko (2013) show that funds with past performance that is not readily explained by common factors, such as the performance of large-cap stocks versus small-cap stocks, perform well in the future.

The research has also considered how the actions of active managers create value in different ways. Wermers (2000), among others, shows that many funds select stocks that outperform the market, while Kaplan and Sensoy (2005) and Jiang, Yao, and Yu (2007) show that some funds can correctly time the market. Other research finds that active managers create value through corporate oversight (Iliev and Lowry, 2015) and tax management (Sialm and Starks, 2012). The returns on these activities vary; Pastor, Stambaugh, and Taylor (2017) and von Reibnitz (2018) show that the amount of value creation depends on market conditions.

Like the academic literature itself, our review focuses primarily on U.S. equity mutual funds, but we also consider active management in other asset classes. After equity funds, bond funds have received the most attention. They have been shown to outperform before costs, though not after costs. However, the lack of a generally-accepted model for measuring bond fund performance makes it difficult to draw strong conclusions about their value creation. We also briefly review the literature on hybrid, socially responsible, target date, real estate investment trust (REIT), sector, and international funds. Arguments both for and against the conventional wisdom can be found in that research, but drawing robust conclusions is difficult given the limited research in these areas.

Our review concludes by considering current research challenges. One challenge arises from the recent rapid evolution of asset pricing models, which may have important implications for mutual fund performance evaluation. A second challenge is the result of data limitations that prevent researchers from developing a complete picture of any fund's investment process. For example, fund trading behavior can typically only be inferred by studying changes in quarterly holdings reports. Finally, because of the many regulatory constraints faced by mutual funds, we consider the degree to which mutual fund findings can be extrapolated to all active management.

Taken as a whole, our review of current academic literature suggests that the conventional wisdom is too negative on the value of active management. The literature that followed Carhart (1997) has documented that active managers have a variety of skills and tend to make value-added decisions, such that, after accounting for all costs, many actively managed funds appear to generate positive value for investors. While the debate between active and passive is not settled and many research challenges remain, we conclude that the current academic literature finds active management more promising for investors than the conventional wisdom claims.

## **Challenging the Conventional Wisdom on Active Management:**

### **A Review of the Past 20 Years of Academic Literature on Actively Managed Mutual Funds**

#### **Introduction**

Active management was once the default choice for investors looking for external money managers. It was effectively the only choice open to them until the first index mutual funds were made available in the late 1970s.<sup>2</sup>

Since then, the value of active management has become a heavily studied question, especially given the rise of passive management and the growing popularity of index funds and ETFs. Using empirically-validated models of risk, researchers could quickly and robustly evaluate the performance of many different investment products. Because of their structure, their popularity, and readily available data about them, mutual funds became a focal point of this area of research.

Beginning with Jensen (1968), the academic literature has been centered on U.S. equity mutual funds, which remain the largest segment of actively managed funds in terms of both numbers and assets. The early consensus of the literature was that these funds, on average, do not ‘beat the market’ net of fees and that few—if any—individual funds consistently outperform. This consensus, which we refer to as the ‘conventional wisdom’ on active management, was driven by research that found that the value created by most managers is offset—or more than offset—by their fees. The conventional wisdom is perhaps best summarized by the conclusion of the seminal study of Carhart (1997), namely that “the results do not support the existence of skilled or informed mutual fund portfolio managers.”

This literature review provides an overview of the considerable body of academic research on the value of active management that has been published since Carhart’s study. After exploring the broad changes in the industry over the past 20 years, we first discuss studies that support the conventional wisdom. We then consider the more recent literature, which in many ways challenge that conventional wisdom. We focus primarily on U.S. equity funds, but also consider active management in other asset classes, such as bond and hybrid funds. Finally, we discuss limitations and challenges in the current literature, important open questions, and the degree to which active management in equity mutual funds can be extrapolated to all active managers.

Overall, our review of the literature suggests that the conventional wisdom judges active management too negatively. We conclude that the academic literature over the past 20 years shows that active managers have a variety of skills and, in many cases, tend to make value-added decisions. In other words, many funds do appear to create value for investors even after accounting for fees. While many challenges remain, we believe the conventional wisdom fails to account for the more positive findings of recent research on active manager skill.

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<sup>2</sup>See, *The First Index Mutual Fund: A History of Vanguard Index Trust and the Vanguard Index Strategy*  
[https://www.vanguard.com/bogle\\_site/lib/sp19970401.html](https://www.vanguard.com/bogle_site/lib/sp19970401.html)

## 1. Modern Trends in the Mutual Fund Industry<sup>3</sup>

The mutual fund industry has undergone significant shifts in the past two decades. This section highlights the overall growth of the industry, the increased market share of passively managed investments, and the decreasing costs of investing.

The composition of the U.S. mutual fund industry changed dramatically between 1998 and 2017. Net assets of all registered investment companies have nearly quadrupled (from \$5.8 trillion to \$22.5 trillion), but the assets managed by traditional open-end mutual funds have only tripled to \$18.8 trillion. The difference in growth rates is due, in large part, to the rise of exchange-traded funds (ETFs), which added \$3.4 trillion in new assets over the period.

The growth in ETFs parallels the growth in the market share of traditional index funds. In 1997, 7.5% of domestic equity mutual fund assets were held in traditional index funds, compared to 29.6% in 2017. Most net cash flow has gone into passive strategies. Between 1997 and 2017, domestic equity index funds had a net cash inflow of \$639 billion, while active funds had a net outflow of \$975 billion over the same period. These trends have been less pronounced in bond and hybrid mutual funds, where index funds represented only 11.2% of \$5.6 trillion in 2017.

During this same time, the cost of active management has declined. In terms of direct expenses to investors, the average mutual fund expense ratio has fallen significantly. The asset-weighted average expense ratio for actively managed equity funds fell from 1.06% in 2000 to 0.78% in 2017, while the average expense ratio for bond funds also decreased from 0.78% to 0.55%. This decline is partly due to a reallocation by fund investors to lower cost funds and share classes, such that assets are increasingly concentrated in funds and share classes with lower expense ratios, but it is also the result of a general decrease in the average expense ratio of active mutual funds.

The indirect cost to investors of trading within actively managed funds has also fallen. Active managers trade less than they did in the past (as shown by Cremers and Pareek, 2016), and they incur lower transaction costs per trade. Specifically, as of 2016, the average turnover experienced by investors was only 34% for active equity funds. Further, Hasbrouck (2009) and Bessembinder, Maxwell, and Venkataraman (2006) show that the transactional cost of trades has declined in both equity and bond markets.

As a result, the active managers of today operate in a far different environment than the managers considered in older academic literature. Today's active manager faces rising competition from both active and passive products and brings in less revenue per dollar managed. Given these trends, it is important to consider the degree to which the conventional wisdom on active management articulated in Carhart (1997) still applies. The next section considers the research that is most often used in support of the conventional wisdom, while the subsequent sections examine more recent research on the value added by active management.

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<sup>3</sup>All data in this section has been sourced from the 2017 and 2018 ICI handbooks except where noted.

## 2. The Conventional Wisdom on Actively Managed U.S. Equity Mutual Funds

The conventional wisdom on actively managed equity mutual funds states that, on average, there is little value to active management for investors. That wisdom is based on the findings that:

- (1) The average fund underperforms after fees.
- (2) The performance of the best funds does not persist.
- (3) Some fund managers are skilled, but few have skill in excess of costs.

This section addresses each of these broad claims by summarizing the best-known studies that support them.

The first component of the conventional wisdom—that the average fund underperforms after fees—argues that the average actively managed fund underperforms a passively managed fund which follows the same investment style or mandate. In theory, the underperformance of the average active investor is guaranteed, because active management is a zero-sum game before costs, meaning that any gain on a trade for one manager generates an offsetting loss for another manager. Therefore, active management becomes a negative-sum game after costs are considered. Sharpe (1991, 2013) calls this the “arithmetic of active management,” while Bogle (2005) refers to this as “the relentless rules of humble arithmetic.” Based on this argument, French (2008) concludes that “in aggregate, the search of trading gains is doomed,” and Buffett (2006) states that “a record portion of earnings that would go in their entirety to owners... is now going to a swelling army of helpers.”

Several papers support the claim that the average actively managed U.S. equity fund underperforms after fees. Jensen (1968), Ippolito (1989), and Gruber (1996) study the average performance of mutual funds from 1945 through 1994 using non-overlapping periods and find that the average fund generates a negative alpha after fees. Similarly, Davis (2001) finds that no equity style from 1965 through 1998 earns a positive alpha after deducting fees. Wermers (2000) indicates that actively managed mutual funds may not be engaged in a zero-sum game before costs, because the stocks held by the average actively managed fund outperform by 1.3% per year; however, after trading, distribution, operational, and other costs, he finds that the average fund underperforms by about 1% per year.

The second component—that the performance of the best funds does not persist—addresses the issue of luck versus skill. Consider a manager who has outperformed the market in the past. If that manager is skilled, outperformance should be expected to persist into the future. However, if that manager was merely ‘lucky’ in the past, that outperformance should not be expected to continue. If all outperformance is simply luck, not skill, then it does not make sense to invest in even the best-performing actively managed funds.

While some early papers find persistence in performance, Carhart (1997) shows that apparent ‘hot hand’ effects can be explained by common factors in stock returns, particularly the Jegadeesh and Titman (1993) momentum factor (i.e., the returns on stocks that have performed relatively well in

the past compared to the returns on stocks that performed poorly).<sup>4</sup> Carhart only finds persistence among the worst-performing funds and concludes that his “results do not support the existence of skilled or informed mutual fund portfolio managers.” Carhart’s conclusions are also notable because he was one of the first to use a survivorship bias-free database, meaning one that includes funds regardless of whether the funds are still in operation. Elton, Gruber, and Blake (1996a) show that studies that only look at surviving funds will inaccurately find evidence of performance persistence because surviving funds are more likely to have outperformed.

Other research published at around the same time supports Carhart’s conclusion. Malkiel (1995) shows the importance of accounting for survivorship bias and finds no evidence of performance persistence after the 1970s. Phelps and Detzel (1997) find that any evidence of persistence disappears when either risk is better measured or when more recent time periods are examined.

The third component of the conventional wisdom—that some fund managers are skilled, but few have skill in excess of costs—does not imply that active managers have no skill. Rather, it claims that the cost to investors to gain access to that skill offsets, or more than offsets, its value. Fama and French (2010) find that many managers can beat the market before costs, but that “few funds produce benchmark-adjusted expected returns sufficient to cover their costs.” Barras, Scaillet, and Wermers (2010) argue that only 0.6% of funds have skill in excess of fees and that 75.4% of funds have some skill but that they “extract all of the rents generated by these abilities through fees.” Furthermore, they “observe that the proportion of skilled funds decreases from 14.4% in early 1990 to 0.6% in late 2006.”

The downward trend in persistence is an important element of the conventional wisdom, since the often-cited explanations for the decline suggest that it is unlikely to reverse. Bernstein (1998) attributes the downward trend to the “ever-increasing efficiency in the equity markets,” because as market efficiency increases, active managers will find fewer profitable investment opportunities that will allow them to offset their fees. Chordia, Roll, and Subrahmanyam (2008, 2011) and Conrad, Wahal, and Xiang (2015) show evidence of increasing efficiency in equity markets in recent years. Grossman and Stiglitz (1980) theorize that markets may never become fully efficient because those engaged in gathering information will only continue to do so if they are compensated for their costs. However, the number of profitable opportunities may become ever smaller as gathering information becomes easier and cheaper.

Another explanation for the decline in the number of investment opportunities is increasing competition among active managers. Pastor, Stambaugh, Taylor (2015) find that managers are becoming more skilled over time, but that greater competition among active managers prevents their increased skill from leading to improved fund performance. Dyck, Lins, and Pomorski (2013) support that result by showing that active management generates greater value in less-competitive asset markets outside of the United States, particularly the emerging markets. Along a similar line, Hoberg, Kumar, and Prabhala (2018) show that active funds investing in the United States tend to

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<sup>4</sup>See Grinblatt and Titman (1992); Elton, Gruber, Das, and Hlavka (1993); Hendricks, Patel, and Zeckhauser (1993); Goetzmann and Ibbotson (1994); Brown and Goetzmann (1995); Elton, Gruber, and Blake (1996b); and Wermers (1997) for early evidence of persistence.

perform better when they face less competition from other active funds investing in the United States.

### **3. Recent Research on Actively Managed U.S. Equity Mutual Funds**

While the conventional wisdom has some support in the recent academic literature, a large portion of that same literature challenges it. Research finds that many active managers have significant observable skills, that those skills create real value for investors, and that those skills persist over time. This section summarizes recent studies related to U.S. equity mutual funds, while the subsequent section considers other mutual fund asset classes.

#### **3.1. Measuring skill**

Almost all academic papers measure the skill of an active manager as the net alpha of the fund, which is the return of the fund after fees compared to a benchmark. In most cases, this benchmark is either a single passive index (such as the S&P 500), a multi-factor model (as in Carhart, 1997), or a portfolio constructed based on the individual holdings of the fund (as in Daniel, Grinblatt, Titman, and Wermers, 1997). Both the choice of benchmark model and the quality of data available for analysis using that model have a large impact on conclusions about the net alphas of funds, and in turn, on conclusions about the skill of active managers.

Several studies consider the impact of the benchmark model chosen. Kothari and Warner (2001) and Glode (2011) highlight the limitations of current models in evaluating the value of active management and show that common performance measures can often underestimate the value of active management. Notably, Glode (2011) argues that, if the model does not properly account for the economic state (recession or expansion), then skilled managers “will (wrongly) appear to underperform passive investment strategies net of fees.” Moreover, Huij and Verbeek (2009) and Cremers, Petajisto, and Zitzewitz (2012) both argue that the multi-factor models that are ubiquitous in academic research have systematic biases and, as a result, are poor benchmarks for evaluating mutual fund performance.<sup>5</sup>

With respect to data, Linnainmaa (2013) shows that, while data with survivorship bias can overstate active manager skill, data without survivorship bias can understate active manager skill because of ‘reverse survivorship bias.’ Reverse survivorship bias occurs because poorly performing funds often close; however, their poor performance is frequently due to bad luck, rather than low skill. Because the unlucky funds would likely have performed better in their future, the skill of their managers is understated by the available data. Therefore, using the average alpha across all funds as a measure of average skill understates the true average skill. Linnainmaa finds that the true alpha of the average fund is 43 basis points per year higher than the average alpha calculated without accounting for reverse survivorship bias.

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<sup>5</sup>In Section 5.1, we discuss in detail the merits of each of the common benchmarking approaches.

### **3.2. Can insiders with private information identify skilled managers?**

The behavior of industry participants, who may have significant private information about managers, indicates that some fund managers are skilled. Berk, van Binsbergen, and Liu (2017) show that investment management firms seem to have private information about their managers, because they are able to efficiently reallocate capital between them. This reallocation “amounts to over 30% of the total value added of the industry.” Fang, Kempt, and Trapp (2014) find that fund families efficiently allocate managers by moving “their most skilled managers to market segments in which manager skill is rewarded best,” while Porter and Trifts (2014) find that underperforming managers are more likely to lose their job. Gallo and Lockwood (1999) show that after a management change the risk-adjusted performance of a fund improves by an average of 2% per year, and Khorana (2001) shows “significant improvements in post-replacement performance relative to the past performance of the fund.”

Fund families make significant efforts to keep skilled managers within the family. Deuskar, Pollet, Wang, and Zhang (2011) find that funds retain top managers “in the face of competition from a growing hedge fund industry.” One method of retention is to provide managers with a hedge fund to manage side-by-side with their mutual fund. Nohel, Wang, and Zheng (2010) find that these side-by-side managers outperform their peers which is “consistent with this privilege being granted primarily to star performers.” However, overall evidence on side-by-side management is mixed. Chen and Chen (2009) find that mutual fund managers with a side-by-side hedge fund tend to outperform, but Cici, Gibson, and Moussawi (2010) and Del Guercio, Genc, and Tran (2018) find those same mutual funds tend to underperform.

This information about manager skill does not appear to be held by other professionals within the industry but outside of the fund family. Goyal and Wahal (2008) find that plan sponsors do not experience improved performance after firing one manager and hiring another; Kostovetsky and Warner (2015) find no performance improvement after external subadvisor managers are replaced; and Phillips, Pukthuanthong, Rau (2014) find that fund managers are not able to accurately identify which of their rivals are the best managers.

### **3.3. Can investors identify skilled managers using public information?**

While the prior section considers the ability of insiders to evaluate managers, substantial research has considered whether investors can identify skilled funds in advance using public information. Kosowski, Timmermann, Wermers, and White (2006) “find that a sizable minority of managers pick stocks well enough to more than cover their costs,” and several measures have been identified that appear to help investors identify those funds in advance. These measures are typically derived from past fund returns, past fund holdings, or a combination of the two.

In contrast to research discussed previously, some studies find that fund performance is somewhat predictable using past performance alone. For example, Bollen and Busse (2005) demonstrate persistence using daily returns, although it is “observable only when funds are evaluated several times a year.”

However, most studies use other information derived from past returns, either in isolation or in conjunction with estimates of past performance, to predict future performance. Amihud and

Goyenko (2013) examine the percentage of a fund's returns that can be explained by common factors, such as the performance of large-cap versus small-cap stocks. They find that, on average, funds with both a low percentage of their past returns attributable to common factors and strong past performance outperform by 3.8% per year in the future. Massa and Yadav (2015) use past returns to measure a fund's sentiment beta, which is its level of exposure to high sentiment stocks, and show that funds with low sentiment betas subsequently outperform funds with high sentiment betas.

Other studies have applied complex statistical techniques to returns. Barras, Scaillet, and Wermers (2010) use a 'false discoveries' technique adapted from medical research to separate funds with skill from those that have generated strong performance through luck, while Busse and Irvine (2006) and Huij and Verbeek (2007) apply Bayesian probability approaches to successfully predict future performance.

Fund holdings can also predict future performance. Cremers and Petajisto (2009) show that funds with high active share (meaning funds with portfolios that differ greatly from their benchmarks) tend to have a positive alpha, while funds with low active share tend to strongly underperform. Cremers and Pareek (2016) show that this outperformance is stronger among funds with high active share that can be identified as 'patient', while Cremers, Fulkerson, and Riley (2018) show greater outperformance among funds with high active share that provide a benchmark in the fund prospectus that accurately reflects fund riskiness.<sup>6</sup> Doshi, Elkamhi, and Sumutin (2015) compare a fund's actual portfolio to a value-weighted portfolio of a fund's investments and find that fund performance increases as the difference between the two increases. Sherrill, Shirley, and Stark (2017) show that large ETF holdings signal poor future performance.

The concentration of a fund's portfolio also has predictive power. Kacperczyk, Sialm, and Zheng (2005) find that funds whose portfolios are more concentrated within certain industry groups tend to have better performance, and Goldman, Sun, and Zhou (2016) find better performance among funds that concentrate their portfolio on "the top one or two stocks within each industry sector." More generally, portfolios that are relatively concentrated have been found to predict better performance (Huij and Derwall, 2011; Hiraki, Liu, and Wang, 2015; and Choi, Fedenia, Skiba, and Sokolyk, 2017), although that finding is not universal (Sapp and Yan, 2008).

Other studies look at both past returns and holdings. For example, Kacperczyk, Sialm, and Zheng (2008) show that the returns generated by the fund's trading activity over a past period—as measured by the difference between a fund's actual returns over the period and the hypothetical returns generated by keeping the fund's portfolio holdings constant—predicts performance. Groenborg, Lunde, Timmermann, and Wermers (2018) likewise use holdings and returns in combination to predict subsequent performance.

Looking beyond holdings and returns, a manager's personal history has been found to predict performance. Chuprinin and Sosyura (2018) find that managers born into poorer families tend to outperform managers born into richer families. In early work, Shukla and Singh (1994), Golec

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<sup>6</sup>There is a debate about whether high active share predicts outperformance (see Schlanger, Philips, and Peterson LaBarge, 2012; Cohen, Leite, Nielson, and Browder, 2014; Frazzini, Friedman, and Pomorski, 2016; Petajisto, 2016; and Cremers, 2017 for point and counterpoint). Brown and Davies (2017) suggest that funds may have an incentive to manipulate active share if investors attempt to use it to make investment decisions.

(1996), and Chevalier and Ellison (1999) find many aspects of fund manager education to be predictive. However, Gottesman and Morey (2006) show that, among educational measures, only the quality of the manager's MBA program is related to future performance.

Ownership stakes have also been found to be predictive of fund performance. Khorana, Servaes, and Wedge (2007) show that fund performance improves "by about 3 basis points for each basis point of managerial ownership." Likewise, Evans (2008) finds a positive relation between manager ownership and performance, and Cremers, Driessen, Maenhout, and Weinbaum (2009) show that funds with low ownership by fund directors tend to underperform.

### **3.4. Distinguishing the various skills of active managers**

While the literature often refers to 'skill' as the generic ability to generate alpha, it also examines the variety of different skills managers actually use to create value for investors.

The skill that has received the most attention is the ability to select stocks. Daniel, Grinblatt, Titman, and Wermers (1997) and Wermers (2000) isolate the performance resulting from stock selection and find that, on average, funds select stocks that outperform the market; however, Fulkerson (2013) shows the outperformance resulting from this skill has declined somewhat through time. Chen, Jegadeesh, and Wermers (2000) find that the stocks purchased by funds tend to have significantly higher returns than the stocks sold by those funds.

Subsequent research explores various nuances with regard to stock-picking. Duan, Hu, and Mclean (2009) find that managers demonstrate greater stock selection ability among stocks with high idiosyncratic volatility, and Fulkerson (2013) finds that the majority of stock selection skill tends to come from selecting stocks within industries. Cohen, Polk, and Silli (2010) find that stock-picking skills are particularly pronounced in the largest positions in a fund's portfolio.

Other studies aim to identify the specific sources of stock selection ability. For example, Baker, Litov, Wachter, and Wurgler (2010) and Cai and Lau (2015) show that managers can predict earnings; Nain and Yao (2013) show evidence that managers can predict post-merger performance; and Koch (2017) shows that some managers add value by transacting before other mutual funds. Further, Chen, Gao, Zhang, and Zhu (2018) show the stock selection skill is amplified by prior work experience as an industry analyst, while Cohen, Frazzini, and Malloy (2008) show evidence that managers leverage their education networks to identify profitable opportunities.

Geographical location appears to play an important role in managers' stock selection. Coval and Moskowitz (1999) show that managers have a preference for investing in local firms for which they may have an information advantage. In times of high aggregate market volatility, Giannetti and Laeven (2016) find that managers are also more likely to liquidate their positions in geographically-remote locations. Social interactions with local managers may play a role as well. Hong, Kubik, and Stein (2005) find that managers are more likely to buy a stock if other managers in the same city are also buying that stock. This behavior appears rational given that Pool, Stoffman, and Yonker (2015) show that "a long-short strategy composed of stocks purchased minus sold by neighboring managers delivers positive risk-adjusted returns."

Studies may underestimate stock selection skill if they do not account for the ‘type’ of trade or the reason for a trade. Alexander, Cici, and Gibson (2007) show that purchases motivated by valuation considerations outperform the market by a significant margin, but that purchases motivated by the need to invest excess cash from fund inflows do not. Similarly, Rohleder, Schulte, Syryca, and Wilkens (2018) show that valuation-motivated buys significantly outperform and that valuation-motivated sells significantly underperform. Da, Gao, and Jagannathan (2011) find that “impatient informed trading positions” generate most of the alpha in the portfolios of funds with positive expected alpha.

While stock selection skill is typically examined on a fund-by-fund basis, the aggregate skill of the fund industry has also been studied. Wermers, Yao, and Zhao (2012) develop a method to efficiently aggregate holdings across funds and show that when the combined position in a stock increases, the stock subsequently outperforms. Gupta-Mukherjee (2013) shows that “a portfolio based on representative beliefs of a group of managers investing in similar assets outperforms passive benchmarks, indicating that they reflect informed beliefs.” Jiang, Verbeek, and Wang (2014) find that the stocks overweighted by active managers as a whole tend to outperform the stocks underweighted by 7% per year after adjusting for risk. As a group, fund managers appear to accurately anticipate future individual stock returns.

Despite these substantial research efforts, precisely estimating a manager’s stock selection skill is difficult. On the one hand, Puckett and Yan (2011) find that many estimates of stock selection skill are downward biased, because the quarterly fund holdings data used in most studies does not account for interim trading. On the other hand, Nicolosi (2009) argues that such estimates are upward biased because of the assumptions about trading made when using that same quarterly data, while Chakrabarty, Moulton, and Trzcinka (2017) find that the short-term trades that are often missed when using quarterly data tend to perform poorly.

Another skill that a manager can use to add value is market timing, which academics usually define as the ability to correctly predict the future direction of the overall market or of sub-markets. Jiang, Yao, and Yu (2007) find that active funds tend to have positive timing ability, and Kaplan and Sensoy (2005) find that active funds tend to increase their benchmark exposure prior to positive benchmark returns. Along similar lines, Busse (1999) shows that funds can time changes in market volatility.

Unfortunately, because of data limitations, testing for market timing ability is particularly difficult. The use of quarterly holdings is common, but Elton, Gruber, and Blake (2012) find more evidence of timing ability using monthly holdings, which are not widely available to researchers. The use of monthly fund returns is also common, but Bollen and Busse (2001) find that “mutual funds exhibit significant timing ability more often in daily tests than in monthly tests.”

Apart from selection and timing, the literature has found that active managers have other ways to add value. Some managers handle information effectively. Kacperczyk and Seru (2007) show that skilled managers tend to be less reliant on new public information, such as the information released in earnings announcements, when making investment decisions. Similarly, Cullen, Gasbarro, and Monroe (2010) find that funds that trade counter to public information tend to exhibit superior average performance, because they have relevant private information. The type of publicly-released information also seems to matter. Chuprinin, Gaspar, and Massa (2018) show that funds

that trade in response to changes in quantitative information, rather than qualitative information, tend to perform better.

Other managers add value through corporate oversight. Iliev and Lowry (2015) show that managers who directly engage on governance issues, rather than relying on the recommendations of Institutional Shareholder Services (ISS), perform better. However, Duan and Jiao (2016) find that many funds ‘vote with their feet’ by selling positions rather than try to influence governance through voting.

More practically, some managers add value through tax management. Sialm and Starks (2012) show that funds held primarily by taxable investors tend to select investment strategies that result in lower taxes, and Gibson, Safieddine, and Titman (2000) show evidence of funds engaging in tax-motivated trades. This tax management is valued by investors. Bergstresser and Poterba (2002) find that “after-tax returns have more explanatory power than pretax returns in explaining inflows” to mutual funds.

Finally, managers can add value by maintaining a disciplined investment approach. Singal and Xu (2011) “find that about 30% of all funds exhibit some degree of disposition behavior and that such funds underperform compared to funds that are not disposition-prone by 4-6% per year.”<sup>7</sup> Managers unable to avoid this bias “have significantly higher rates of failure than other funds,” as investors tend to avoid such funds. Del Guercio and Reuter (2014) show more generally that this type of monitoring by investors is important, as funds with low monitoring tend to significantly underperform.

### **3.5. When are managers’ skills most useful?**

As described in the previous sections, managers create value through active management using a number of skills. However, the value to investors of these skills is affected by many factors, including market conditions, the competitive environment, and fund structure. In this section we consider the factors that may increase or decrease the value of active management.

One important factor in determining the value of skill is the variation in the number of opportunities for profitable investments. Pastor, Stambaugh, and Taylor (2017) show that funds perform better in periods after they have increased trading and that overall trading within the industry predicts performance. They hypothesize that funds vary their trading depending on the number of profitable opportunities available in the market. Along a similar line, von Reibnitz (2018) finds that funds perform better in periods when there is greater variation in returns among stocks, and Dong, Feng, and Sadka (2018) find that “the ability of fund managers to create value depends on market liquidity conditions.”

The value of both stock selection and market timing ability varies with market and economic conditions. Kacperczyk, Van Nieuwerburgh, and Veldkamp (2014) show that skilled funds time the market well during bear markets and pick stocks well during bull market. Studies that ignore the impact of market conditions make managers as a whole appear less skilled. Kosowski (2011)

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<sup>7</sup>The disposition effect refers to investors treating unrealized losses and unrealized gains differently. Investors tend to avoid selling assets with unrealized losses because they want to ‘get even’ before selling.

finds that funds have negative risk-adjusted returns in expansion periods, but positive risk-adjusted returns in recession periods. Consequently, he states that many traditional models “understate the value added by active mutual fund managers in recessions.”

The level of competition also affects the value of a fund manager’s skill. Dyck, Lins, and Pomorski (2013) find that the value of active management is greater in less competitive asset markets, and Hoberg, Kumar, and Prabhala (2018) find that active funds investing in the United States perform better when they have a style that faces less competition from other active funds. However, lower competition across all dimensions does not lead to better performance for active funds. Cremers, Ferreira, Matos, and Starks (2016) examine a variety of international markets and show that active funds are more active, are lower cost, and perform better when competition from low-cost index funds is higher.

The structure of the fund’s managerial team appears to influence how value is created through active management. Dass, Nanda, and Wang (2013) find that solo managers tend to time the market well, while teams of managers tend to select stocks well. Goldman, Sun, and Zhou (2016) find that solo managers “have much more concentrated portfolios, tend to perform better, and have higher expense ratios than funds managed by multiple managers.” However, using more accurate data on team structure, Patel and Sarkissian (2017) show that “team-managed funds outperform single-managed funds across various performance metrics.” Overall, it is unclear whether a team or solo manager adds more value.

Finally, the structure of manager incentives matters. Elton, Gruber, and Blake (2003) show that management incentive fees are related to better stock-picking, although it may also lead to increased risk. Massa and Patgiri (2009) find that high-incentive contracts are associated with both increased risk-taking and higher risk-adjusted returns. Conversely, using exogenous shocks to manager’s incentive structure, Golec and Starks (2004) find no evidence of increased risk-taking. Outside of risk and return measures, Dass, Massa, and Patgiri (2008) find that the “incentives contained in the mutual funds’ advisory contracts induce managers to overcome their tendency [to make similar trades as other managers].” Contrary to all these results, Drago, Lazzari, and Navone (2010) find that incentive clauses are not particularly effective for mutual funds that are chartered in Italy.

### **3.6. On the zero-sum game**

Finally, the theory that active management is a ‘zero-sum game’ may miss important nuances. Pedersen (2018) argues that this mathematical argument “is based on the implicit assumption that the market portfolio never changes, which does not hold in the real world because new shares are issued, others are repurchased, and indices are reconstituted so even passive investors must regularly trade.” He claims that “active managers can be worth positive fees in aggregate” once this assumption is relaxed.

Index reconstitutions provide evidence of an opportunity for all active managers to benefit from the predictable trades of passive managers. Chen, Noronha, and Singal (2006) show that arbitrage activity around the reconstitution of the S&P 500 and the Russell 2000 costs investors in passively

managed funds linked to those indexes about \$1 billion to \$2 billion per year, a significant transfer of wealth from passive funds to active funds.

### **3.7. An alternative measure of skill**

Berk and van Binsbergen (2015) propose that an active manager's skill should be measured as the fund's "gross excess return over its benchmark multiplied by [assets under management]." In other words, their measure estimates the value extracted by the manager from the capital markets in dollar terms. Using this measure, they find that the average actively managed fund (across all fund styles, including non-equity) generates about \$3.2 million per year in value for investors. Further, they find that, on average, active funds have a net alpha of 36 basis points per year when compared to index mutual funds with similar styles. The comparison to the index mutual funds is particularly relevant, because those funds reflect the net cost of passive investing, as opposed to theoretical benchmarks that cannot easily be held by investors.

Berk and Van Binsbergen (2015) prefer their measure of gross skill because "the net alpha is determined in equilibrium by competition between investors, and not by the skill of managers." They build on the theoretical model of the mutual fund industry developed by Berk and Green (2004). In that model, investors competitively allocate capital between funds, which are subject to diseconomies of scale—meaning that as a fund's assets under management increases, its performance tends to decrease. In equilibrium in this model, skilled managers cannot have persistently positive net alpha because they will continue to receive new capital until they are no longer able to generate that positive alpha. In the end, all managers, regardless of their skill level, will have the same expected net alpha. Using this model, Berk (2005) labels as "myths" the ideas that (1) "the return investors earn in an actively managed fund measures the skill level of the manager managing that fund" and (2) "because the average return of all actively managed funds does not beat the market, the average manager is not skilled and therefore does not add value."

However, for the Berk and Green (2004) model to be accurate, capital must be competitively allocated and diseconomies of scale must actually exist. There is significant evidence that capital is competitively allocated, starting with Chevalier and Ellison (1997) and Siri and Tufano (1998). While fund flows may not be fully efficient, the literature shows that funds that perform well (which tend to have more skill on average) generally grow, and that funds that perform poorly tend to shrink.<sup>8</sup> Wahal and Wang (2011) conclude that "the mutual fund market has evolved into one that displays the hallmark features of a competitive market."

On the other hand, the academic literature has found mixed evidence for diseconomies of scale. Chen, Hong, Huang, and Kubik (2004) and Pastor, Stambaugh, and Taylor (2015) find evidence of diseconomies of scale in the mutual fund industry, but Reuter and Zitzewitz (2015) and Phillips, Pukthuanthong, and Rau (2018) find no relation between fund size and performance. Keswani, Miguel, and Ramos (2013) only find diseconomies of scale for certain funds. Therefore, given that

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<sup>8</sup>Among other papers, Goetzmann and Peles (1997); Wilcox (2003); Elton, Gruber, and Busse (2004); Barber, Odean, and Zheng (2005); Cooper, Gulen, and Rau (2005); Frazzini and Lamont (2008); Sensoy (2009); Bailey, Kumar, and Ng (2011); Barber, Huang, and Odean (2016); and Phillips, Pukthuanthong, and Rau (2016) all show results that appear inconsistent with investors acting rationally with respect to capital allocation between funds.

the evidence regarding diseconomies of scale seems debatable, or perhaps even lacking strong support, results based on the Berk and Green (2004) model must be interpreted carefully.

#### **4. Recent Research on Other Actively Managed Mutual Fund Styles**

The prior section considers the expansive literature on active management in U.S. equity funds that has been published since approximately 1997. A natural extension of that review is an examination of the literature on other fund types. Unfortunately, there has been far less research on the degree to which the conventional wisdom applies to other asset classes and investment approaches. Furthermore, the advances in the U.S. equity literature over the past 20 years have rarely been applied to other fund types. Here, we briefly consider what has been published in the areas of bond funds, hybrid funds, socially responsible funds, target date funds, real estate investment trust (REIT) funds, sector funds, and international funds.

##### **4.1. Bond funds**

Several studies provide evidence that active bond fund managers are skilled. By examining bond fund buying and selling, Moneta (2015) finds that bond funds generate alpha before costs. Gutierrez, Maxwell, and Xu (2009) find evidence of persistence in performance. As with U.S. equity funds, Amihud and Goyenko (2013) find that if common pricing factors explain a relatively low percentage of a bond fund's past returns, then the future performance of that fund is likely to be relatively strong. Chen, Ferson, and Peters (2010) and Cici and Gibson (2012) find evidence of market timing ability, while Boney, Comer, and Kelly (2009) show that managers are generally unsuccessful at timing the yield curve. In general, bond fund managers appear to make informed decisions on behalf of their investors, consistent with the findings for U.S. equity funds.

However, bond funds appear to underperform, on average, when considering net returns. Moneta (2015) finds that, despite outperformance before fees, most categories of bond funds underperform after fees. Similar underperformance after fees is seen in U.S. government bond funds (Ferson, Henry, and Kisgen, 2006), U.S. corporate bond funds (Cici and Gibson, 2012), Canadian bond funds (Ayadi and Kryzanowski, 2011), and global bond funds (Detzler, 1999). Jones and Wermers (2011) find that the majority of bond funds failed to beat their benchmark during the 2008-2009 recession.

An important caveat regarding the apparent negative average performance in actively managed bond funds is that, despite significant research in monetary economics and finance on interest rates and the returns on fixed income investments, there is no generally-accepted model for controlling for bond portfolio risks. As a result, a wide variety of models have been employed. Table 1 summarizes the models employed in past studies. This variation suggests a gap in the literature regarding the best model for capturing the risks of bond investing, which in turn creates a gap in our understanding of the true performance of bond funds.

**Table 1 – The variety of performance models in bond fund research**

<b>Performance model</b>	<b>Studies using model</b>
Small number of bond-specific pricing factors	Blake, Elton, and Gruber (1993)
Large number of bond-specific pricing factors	Bessembinder, Kahle, Maxwell, and Xu (2009)
Equity models augmented with bond-specific factors	Comer, Larrymore, and Rodriguez (2007) Chen, Hong, Jiang, and Kubik (2013) Goldstein, Jiang, and Ng (2017)
Conditional factor model	Ayadi and Kryzanowski (2011)
Stochastic discount factor	Ferson, Henry, and Kisgen (2006)
Active peer benchmarks	Hunter, Kandel, Kandel, and Wermers (2014)
Holdings	Cici and Gibson (2012) Moneta (2015)

## **4.2. Hybrid funds**

Hybrid funds are a mix of equity and fixed income assets. Most of the limited research on these funds focuses on the unique issues that arise when measuring their performance. For example, traditional equity factor models show a positive alpha, but Comer, Larrymore, and Rodriguez (2007) find that the inclusion of pricing factors related to bonds lead to a negative alpha in at least one subsample. Herrmann and Scholz (2013) focus on style benchmarks to control for risk, and while they find no average outperformance, there is some short-term persistence in returns.

Since hybrid funds have the freedom to change their mix of stocks and bonds, managers of these funds may create value through superior market timing. Specifically, they may adjust the relative percentage of stocks and fixed income assets in their portfolio depending on which asset class they expect to earn the highest returns. Comer (2006) finds some timing ability in a few subsamples of hybrid funds, and Comer, Larrymore, and Rodriguez (2008) show outperformance by hybrid funds during bear markets.

## **4.3. Socially responsible, or ESG, funds**

Socially responsible funds—also known as environmental, social, and governance, or ESG, funds—have grown rapidly in recent years. Assets in these funds, including assets in new ESG ETFs, doubled between 2013 and 2015 (Davidson, 2015). Some investors prefer these funds

because they either want to encourage pro-social corporate behavior or to avoid associating with firms that engage in certain behaviors. There is an extensive body of research on ESG investing, but only a few of these studies specifically evaluate mutual funds.<sup>9</sup>

The research on socially responsible funds that does exist focuses on the potential negative impact of restricting a portfolio to a socially responsible strategy. In the context of Modern Portfolio Theory, a constrained portfolio would be dominated by an unconstrained portfolio, so excluding stocks based on ESG criteria should lead to a suboptimal portfolio. However, the empirical research on the actual impact of ESG filters on funds is split. Grinold (1989); Adler and Kritzman (2008); and Verheyden, Eccles, and Feiner (2016) find that the constraints create costs for investors. However, Renneboog, Horst, and Zhang (2008); Meziani (2014); and Dolvin, Fulkerson, and Krukover (2018) suggest that ESG funds are neither better nor worse than conventional funds on a risk-adjusted basis.

#### **4.4. Target date funds**

Target date funds represent a growing percentage of assets under management, but it is unclear if active management in target date funds creates value for investors. Bodie and Treussard (2007) and Gomes, Kotlikoff and Viceira (2008) show that target date funds represent a significant improvement over the decisions being made by plan participants and that these funds create some value by holding lower expense share classes. However, Elton, Gruber, de Souza, and Blake (2015) demonstrate that target date fund managers have neither positive alpha nor timing ability, and Elton, Gruber, and de Souza (2018) find that target date funds may do worse than the general public when selecting managers.

One complication in evaluating the performance of target date funds arises from the shifting asset mix of the fund. Managers design a ‘glide path’ that changes the mix of investments as the target date becomes closer, but it isn’t clear what the most appropriate glide path should be. Balduzzi and Reuter (2011, 2017) find that target date funds with similar target dates often have distinctly different risk profiles and historical returns. Spitzer and Singh (2008) show that target date funds have begun to skew towards fixed income and that, around 2007, target date funds began to underperform relative to a portfolio equally split between stocks and bonds. Tang and Lin (2015) suggest that this trend is the result of some managers taking on too little risk, while Trammell (2009) suggest it comes from focusing the fund on the needs of employers with a particular type of workforce.

The shifting asset mix of target date funds makes them difficult to benchmark. Because their asset allocations change over time, Surz and Israelsen (2008) find that it is difficult to identify a single benchmark that can be consistently applied. The funds’ changing allocations are intended to create value for shareholders, but Branch and Qui (2011) show that glide paths and changing allocations have not clearly been better than a fixed allocation strategy.

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<sup>9</sup>Several studies consider the value of investing in individual securities based on socially responsible criteria: Fulton, Kahn, and Sharples (2012); De and Clayman (2015); Nagy, Kassam, and Lee (2016); and Verheyden, Eccles, and Feiner (2016).

#### **4.5. REIT funds**

Real estate investment trust, or REIT, mutual funds invest primarily in the equity issuances of exchange listed REITs. While REIT funds represent a relatively small part of the total mutual fund industry, many investors include these funds in their portfolios because of their high dividend yields and low correlations with the overall market. Fund managers can potentially add value by choosing REITs that outperform or by timing the relative performance of different types of REITs. However, the research on performance is mixed. A number of studies suggest no outperformance, while other studies suggest superior performance.<sup>10</sup>

#### **4.6. Sector funds**

Research on active management often excludes sector funds, which means that there is limited current knowledge about them. Sector funds have restrictive mandates that provide a smaller scope through which a manager can add value, and the low diversification of sector funds necessarily leads to higher idiosyncratic risk. Dellva, DeMaskey, and Smith (2001) find evidence of stock-picking ability in sector funds, consistent with manager expertise in the sector, but neither they nor Kaushik, Pennathur, and Barnhart (2010) find any evidence that sector funds can time the market. One concern in evaluating these funds is that their performance is sensitive to the choice of benchmark, but Khorana and Nelling (1997) show that the return on the overall market still explains most of the returns for sector funds.

#### **4.7. International funds**

International mutual funds have a larger set of opportunities than domestic funds. However, security markets in different countries have significant heterogeneity, with varying levels of transparency, liquidity, regulation, and investor protection. Forester and Karolyi (1999), among others, show that these differences help lead to higher correlations in local stock returns than in global stock returns. Even though Fama and French (2012, 2017) show that common return patterns exist in most markets and Eun, Huang, and Lai (2008) show an increasing correlation between markets over time, international mutual funds domiciled in the United States could add value by navigating the significant complexities that still exist when investing internationally.

Karolyi (2016) finds that only 16% of top academic studies examine non-U.S. markets, so it is not surprising that limited research exists on U.S.-domiciled international mutual funds. Kao, Cheng, and Chan (1998) find that international funds had a positive average alpha during the 1980s and 1990s, and Turtle and Zhang (2012) show positive alphas for emerging market funds during global bull markets. Hiraki, Liu, and Wang (2015) find that international funds that concentrate in specific countries and industries outperform more diversified funds. Fan and Addams (2012) and Breloer, Scholz, and Wilkens (2014) do not find evidence that top-performing international funds in the past continue to outperform in the future, but Droms and Walker (2001) do find some evidence of

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<sup>10</sup>O'Neal and Page (2000); Lin and Yung (2004); Chiang, Kozhevnikov, Lee, and Wisen (2008); Derwall, Huij, Brounen, and Marquering (2009); and Hartzell, Muhlhofer, and Titman (2010) find no evidence of outperformance, while Gallo, Lockwood, and Rutherford (2000); Kallberg, Liu, and Trzcinka (2000); Fuerst and Marcato (2009); and Kaushik and Pennathur (2012) do find some evidence of outperformance.

persistence. Eun, Huang, and Lai (2008) highlight the diversification value of small-cap international funds, although Didier, Rigobon, and Schmukler (2013) find that the funds themselves could be more diversified than they are.

Many unique factors make the process of assessing the value created by active management in international funds difficult. The approach used to calculate the daily net asset values of international funds in the past may cause distortions in the evaluation of the returns.<sup>11</sup> Comer and Rodriguez (2012) highlight issues with the benchmarking of international funds, particularly the biases that result from the common use of the MSCI World Index. Dyck, Lins, and Pomorski (2013) show that the value of active management depends on the efficiency of the particular markets in which the fund invests, and Cremers, Ferreira, Matos, and Starks (2016) highlight that the level of competition between active managers—including competition from index funds and ETFs—varies significantly across international mutual fund markets. Finally, the complexities of international investing may generate additional constraints for managers, with Dubofsky (2010) finding that international funds have portfolios biased towards greater liquidity.

## **5. Important Questions**

We conclude our literature review by considering the current challenges facing researchers addressing the value of active management. Because of these challenges, several open questions remain, with many opportunities for future research. We discuss six topics in this section that, with further exploration, may refute or confirm the conventional wisdom on active management.

### **5.1. The appropriate model for evaluating fund performance**

Any measure of the value of active management must use a method of accounting for fund risk or factor exposure. Active managers typically create value when they deliver a higher return than a passive benchmark of equivalent risk. Therefore, conclusions about the value of active management only have merit if the benchmark used in the analysis is correct. The literature uses factor models, market index models, and holdings-based models, but they all have important limitations, as we outline in this section.

For mutual funds, the multi-factor model of Carhart (1997) is commonly used. That model attempts to account for returns that can be attributed to market, size, value, and momentum factors rather than fund manager skill. However, important critiques of this model have arisen. Huij and Verbeek (2009); Moreno and Rodriguez (2009); and Kadan and Liu (2014) highlight the shortcomings of this type of factor specification. Cremers, Petajisto, and Zitzewitz (2012) show that the construction of the size and value factors in the Carhart model implies that mutual funds should be compared to benchmarks with large weights (both positive and negative) on small-cap

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<sup>11</sup>Funds that invest in domestic assets can calculate their daily net asset value using that day's closing market prices. However, because of time zone differences, the prices used for international assets can be either stale or still fluctuating. Bhargava and Dubofsky (2001); Goetzmann, Ivokovic, and Rouwenhorst (2001); Bhargava, Bose, and Dubofsky (2003); Zitzewitz (2006); and Chua, Lai, and Wu (2008) show how this issue can make the net asset value inaccurate for international funds and demonstrate that short-term traders can exploit that inaccuracy. Since that research was conducted, however, changes in regulation and fund practices may have altered the viability of these 'time-zone arbitrage' strategies.

value stocks, despite those stocks being only a very minor part of the investment universe. This questionable comparison can “lead to biased alphas (in either direction).”

Furthermore, the factors used in Carhart (1997) may not be the appropriate set. Harvey, Liu, and Zhu (2016) and Hou, Xue, and Zhang (2017) identify hundreds of potential pricing factors that could be used, and the choice of factors has a significant effect on conclusions about fund performance. For example, Jordan and Riley (2015) show that including the new Fama and French (2015) factors explains the apparent outperformance of U.S. equity mutual funds with low volatility. However, despite the shortcomings of Carhart’s model, the literature has not settled on a broadly-accepted factor model to replace it.

Instead of a factor model, researchers can compare an active fund’s returns to a passive market index. If an active fund’s risk or factor exposures are the same as the index, then the manager of a fund adds value whenever the fund’s returns exceed the index’s returns. This type of benchmark is ubiquitous in practice. In the United States, the Securities and Exchange Commission (SEC) requires that mutual funds disclose a benchmark index in their prospectuses to help investors evaluate fund performance. Several studies use benchmark-adjusted returns, and benchmark-adjusted returns are prevalent in industry reports, such as the SPIVA U.S. Scorecard from S&P Dow Jones Indices (Soe and Poirier, 2016), Morningstar’s Active/Passive Barometer (Bryan, Boccillari, Johnson, and Rawson, 2015), and Vanguard’s research white papers (Harbron, Roberts, and Rowley, 2017).

Unfortunately, self-declared benchmarks often do not represent the actual investment style of the fund. Sensoy (2009) and Cremers, Fulkerson, and Riley (2018) find that 25% to 30% of funds have self-declared benchmarks that are a poor match for the fund. The later paper shows that the self-declared benchmarks of those funds typically have less risk than the funds themselves, which leads to fund performance being overstated, on average. Further, self-declared benchmarks rarely change, even though fund managers frequently change their style over time.<sup>12</sup> Alternative methods of determining the benchmark, such as the ‘minimum active share’ benchmark proposed by Cremers and Petajisto (2009), can be used to improve this method of evaluating performance.

A final alternative for risk adjustment is to focus on fund holdings and evaluate performance on a position-by-position basis. Daniel, Grinblatt, Titman, and Wermers (1997) and Wermers (2000) provide some of the first holdings-based analyses of fund performance and find that, before costs, mutual funds tend to select stocks that outperform. Busse, Jiang, and Tang (2018) combine holdings-based returns with factor models to ‘double-adjust’ fund performance. While these methods are useful for calculating the value of active managers’ decisions, evaluating funds based on the performance of their holdings has significant drawbacks. The holdings-implied performance may not accurately represent the actual returns realized by a fund’s investors, due to trading costs and fees, and these methods cannot include the substantial trading activity that occurs between the dates when holdings reports are available.

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<sup>12</sup>See, for example, diBartolomeo and Witkowski (1997); Kim, Shukla, and Tomas (2000); Elton, Gruber, and Blake (2003); Hirt, Tolani, and Philips (2015); Bams, Otten, and Ramezanifar (2017); and Mateus, Mateus, and Todorovic (2017).

## **5.2 Investor behavior with respect to fund performance**

While the prior subsection focused on the issue of measuring fund performance from an academic standpoint, identifying the performance measures that are considered by mutual fund investors when making their buy and sell decisions is a separate challenge. A long literature, starting with Chevalier and Ellison (1997) and Sirri and Tufano (1998), shows that investors pay significant attention to the historical performance of a fund and invest more in the highest performing funds. However, the precise measure of performance that investors use to make decisions is still being determined, as are the implications of that choice of performance measure.

Barber, Huang, and Odean (2016) and Berk and van Binsbergen (2016) show that the Sharpe (1964) and Lintner (1965) capital asset pricing model (CAPM) best explains the actual behavior of mutual fund investors. That is, the buying and selling decisions of mutual fund investors are best predicted by assuming that they estimate a fund's performance by adjusting just for risk relative to the overall market. This approach stands in contrast to the more complex factor models often used in the academic literature, such as the Carhart (1997) model, which includes multiple factors in addition to risk relative to the overall market.

Berk and van Binsbergen (2016) claim that their results imply that the CAPM is the best model currently available to capture fund riskiness and estimate fund performance, but Barber, Huang, and Odean (2016) disagree. They argue that, when measuring fund manager skill, accounting for “all factor-related returns” is important. More generally, they claim that they “do not believe the results in either paper provide much evidence regarding the true asset pricing model.”

Outside of factor models, Sensoy (2009) and Cremers, Fulkerson, and Riley (2018) show that investors also consider performance relative to passive benchmark indices when making decisions. The benchmark that funds are required to provide by the SEC is particularly important because investors appear to use that benchmark to make buying and selling choices even when it is a poor match for the fund's investment style. While this observation may be consistent with other evidence that mutual fund investors are not perfectly rational (e.g., Cooper, Gulen, and Rau, 2005), it may also be a result of the barriers investors face. Sirri and Tufano (1998) and Hortacsu and Syverson (2004) describe these barriers as ‘search costs’—meaning the money and time required to research investments—and conclude that these costs may encourage investors to use simpler criteria and discourage them from using data that is difficult to acquire or interpret.

## **5.3 Limitations of the holdings data**

The lack of transparency regarding the process of managing fund portfolios creates a further limitation on the assessment of the value of active management. Most research uses data on fund holdings from Thomson Reuters, but that database has three important limitations. First, the database only contains quarterly holdings reports. Second, it contains only equity positions. Third, as Schwarz and Potter (2016) show, it misses many reported holdings from mandated SEC filings, while including many voluntary filings that are not publicly available from the SEC. Together, those constraints limit the conclusions that researchers can draw about active management from available holdings data. The quarterly nature of the data appears to be its most limiting aspect.

Elton, Gruber, Blake, Krasny, and Ozelge (2010) show that quarterly holdings miss many trades that occur during the quarter.

Apart from these data concerns, the holdings themselves may not actually represent the fund's portfolio. Because fund managers know their positions will be publicly available, they may 'window dress' their portfolios by changing allocations near the end of a quarter. Danthine and Moresi (1998) and Wermers (2001) explain these changes as an effort to prevent front-running or free-riding on a manager's investments ideas. Morey and O'Neal (2006) and Agarwal, Gay, and Ling (2014) suggest that managers change holdings to make the fund appear better informed to mutual fund investors.

Even if a fund's holdings reflect its true strategy, Nicolosi (2009) and Fulkerson (2013) show that typical academic assumptions about when trading occurs can bias the measured performance of fund managers.

#### **5.4 Limitations of manager data**

Despite the fact mutual funds are relatively easy to invest in and are heavily regulated, academic researchers do not have access to detailed data on fund managers and fund operations. With regard to fund managers, Massa, Reuter, and Zitzewitz (2010) discuss how the CRSP database, which is the most widely-used source of information in academic research, has very limited data on fund managers. Patel and Sarkissian (2017) show that Morningstar Direct has better data, but neither database makes it easy to track managers between funds, nor do they provide readily usable information on manager backgrounds and non-mutual fund activities (see, e.g., Gottesmann and Morey, 2006; Evans and Fahlenbrach, 2012; Kempf, Manconi, and Spalt, 2017; and Chen, Chen, Johnson, and Sardarli, 2017).

Even less information is available about the investment processes used by active managers to identify new opportunities and monitor their current positions. We are aware of no research that even summarizes those processes. Research in this area would require data on the key inputs into the processes—such as the number of analysts employed, the use of outside research, and the data sources—all of which is currently unavailable. Because of these data limitations, the literature has given almost no consideration to the role of process in value creation through active management. As a result, many questions related to active management remain unexplored.

#### **5.5 Active management in multi-asset portfolios**

The bulk of this literature review considers the active management of mutual funds, but active management also occurs in multi-asset portfolios. In addition to maximizing performance within an asset class, a multi-asset portfolio manager also makes decisions about the amount of investment in each asset class. Current knowledge about the value of active management in multi-asset portfolios is limited to a relatively small amount of research on pension funds.

Brinson, Hood, and Beebower (1986) find that the decisions of pension fund managers explain only a small part of their funds' total returns. Dyck, Lins, and Pomorski (2013) show that pension funds underperform by 0.35% per year in U.S. markets, but outperform by 1.80% per year in

emerging markets. Andonov, Bauer, and Cremers (2013) find that U.S. pension fund managers improve performance by 0.89% per year through their allocation, timing, and security selection activities. However, that improvement is largely explained by momentum and has significant diseconomies of scale.

While these studies provide some evidence that the active management of pension funds creates value, pension fund managers face unique constraints. Novy-Marx and Rauh (2011) show that public pension funds are biased towards riskier assets, because regulations allow funds holding riskier assets to have a higher liability discount rate. Higher discount rates enable public pension funds to report a better funding ratio to officials. Andonov, Bauer, and Cremers (2017) consider this regulatory incentive and find that underfunded pension funds increase their risk at the cost of decreased risk-adjusted performance. Because of these distinctive circumstances, applying results from pension funds to all multi-asset portfolios is difficult.

## **5.6 Impact of constraints on the value of active management**

A final challenge in measuring the value of active management regards the impact of constraints on active managers. Theoretical models often assume that active managers are unconstrained and are able to allocate assets optimally to maximize risk-adjusted returns. In practice, active managers of mutual funds operate under many regulatory and institutional constraints that may affect their decisions and their ability to create value for investors. If these constraints are important, studies of active management in mutual funds may not be applicable to other actively managed investment vehicles, the value of active management in mutual funds may vary as the constraints change, and conclusions about active management using mutual fund data today may not be applicable in the future.

There has been some research on the impact of constraints on mutual fund managers. In particular, the literature focuses on two primary constraints: the requirement to provide daily liquidity and the need for regulatory compliance. Mutual funds provide daily liquidity to investors by buying and selling shares of the fund at net asset value at the end of each day. Offering this level of liquidity forces managers to maintain portfolios that will allow them to quickly raise cash for investors who want to exit the fund on any given day. The need to maintain liquidity has been shown to generate real costs for individual funds and can negatively impact both mutual funds as a whole and the overall market.<sup>13</sup> Managers can hold more cash or invest more in assets that are easily sold to better manage investor buying and selling, but that comes at the cost of deviating from their otherwise optimal asset allocation.<sup>14</sup>

Beyond the requirement to provide liquidity, mutual funds face many other regulatory requirements that could affect the value of active management. Funds must make a variety of disclosures, such as the previously discussed requirement to disclose holdings to the public, and

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<sup>13</sup>Edelen (1999); Johnson (2004); Greene, Hodges, and Rakowski (2007); Dubofsky (2010); Rakowski (2010); and Fulkerson and Riley (2017) focus on the cost of providing liquidity at the individual fund level. Chen, Goldstein, and Jiang (2010); Coval and Stafford (2007); Dyakov and Verbeek (2013); Shive and Yun (2013); Goldstein, Jiang, and Ng (2017); and Parida and Teo (2018) have implications at the fund level but also discuss more general market impact.

<sup>14</sup>See Wermers (2000); Yan (2006); Nascimento and Powell (2010); Simutin (2014); and Chernenko and Sunderam (2016) for a discussion of the trade-offs associated with mutual fund cash holdings.

funds are subject to investment restrictions, like limitations on leverage. In addition to the direct costs of compliance, these regulatory requirements can generate substantial indirect costs. For example, Parida and Teo (2018) show that more frequent portfolio disclosure lowers mutual fund performance by making it easier for other investors to ‘front run’ trades, and Dyakov and Verbeek (2013) show that “publicly available information of fund flows and holdings exposes mutual funds in distress to predatory trading.”

Estimating the total impact of these constraints on the value of active management is a daunting task. One approach is to look at the value of active management in less-constrained portfolios, such as hedge funds and separate accounts. Though not completely unregulated, these investment vehicles are subject to fewer constraints than mutual funds. Kosowski, Naik, and Teo (2007) and Ibbotson, Chen, and Zhu (2011) suggest hedge funds have an alpha of 3% to 5% per year, indicating substantial value from active management in that industry; however, Aragon (2007), Fung, Hsieh, Naik, and Ramadorai (2008), and Dichev and Yu (2011) estimate that hedge funds have alphas of roughly zero. Separate accounts have received much less attention than hedge funds, but Busse, Goyal, and Wahal (2010) and Elton, Gruber, and Blake (2013) find that, on average, separate accounts outperform equivalent mutual funds.

Unfortunately, using this type of comparison to estimate the cost of constraints, or to determine the general applicability of mutual fund results, is perilous. The comparison with hedge funds is particularly difficult because there are many problems with the available data.<sup>15</sup> Granting those concerns, it is worth observing that Agarwal, Boyson, and Naik (2009); Clifford, Jordan, and Riley (2013); Huang and Wang (2013); and Hartley (2017) each find that mutual funds that attempt to replicate ‘hedge fund style’ investment strategies are unable to replicate the performance of actual hedge funds. These results support the idea that mutual fund managers have a more limited ability to create value for investors through active management because of constraints.

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<sup>15</sup>See, for example, Getmansky, Lo, and Makarov (2004); Bollen and Pool (2009); Agarwal, Fos, and Jiang (2013); Aiken, Clifford, and Ellis (2013); Hodder, Jackwerth, and Kolokolova (2014); Jorion and Schwarz (2014a); Jorion and Schwarz (2014b); Patton, Ramadorai, and Streatfield (2015); and Dimmock and Gerken (2016).

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