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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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Just over 20 years have passed since the publication of Mark Carhart's landmark 1997 study on mutual funds. Its conclusion—that the data did “not support the existence of skilled or informed mutual fund portfolio managers”—was the capstone of an academic literature, which began with Michael Jensen in 1968, that formed the conventional wisdom that active management does not create value for investors. We review the literature on active mutual fund management since the publication of Carhart's work to assess the extent to which current research still supports the conventional wisdom. Our review of the most recent literature suggests that the conventional wisdom is too negative on the value of active management.

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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 (see Bogle 1997).

Since then, the value of active management has become a heavily studied question, especially because of the rise of passive management and the growing popularity of index funds and exchange-traded funds (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 focused on US equity mutual funds, which remain the largest segment of actively managed funds in terms of both numbers and assets. Sharpe (1966) noted that “the traditional view” was “that the search for securities whose prices diverge from their intrinsic values is worth the expense required” (p. 138). The early findings of the literature, however, indicated that these funds, on average, did not beat the market net of fees and that few, if any, individual funds consistently outperformed. From these studies, a new consensus arose that the value created by most managers is offset—or more than offset—by their fees. This conventional wisdom is perhaps best summarized by the conclusion of the seminal study of Carhart (1997): “The results do not support the existence of skilled or informed mutual fund portfolio managers” (p. 57).¹

This literature review provides an overview of the considerable body of academic research on the value of active management that has

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been published since 1997. After exploring the broad changes in the industry in the past 20 years, we first discuss studies that support the conventional wisdom. We then consider the more recent studies, which in many ways challenge that conventional wisdom. Our focus is primarily on US equity funds, but we 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 extended 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 during 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. We believe the conventional wisdom fails to account for the positive findings of recent research on active manager skill.

Modern Trends in the Mutual Fund Industry

The mutual fund industry has undergone significant shifts since the 1990s.² 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 US 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 the result, in large part, of the rise of 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, only 7.5% of domestic equity mutual fund assets were held in traditional index funds, compared with 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 whereas active funds had a net outflow of \$975 billion. 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, and the average expense ratio for bond funds also decreased—from 0.78% to 0.55%. This decline is partly the result of a reallocation by fund investors to lower-cost funds and share classes, so assets are increasingly concentrated in funds and share classes with lower expense ratios. It is also the result, however, of a general decrease in the average expense ratio of active mutual funds.

The indirect cost to investors of trading in 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. Furthermore, Hasbrouck (2009) and Bessembinder, Maxwell, and Venkataraman (2006) showed 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 from the one 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, an important consideration is the degree to which the conventional wisdom on active management articulated in the period between Jensen (1968) and Carhart (1997) still applies. The next section considers the research that is most often used in support of the conventional wisdom, and the subsequent sections examine the more recent research on the value added by active management.

The Conventional Wisdom on Actively Managed US Equity Mutual Funds

The conventional wisdom applied to actively managed US equity mutual funds states that, on average,

active management provides little value to investors. That wisdom is based on these findings:

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 is that the average actively managed fund underperforms a passively managed fund that 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 when costs are considered. Sharpe (1991, 2013) called this phenomenon the “arithmetic of active management,” and Bogle (2005) referred to it as “The Relentless Rules of Humble Arithmetic.” Based on this argument, French (2008) concluded that “in aggregate, the search for trading gains is doomed” (p. 1538), and Buffett (2006) stated that “a record portion of earnings that would go in their entirety to owners . . . is now going to a swelling army of helpers” (p. 19).

Several papers support the claim that the average actively managed US equity fund underperforms after fees. Jensen (1968), Ippolito (1989), and Gruber (1996), using nonoverlapping periods, studied the average performance of mutual funds from 1945 through 1994 and found that the average fund generated a negative alpha after fees. Similarly, Davis (2001) found that no equity style from 1965 through 1998 earned a positive alpha after deducting fees. Wermers (2000) indicated 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, but after trading, distribution, operational, and other costs, the average fund does underperform 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. If that manager was merely “lucky” in the past, the outperformance should not be expected to continue. If all outperformance is simply luck, not skill, then investing in even the best-performing actively managed funds does not make sense.

Although some early papers found persistence in performance, Carhart (1997) showed 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 with the returns on stocks that performed poorly).³ Carhart found persistence only among the worst-performing funds and concluded that his “results do not support the existence of skilled or informed mutual fund portfolio managers” (p. 57). His 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 (1996b) showed that studies that examine only surviving funds will inaccurately find evidence of performance persistence because surviving funds are more likely to have outperformed, and Brown, Goetzmann, Ibbotson, and Ross (1992) showed that the relationship between volatility and returns in a sample with survivorship bias can give the false appearance of persistent performance.

Other research published at around the same time in the mid-1990s supported Carhart’s (1997) conclusion. Malkiel (1995) showed the importance of accounting for survivorship bias and found no evidence of performance persistence after the 1970s. Phelps and Detzel (1997) found that any evidence of persistence disappeared either when risk was correctly measured or when more recent time periods were 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) found that many managers can beat the market before costs but that “few funds produce benchmark-adjusted expected returns sufficient to cover their costs” (p. 1915). Barras, Scaillet, and Wermers (2010) argued that only 0.6% of funds have skill in excess of fees and that 75.4% of funds have some skill but “extract all of the rents generated

by these abilities through fees” (p. 2). Furthermore, they observed that “the proportion of skilled funds decreases from 14.4% in early 1990 to 0.6% in late 2006” (p. 3).

The downward trend in persistence is an important element of the conventional wisdom because the often-cited explanations for the decline suggest that it is unlikely to reverse. Bernstein (1998) attributed the downward trend to the “ever-increasing efficiency in the equity markets” (p. 9) 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) provided evidence of increasing efficiency in equity markets in recent years. Grossman and Stiglitz (1980) theorized that markets may never become fully efficient because those engaged in gathering information will continue to do so only if they are compensated for their costs. The number of profitable opportunities may become ever smaller, however, as gathering information becomes easier and cheaper.

Another explanation for the decline in the number of investment opportunities is increasing competition among active managers. Pástor, Stambaugh, and Taylor (2015) found 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) supported that result by showing that active management generates greater value in the less competitive asset markets outside the United States, particularly in the emerging markets. Along a similar line, Hoberg, Kumar, and Prabhala (2018) showed that active funds investing in the United States tend to perform better when they face less competition from other active funds investing in the United States.

Our discussion of research related to the conventional wisdom comes with an important caveat. The publication processes in many fields privilege statistically significant results that provide new insights. Accordingly, papers confirming (or failing to find evidence against) the conventional wisdom will be difficult to publish. Rosenthal (1979) wrote that an extreme version of privileging statistically significant results would cause journals to be “filled with the 5% of the studies that show Type I errors” (i.e., false positives) while the insignificant results would end up hidden from observation in “the file drawer” (p. 638). Galiani, Gertler, and Romero (2017) further noted

that “replication is the exception rather than the rule in economics” (p. 1). Finally, in fields of study with “a greater number . . . of tested relationships” and “greater flexibility in designs, definitions, outcomes and analytical modes,” any given research finding is less likely to be true (Ioannidis 2005, p. 696). The number of possible relationships in finance is high, and most research on active management has enough latitude to allow for flexible designs when testing relationships. With respect to our study, this situation suggests (1) that we are highly unlikely to observe all of the papers that support the conventional wisdom and (2) that some of the results in the papers that run counter to the conventional wisdom may be false positives.

Recent Research on Actively Managed US Equity Mutual Funds

The conventional wisdom has some support in the academic literature, but a large portion of that literature challenges it. Recent research has found that many active managers have significant observable skills, that those skills create real value for investors, and that those skills persist over time. These new lines of research have often used new measures (e.g., the “value added” measure of Berk and van Binsbergen 2015) or applied novel methods (e.g., use of the “false discoveries” technique of Barras et al. 2010). Other research (e.g., Daniel, Grinblatt, Titman, and Wermers 1997) has made use of relatively new data, such as individual fund holdings. This section summarizes recent studies related to US equity mutual funds, and the subsequent section considers other mutual fund asset classes.

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 with a benchmark. In most cases, this benchmark is either a single passive index (such as the S&P 500 Index), a multifactor model (as in Carhart 1997), or a portfolio constructed from the individual holdings of the fund (as in Daniel et al. 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 have considered the impact of the benchmark model chosen. Kothari and Warner

(2001) and Glode (2011) highlighted the limitations of current models for evaluating the value of active management and showed that common performance measures often underestimate the value of active management. Notably, Glode argued 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” (p. 547). Moreover, Huij and Verbeek (2009) and Cremers, Petajisto, and Zitzewitz (2013) both argued that the multifactor models that are ubiquitous in academic research have systematic biases and, as a result, are poor benchmarks for evaluating mutual fund performance.⁴

With respect to data, Linnainmaa (2013) showed that, whereas 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 when funds close due to poor performance driven by bad luck rather than low skill. Because the unlucky funds would probably 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 found that the true alpha of the average fund is 43 bps per year higher than the average alpha calculated without accounting for reverse survivorship bias.

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) showed that investment management firms seem to have valuable private information about their managers because they are able to reallocate capital efficiently among them. This reallocation “amounts to over 30% of the total value added of the industry” (p. 1). Fang, Kempf, and Trapp (2014) found that fund families efficiently allocate managers by moving “their most skilled managers to market segments in which manager skill is rewarded best” (p. 661). Porter and Trifts (2014) found that underperforming managers are more likely to lose their jobs than other managers are. Gallo and Lockwood (1999) showed that after a management change, the risk-adjusted performance of a fund improves by an average of 2% per year, and Khorana (2001) showed “significant improvements in post-replacement

performance relative to the past performance of the fund” (p. 371).

Fund families make significant efforts to keep skilled managers within the family. Deuskar, Pollet, Wang, and Zheng (2011) found that funds retain top managers “in the face of competition from a growing hedge fund industry” (p. 3008). 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) found that these side-by-side managers outperform their peers, which is “consistent with this privilege being granted primarily to star performers” (p. 2342). However, the overall evidence on side-by-side management is mixed. Chen and Chen (2009) found 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) found those mutual funds tend to underperform.

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

Can Investors Identify Skilled Managers by Using Public Information? The prior subsection considered the ability of insiders to evaluate managers, but substantial research has considered whether *investors* can use public information to identify skilled funds in advance. Kosowski, Timmermann, Wermers, and White (2006) found “a sizable minority of managers pick stocks well enough to more than cover their costs” (p. 2551), and several measures have been identified that appear to help investors identify those winning funds in advance.⁵ 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 have found that fund performance is somewhat predictable from past performance alone. For example, Bollen and Busse (2005) used daily returns to demonstrate persistence—although it was “observable only when funds are evaluated several

times a year” (p. 569)—and Kosowski et al. (2006) demonstrated persistence by following Carhart’s (1997) procedure while using a more robust technique for evaluating statistical significance.

Many studies have used other information derived from past returns (i.e., other than past performance), either in isolation or in conjunction with past performance, to predict future performance. Amihud and Goyenko (2013) examined the percentage of a fund’s returns that can be explained by common factors, such as the performance of large-capitalization stocks versus that of small-capitalization stocks. They found that, on average, funds with both strong past performance and a low percentage of their past returns attributable to common factors outperform in the future by 3.8% per year. Massa and Yadav (2015), using past returns to measure a fund’s “sentiment beta,” which is a fund’s level of exposure to high-sentiment stocks, showed that funds with low sentiment betas subsequently outperform funds with high sentiment betas.⁶

Other studies have applied complex statistical techniques to evaluate returns. Barras et al. (2010) used a “false discoveries” technique adapted from medical research to separate funds with skill from those that have generated strong performance through luck.⁷ Busse and Irvine (2006); Avramov and Wermers (2006); and Huij and Verbeek (2007) applied Bayesian probability approaches to successfully predict future performance. Mamaysky, Spiegel, and Zhang (2007) found groups of funds with alphas “of over 4% per annum” (p. 359) after applying filters to control for estimation errors that commonly occur in return-based analyses. Baks, Metrick, and Wachter (2001) and Pástor and Stambaugh (2002) demonstrated that actively managed funds should be part of an investor’s optimal portfolio even if that investor strongly doubts such funds can outperform the market.

Fund holdings can also predict future performance. Cremers and Petajisto (2009) showed that funds with a high active share (meaning funds with portfolios that differ greatly from their benchmarks) tend to have a positive alpha whereas funds with a low active share tend to underperform. Cremers and Pareek (2016) showed that this outperformance is stronger among funds with a high active share that can also be identified as “patient,” and Cremers, Fulkerson, and Riley (2018) found greater outperformance among funds with a high active share that also provided a benchmark in the fund prospectus that accurately reflected fund riskiness. Doshi, Elkamhi, and Simutin

(2015) compared a fund’s actual portfolio with a value-weighted portfolio of a fund’s investments and found that fund performance increases as the difference between the two increases. Sherrill, Shirley, and Stark (2017) showed that large ETF holdings signal poor future performance.

As for active share, a substantial debate is under way about whether it has predicted and will continue to predict outperformance. Schlanger, Philips, and LaBarge (2012) and Cohen, Leite, Nielson, and Browder (2014) both questioned the predictive power of active share, and Frazzini, Friedman, and Pomorski (2016) found that the measure was not empirically robust. Conversely, Petajisto (2016) and Cremers (2017) argued that the Frazzini et al. analysis, in particular, contained significant shortcomings (e.g., in the model used to measure fund performance and the interpretation of the results). Regardless of active share’s power in previous time periods, Brown and Davies (2017) suggested funds may have had an incentive to manipulate active share if investors use it to make decisions, which could constrain its future utility.

The concentration of a fund’s portfolio also has predictive power. Kacperczyk, Sialm, and Zheng (2005) found that funds whose portfolios are more concentrated within certain industry groups tend to have better performance than less concentrated funds, and Goldman, Sun, and Zhou (2016) found better performance among funds that concentrate their portfolios on “the top one or two stocks within each industry sector” (p. 49). In general, relatively high portfolio concentration has been found to predict better performance (Huij and Derwall 2011; Hiraki, Liu, and Wang 2015; Choi, Fedenia, Skiba, and Sokolyk 2017; Fulkerson and Riley 2019), although that finding is not universal (Sapp and Yan 2008).

Some studies have looked at both past returns and holdings. For example, Kacperczyk, Sialm, and Zheng (2008) showed that the returns generated by the fund’s trading activity over a past period—as measured by the difference between the fund’s actual returns over the period and the hypothetical returns generated by keeping the fund’s portfolio holdings constant—predict performance. Similarly, Groenborg, Lunde, Timmermann, and Wermers (2018) used 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) found that

managers born into poor families tend to outperform managers born into rich families. In early work, Shukla and Singh (1994); Golec (1996); and Chevalier and Ellison (1999) found many aspects of fund manager education to be predictive. Gottesman and Morey (2006) showed, however, 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) showed that fund performance improves "by about 3 basis points for each basis point of managerial ownership" (p. 179). Similarly, Evans (2008) found a positive relationship between manager ownership and performance, and Cremers, Driessen, Maenhout, and Weinbaum (2009) showed that funds with low ownership by fund directors tend to underperform.

Distinguishing the Various Skills of Active Managers. Although the literature often refers to *skill* generically as the ability to generate alpha, it also examines the variety of *skills* managers actually use to create value for investors.

The skill that has received the most attention is the ability to select stocks. Daniel et al. (1997) and Wermers (2000) isolated the performance resulting from stock selection by studying the performance of individual fund holdings. Each stock in a fund's portfolio was compared with a benchmark consisting of stocks with matching characteristics (i.e., similar market capitalization, book-to-market ratio, and prior return). They found that, on average, funds select stocks that outperform the market. Fulkerson (2013) showed, however, that the outperformance resulting from this skill has declined somewhat through time. Jones and Shanken (2005) found that, on average, funds "possess some skill in selecting stocks" (p. 544), although the benefits from that skill are not enough to offset expenses. Relatedly, Chen, Jegadeesh, and Wermers (2000) showed that the stocks purchased by funds tend to have significantly higher returns than the stocks sold, and Chen, Desai, and Krishnamurthy (2013) found significant stock selection ability with respect to short selling.

Related research has explored various nuances with regard to stock picking. Duan, Hu, and McLean (2009) found that managers demonstrate greater stock selection ability in regard to stocks with high idiosyncratic volatility, and Fulkerson (2013) found that the majority of stock selection skill tends to

come from selecting stocks within industries. Cohen, Polk, and Silli (2010) found that stock-picking skills are particularly pronounced in the largest positions in a fund's portfolio.

Other studies aimed to identify the specific sources of stock selection ability. For example, Baker, Litov, Wachter, and Wurgler (2010) and Cai and Lau (2015) showed that managers can predict earnings; Nain and Yao (2013) provided evidence that managers can predict postmerger performance; and Koch (2017) showed that some managers add value by transacting before other mutual funds. Furthermore, Chen, Gao, Zhang, and Zhu (2018) showed that stock selection skill is amplified by the practitioner's prior work experience as an industry analyst, and Cohen, Frazzini, and Malloy (2008) provided 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) showed that managers have a preference for investing in local firms, for which they may have an information advantage. Giannetti and Laeven (2016) found that in times of high aggregate market volatility, managers are also more likely to liquidate their positions in firms in geographically remote locations. Social interactions with local managers may also play a role. Hong, Kubik, and Stein (2005) found that managers are more likely to buy a stock if other managers in the same city are buying that stock. This behavior appears to be rational, given that Pool, Stoffman, and Yonker (2015) showed that "a long-short strategy composed of stocks purchased minus sold by neighboring managers delivers positive risk-adjusted returns" (p. 2679).

Studies may underestimate stock selection skill if they do not account for the "type" of or reason for the trade. Alexander, Cici, and Gibson (2007) showed that purchases motivated by valuation considerations outperform the market by a significant margin but purchases motivated by the need to invest excess cash from fund inflows do not. Similarly, Rohleder, Schulte, Syryca, and Wilkens (2018) showed that valuation-motivated buys significantly outperform and that valuation-motivated sells significantly underperform. Da, Gao, and Jagannathan (2011) found that "impatient informed trading positions" (p. 717) generate most of the alpha in the portfolios of funds with positive expected alpha.

Although stock selection skill has typically been examined on a fund-by-fund basis, the aggregate

selection skill of the fund industry has also been studied. Wermers, Yao, and Zhao (2012) developed a method to efficiently aggregate holdings across funds and showed that when the combined position in a stock increases, the stock subsequently outperforms. Gupta-Mukherjee (2013) showed 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” (p. 1286). Jiang, Verbeek, and Wang (2014) found 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) found that many estimates of stock selection skill are downwardly biased because the quarterly fund holdings data used in most studies do not account for interim trading. On the other hand, Nicolosi (2009) argued that such estimates are upwardly biased because of the assumptions about trading made when using that same quarterly data, and Chakrabarty, Moulton, and Trzcinka (2017) found that the short-term trades that are often missed when quarterly data are used tend to perform poorly.

Another skill 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 submarkets. Jiang, Yao, and Yu (2007) found that active funds tend to have positive timing ability, and Kaplan and Sensoy (2005) found that active funds tend to increase their benchmark exposure prior to positive benchmark returns. Mamaysky, Spiegel, and Zhang (2008) showed that “a subset of [funds] (perhaps as high as 20%)” (p. 234) are able to time the market. Along similar lines, Busse (1999) showed 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) found more evidence of timing ability by using monthly holdings, which are not widely available to researchers. The use of monthly fund returns is also common, but Bollen and Busse (2001) found that “mutual funds exhibit significant timing ability more often in daily tests than in monthly tests” (p. 1075). Similarly, Goetzmann, Ingersoll, and Ivković (2000) documented the difficulty of accurately

measuring timing ability from monthly returns if the fund manager is making daily timing decisions.

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) showed that skilled managers tend to be less reliant on new public information, such as the information released in earnings announcements, when making investment decisions. Likewise, Cullen, Gasbarro, and Monroe (2010) found 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 (2019) showed that funds that trade in response to changes in quantitative information, rather than qualitative information, tend to outperform.

Other managers add value through corporate oversight. Iliev and Lowry (2015) showed that managers who directly engage on governance issues, rather than relying on the recommendations of Institutional Shareholder Services, outperform. Duan and Jiao (2016) found, however, that many funds “vote with their feet” by selling positions rather than trying to influence governance through voting.

On a practical level, some managers add value through tax management. Sialm and Starks (2012) showed that funds held primarily by taxable investors tend to select investment strategies that result in lower taxes, and Gibson, Safieddine, and Titman (2000) provided evidence of funds engaging in tax-motivated trades. This tax management is valued by investors. Bergstresser and Poterba (2002) found that “after-tax returns have more explanatory power than pretax returns in explaining inflows” (p. 381) to mutual funds.

Finally, managers can add value by maintaining a disciplined investment approach. Singal and Xu (2011) found that “about 30% of all funds exhibit some degree of disposition behavior⁸ and that such funds underperform compared with funds that are not disposition-prone by 4–6% per year” (p. 2704). Managers unable to avoid this bias “have significantly higher rates of failure than other funds” (p. 2704) because investors tend to avoid such funds. Cici (2012) showed that “learning effects have reduced the manifestation of the disposition effect over time, implying that academic research has influenced industry practices” (p. 795). Del Guercio and Reuter (2014) showed that, in general, investor monitoring

of fund behavior is important because funds with low monitoring tend to significantly underperform.

When Are Managers' Skills Most Useful?

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

An important factor in determining the value of a manager's skills is the variation in the number of opportunities for profitable investments. Pástor, Stambaugh, and Taylor (2017) showed that funds perform better in periods after they have increased trading and that overall trading within the industry predicts performance. They hypothesized that funds vary their trading depending on the number of profitable opportunities available in the market. Along a similar line, von Reibnitz (2017) found that funds perform better in periods of greater variation in returns among stocks, and Dong, Feng, and Sadka (2019) found that "the ability of fund managers to create value depends on market liquidity conditions" (p. 1020).⁹

The value of both the stock selection and market-timing abilities varies with market and economic conditions. Kacperczyk, van Nieuwerburgh, and Veldkamp (2014) showed that skilled funds time the market well during bear markets and pick stocks well during bull markets. Studies that ignore the impact of market conditions make managers as a whole appear less skilled than they are. Kosowski (2011) found that funds have negative risk-adjusted returns in expansion periods but positive risk-adjusted returns in recession periods. Consequently, he concluded, many traditional models "understate the value added by active mutual fund managers in recessions" (p. 607).

The level of competition also affects the value of a fund manager's skill. Dyck et al. (2013) found that the value of active management is greater in less competitive asset markets, and Hoberg et al. (2018) found that active funds investing in the United States perform better when they have a style that faces less competition from other active funds. Less competition across all dimensions, however, does not lead to better performance for active funds. Cremers, Ferreira, Matos, and Starks (2016) examined a variety of international markets and showed that active

funds are more active, are lower cost, and perform better when competition from low-cost index funds is high.

The structure of the fund's managerial team appears to influence how value is created through active management. Dass, Nanda, and Wang (2013) found that solo managers tend to time the market well whereas teams of managers tend to select stocks well. Goldman et al. (2016) found that solo managers "have much more concentrated portfolios, tend to perform better, and have higher expense ratios than funds managed by multiple managers" (p. 49). Using more accurate data on team structure than was previously available, however, Patel and Sarkissian (2017) showed that "team-managed funds outperform single-managed funds across various performance metrics" (p. 1989). Overall, whether a team or a solo manager adds more value is unclear.

Finally, the structure of a manager's incentives may matter. Elton, Gruber, and Blake (2003) showed that management incentive fees are related to better stock picking, although incentives may also increase risk. Massa and Patgiri (2009) found that high-incentive contracts are associated with both increased risk taking and higher risk-adjusted returns. Conversely, Golec and Starks (2004) identified no evidence of increased risk taking, and Drago, Lazzari, and Navone (2010) found no statistically significant effect on risk or return. Ma, Tang, and Gómez (2019) demonstrated that there is substantial variation in managers' total compensation contracts but found "little evidence of differences in future performance associated with any particular compensation arrangement" (p. 587). Aside from risk and return measures, Dass, Massa, and Patgiri (2008) found that the "incentives contained in the mutual funds' advisory contracts induce managers to overcome their tendency [to make trades similar to those of other managers]" (p. 51).¹⁰

On the Zero-Sum Game. The theory that active management is a zero-sum game may miss important nuances in the scoring. Pedersen (2018) argued 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 indexes are reconstituted—so even 'passive' investors must regularly trade" (p. 21). He claimed that once this assumption is relaxed, "active managers can be worth positive fees in aggregate" (p. 21).

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) showed that arbitrage activity around the reconstitution of the S&P 500 Index and the Russell 2000 Index 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.

An Alternative Measure of Skill. Berk and van Binsbergen (2015) proposed that an active manager's skill should be measured as the fund's "gross excess return over its benchmark multiplied by [assets under management]" (p. 2). In other words, their measure estimates the value extracted by the manager from the capital markets in dollar terms. Using this "value-added" measure, they found that the average actively managed fund (across all fund styles, including nonequity) generates about \$3.2 million per year in value for investors. Furthermore, they found that, on average, active funds have a net alpha of 36 bps per year when compared with index mutual funds with similar styles. The comparison with 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) preferred their measure of gross skill because "the net alpha is determined in equilibrium by competition between investors, and not by the skill of managers" (p. 2). They built on the theoretical model of the mutual fund industry developed by Berk and Green (2004). In that model, investors competitively allocate capital among funds, which are subject to diseconomies of scale—meaning that as a fund's assets under management increase, its performance tends to worsen. In this model's equilibrium, 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, will have the same expected net alpha. Using this model, Berk (2005) labeled 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" (p. 28).

For the Berk and Green (2004) model to be an accurate representation of the mutual fund industry, however, capital must be competitively allocated

and significant diseconomies of scale must exist. Regarding the first requirement, a substantial body of research—starting with Chevalier and Ellison (1997) and Sirri and Tufano (1998)—shows that capital is competitively allocated. Although fund flows may not be fully efficient, the literature shows that funds that perform well generally receive inflows and funds that perform poorly tend to experience outflows. Wahal and Wang (2011) concluded that "the mutual fund market has evolved into one that displays the hallmark features of a competitive market" (p. 40).

Not all distribution channels are equally competitive. Funds can be sold either directly to investors or through a broker. Del Guercio and Reuter (2014) showed that allocations are less efficient for broker-sold funds, and Christoffersen, Evans, and Musto (2013) found that brokers' incentives (e.g., the size of fund loads) play a significant role in how brokers direct capital. The findings on these broker-sold funds, which Bergstresser, Chalmers, and Tufano (2009) found underperform "even before subtracting distribution costs" (p. 4129), suggest that the assumption of competitive capital allocation does not have complete empirical support. Instead of allocating capital purely on a comparison of fund assets with managerial skill, investors may give significant weight to factors such as trust (Gennaioli, Shleifer, and Vishny 2015) or make different choices depending on their sophistication (e.g., Chalmers, Kaul, and Phillips 2013; Gârleanu and Pedersen 2018).¹¹ In short, market segmentation may undermine the first requirement of the Berk and Green (2004) model.

Regarding the second requirement, the academic literature has found mixed evidence for diseconomies of scale. Chen, Hong, Huang, and Kubik (2004); Yan (2008); Pástor et al. (2015); Harvey and Liu (2017); Zhu (2018); and McLemore (forthcoming) found evidence of diseconomies of scale in the mutual fund industry, but Reuter and Zitzewitz (2015); Phillips, Pukthuanthong, and Rau (2018); and Adams, Hayunga, and Mansi (2018) found no relationship between fund size and performance. Ferreira, Keswani, Miguel, and Ramos (2013) found diseconomies of scale only for certain types of funds. In particular, they found that "funds that invest overseas [are] not negatively affected by scale" (p. 483). Therefore, given that the evidence with respect to diseconomies of scale is mixed and that the support for competitive capital allocation is incomplete, results based on the Berk and Green (2004) model must be interpreted carefully.

Recent Research on Other Actively Managed Mutual Fund Styles

The prior section considered the expansive literature on the active management of US equity mutual 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, far less research has been carried out on the degree to which the conventional wisdom applies to other asset classes and investment approaches. Furthermore, the advances in the US equity literature over the past 20 years have rarely been applied to other fund types. In these subsections, 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.

Bond Funds. Several studies provide evidence that active bond fund managers are skilled. By examining bond fund buying and selling, Moneta (2015) found that bond funds generate alpha before costs. Gutierrez, Maxwell, and Xu (2009) found evidence of persistence in performance. As with US equity funds, Amihud and Goyenko (2013) found 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) found evidence of market-timing ability on the part of bond fund managers, although Boney, Comer, and Kelly (2009) showed 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, which is consistent with the findings for US equity funds.

When net returns are considered, however, bond funds appear to underperform, on average. Moneta (2015) found that, despite outperformance before fees, most categories of bond funds underperform after fees. Similar underperformance after fees has been seen in US government bond funds (Ferson, Henry, and Kisgen 2006), US corporate bond funds (Cici and Gibson 2012), Canadian bond funds (Ayadi and Kryzanowski 2011), and global bond funds (Detzler 1999). Jones and Wermers (2011) found that the majority of bond funds failed to beat their benchmarks during the 2008–09 recession, and Choi and Kronlund (2018) found that corporate bond funds that “reach for yield” in low-interest-rate environments tend to have negative risk-adjusted returns.

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, no model is generally accepted for controlling for bond portfolio risks. As a result, a wide variety of models have been used. **Exhibit 1** summarizes the models used in past studies. Bai, Bali, and Wen (2019) have developed a novel model focusing on downside risk, credit risk, and liquidity risk in corporate bonds. This model could lead to new insights if applied to bond funds. Nevertheless, a gap currently exists in the literature regarding the best model for understanding the performance of bond funds.

Exhibit 1. The Variety of Performance Models in Bond Fund Research

Performance Model	Studies Using Model
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 (2009) 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)

Hybrid Funds. Hybrid funds are a mix of equity and fixed-income assets. Most of the limited research on these funds has focused on the unique issues that arise when measuring their performance. For example, traditional equity factor models can show a positive alpha, but Comer et al. (2009) found that the inclusion of pricing factors related to bonds led to a negative alpha in at least one subsample. Herrmann and Scholz (2013) focused on style benchmarks to control for risk, and although they found no average outperformance, they did find some short-term persistence in returns.

Because 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 portfolios depending on which asset class they expect to earn the higher returns. Comer (2006) found some timing ability in a few subsamples of hybrid funds, and Comer, Larrimore, and Rodriguez (2008) found outperformance by hybrid funds during bear markets.

Socially Responsible or Environmental, Social, and Governance Funds. Socially responsible funds—also known as environmental, social, and governance (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 certain corporate behavior or want to avoid associating with companies that engage in certain behavior. Riedl and Smeets (2017) found that some “investors are willing to forgo financial performance in order to invest in accordance with their social preferences” (p. 2505). An extensive body of research on ESG investing exists, but only a few of the studies have specifically evaluated mutual funds.¹²

The research on socially responsible funds that does exist has focused 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. The empirical research on the actual impact of ESG filters on funds, however, is split.

On the one hand, Grinold (1989); Adler and Kritzman (2008); and El Ghoul and Karoui (2017) found that the constraints create costs for investors. On the

other hand, Hamilton, Jo, and Statman (1993); Statman (2000); Bauer, Koedijk, and Otten (2005); Renneboog, Ter Horst, and Zhang (2008a); Meziani (2014); and Dolvin, Fulkerson, and Krukover (2019) suggested that ESG funds are generally neither better nor worse than conventional funds on a risk-adjusted basis. Renneboog, Ter Horst, and Zhang (2008b) performed a thorough review of the ESG literature at that time and concluded that “there is little evidence that the risk-adjusted returns of [ESG funds in the United States and United Kingdom] are different from those of conventional funds” but that “[ESG] funds in Continental Europe and Asia-Pacific underperform benchmark portfolios” (p. 1724).

Despite the constraints of socially responsible investing, some research has found positive effects on performance. Henke (2016), examining bond mutual funds, found that those following a socially responsible strategy outperform those following a conventional strategy by about 0.5% per year. Nofsinger and Varma (2014) showed that ESG funds outperform comparable conventional funds during market crises.

Target Date Funds. Target date funds represent a growing percentage of assets under management, but whether active management in target date funds creates value for investors is unclear. Bodie and Treussard (2007) and Gomes, Kotlikoff and Viceira (2008) showed 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 the share classes with lower expenses. Elton, Gruber, de Souza, and Blake (2015) demonstrated, however, that target date fund managers have neither positive alpha nor timing ability, and Elton, Gruber, and de Souza (2018) found that target date funds may do worse than the general public when selecting managers.

A complication in evaluating the performance of target date funds arises from those funds' shifting asset mixes. Managers design a “glide path” that changes the asset mix as the target date nears, but the most appropriate glide path is not clear. Balduzzi and Reuter (2019) found that target date funds with similar target dates often have distinctly different risk profiles and historical returns. Spitzer and Singh (2008) showed that target date funds have begun to skew toward 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) suggested that this trend is the result of some managers taking on too little risk,

whereas Trammell (2009) suggested 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 also makes them difficult to benchmark. Because the funds' asset allocations change over time, Surz and Israelsen (2008) found that identifying a single benchmark that can be consistently applied is difficult. The funds' changing allocations are intended to create value for shareholders, but Branch and Qiu (2011) showed that glide paths and changing allocations have not clearly been better than a fixed allocation strategy.

REIT Funds. REIT mutual funds invest primarily in the equity issuances of exchange-listed REITs. Although 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, whereas other studies suggest superior performance.¹³

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

International Funds. International mutual funds have a larger set of opportunities than domestic funds. Security markets in different countries have significant heterogeneity, however, with varying levels of transparency, liquidity, regulation, and investor protection. Foerster and Karolyi (1999), among others, showed that these differences help lead to higher correlations in local stock returns than in global stock returns. Even though Fama and French

(2012, 2017) showed that common return patterns exist in most markets and Eun, Huang, and Lai (2008) showed 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) found that only 16% of top academic studies have examined non-US markets, so it is not surprising that limited research exists on US-domiciled international mutual funds. Kao, Cheng, and Chan (1998) found that international funds had a positive average alpha during the 1980s and 1990s, and Turtle and Zhang (2012) showed positive alphas for emerging market funds during global bull markets. Hiraki et al. (2015) found that international funds that concentrate in specific countries and industries outperform more diversified funds. Fan and Addams (2012) and Breloer, Scholz, and Wilkens (2014) did not find evidence that top-performing international funds in the past continue to outperform in the future, but Droms and Walker (2001) did find some evidence of persistence. Eun et al. (2008) highlighted the diversification value of small-cap international funds, although Didier, Rigobon, and Schmukler (2013) found 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 (NAVs) of international funds in the past may cause distortions in the evaluation of the returns.¹⁴ Comer and Rodriguez (2012) highlighted issues with the benchmarking of international funds, particularly the biases that result from the common use of the MSCI World Index. Dyck et al. (2013) showed that the value of active management depends on the efficiency of the particular markets in which the fund invests, and Cremers et al. (2016) emphasized that the level of competition among managers—including competition from managers of index funds and ETFs—varies significantly in the international mutual fund markets. Finally, the complexities of international investing may generate additional constraints for managers; Dubofsky (2010) found that international funds have portfolios biased toward liquidity.

Important Questions

We conclude our literature review by considering the current challenges researchers face in 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, following further exploration, may refute or confirm the conventional wisdom on active management.

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 have merit only if the benchmark used in the analysis is correct. The literature uses factor models, market index models, and holdings-based models, but all these models have important limitations, as we outline in this subsection.

For mutual funds, the multifactor 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 emerged. Huij and Verbeek (2009); Moreno and Rodríguez (2009); and Kadan and Liu (2014) highlighted the shortcomings of this type of factor specification. Cremers et al. (2013) showed that the construction of the size and value factors in the Carhart model implies that mutual funds should be compared with benchmarks with large weights (both positive and negative) on small-cap value stocks, despite those stocks being only a minor part of the investment universe. This questionable comparison can “lead to biased alphas (in either direction)” (p. 4).

Furthermore, the factors used in Carhart (1997) may not be the appropriate set. Harvey, Liu, and Zhu (2016) and Hou, Xue, and Zhang (2017) identified 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) showed that including the new Fama and French (2015) factors explains the apparent outperformance of US equity mutual funds with low volatility. Despite the shortcomings of Carhart’s model, the literature has not settled on a broadly accepted factor model to replace it.

Instead of using a factor model, researchers can compare an active fund’s returns with those of 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 SEC requires that every mutual fund disclose a benchmark index in its prospectus 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 the S&P Dow Jones indexes (Soe and Poirier 2016), Morningstar’s Active/Passive Barometer (Bryan, Boccellari, Johnson, and Rawson 2015), and Vanguard’s research white papers (Rowley, Walker, and Ning 2018).

Unfortunately, self-declared benchmarks often do not represent the actual investment style of the fund. Sensoy (2009) and Cremers et al. (2018) found that 25%–30% of funds have self-declared benchmarks that are a poor match for the fund. Cremers et al. (2018) in particular showed 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. Furthermore, self-declared benchmarks rarely change, even though many fund managers change their styles over time.¹⁵ 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 et al. (1997) and Wermers (2000) provided some of the first holdings-based analyses of fund performance. They found that before costs, mutual funds tend to select stocks that outperform. Busse, Jiang, and Tang (2019) combined holdings-based methods with factor models to “double-adjust” fund performance.

Although holdings-based methods can be useful for calculating the value of active managers’ decisions, evaluating funds on the basis of the performance of their holdings has significant drawbacks. One reason is that, because of trading costs and fees, the holdings-implied performance may not accurately represent the actual returns realized by a fund’s investors. Another reason is that these methods cannot include the substantial trading activity that occurs between the dates when holdings reports are available.

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

Barber et al. (2016) and Berk and van Binsbergen (2016) showed 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 only 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) claimed that their results imply that the CAPM is the best model currently available to capture fund riskiness and estimate fund performance, but Barber et al. (2016) disagreed. They argued that when measuring fund manager skill, accounting for "all factor-related returns" (p. 2606) is important. Generally, Barber et al. (2016) stated they "do not believe the results in either paper provide much evidence regarding the true asset pricing model" (p. 2607).

Aside from factor models, Sensoy (2009) and Cremers et al. (2018) showed that investors also consider performance relative to passive benchmark indexes when making decisions. The benchmark that funds are required to provide to investors by the SEC is particularly important because investors appear to use that benchmark to make buying and selling choices even when that benchmark is a poor match for the fund's investment style. Although this observation may be consistent with other evidence that mutual fund investors are not perfectly rational (e.g., Cooper et al. 2005), it may also be a result of the barriers investors face. Sirri and Tufano (1998)

and Hortaçsu and Syverson (2004) described these barriers as "search costs"—meaning the money and time required to research investments—and concluded that these costs may encourage investors to use simple criteria and discourage them from using data that are difficult to acquire or interpret.

Limitations of the Holdings Data. The lack of transparency regarding the process of managing mutual fund portfolios creates another limitation on the assessment of the value of active management. Most research has used data on fund holdings from Thomson Reuters, but that database has three important limitations. First, it contains only quarterly holdings reports. Second, it contains only equity positions. Third, as Schwarz and Potter (2016) showed, it misses some data present in mandated public SEC filings while including other data not in those filings. Together, these 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) showed that quarterly holdings miss many trades that occur during a given quarter.

Apart from these data concerns, the holdings themselves may not actually represent a 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) explained window dressing as an effort by managers to prevent front running or free riding on their investment ideas. Morey and O'Neal (2006) and Agarwal, Gay, and Ling (2014) suggested that managers window dress their portfolio to make themselves appear well informed to investors.

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

Limitations of Manager Data. Despite mutual funds being relatively simple to invest in and heavily regulated, academic researchers do not have easy access to detailed data on fund managers and fund operations. With regard to fund managers, Massa, Reuter, and Zitzewitz (2010) discussed how the CRSP database, which is the most widely used source of mutual fund information in academic research, has limited data on fund managers. Patel and Sarkissian

(2017) showed that Morningstar Direct has better data, but neither database makes it easy to track managers who move between funds, nor do they provide readily usable information on managers' backgrounds and non-mutual-fund activities (e.g., Gottesman 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 are 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.

Active Management in Multiasset

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

Brinson, Hood, and Beebower (1986) found that the decisions of pension fund managers explain only a small part of their funds' total returns. Dyck et al. (2013) showed that pension funds underperform by 0.35% per year in US markets but outperform by 1.80% per year in emerging markets. Andonov, Bauer, and Cremers (2012) found that US pension fund managers improve performance by 0.89% per year through their allocation, timing, and security selection activities. That improvement is largely explained by momentum, however, and has significant diseconomies of scale.

Although 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) showed that public pension funds are biased toward 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. Considering this regulatory incentive, Andonov, Bauer, and Cremers (2017) found 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 multiasset portfolios is difficult.

Impact of Constraints on the Value of Active Management.

A final challenge in evaluating the value of active management is 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. Clarke, de Silva, and Thorley (2002) noted that any constraint will "limit a manager's ability to transfer valuable information into portfolio positions" (p. 48). Among other constraints, Almazan, Brown, Carlson, and Chapman (2004) found that mutual funds often have institutional restrictions on "borrowing, purchasing securities on margin, short-selling, holding individual equity options, trading in equity index futures, or purchasing restricted securities" (p. 290) beyond those imposed by the SEC. Similarly, Evans, Ferreira, and Prado (2017) showed that fund families often tightly restrict their individual funds' investment opportunity sets. 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 based on mutual fund data today may not be applicable in the future.

Some research has been carried out on the impact of constraints on active mutual fund managers. In particular, the literature has focused on two primary constraints: (1) the requirement to provide daily liquidity and (2) the need for regulatory compliance. Mutual funds provide daily liquidity to investors by buying and selling shares of the fund at the NAV at the end of each day. Offering this level of liquidity forces managers to maintain portfolios that allow them to quickly raise cash for investors who want to exit the fund on any given day. This necessity has been shown to generate real costs for individual mutual funds and can negatively affect both mutual

funds as a whole and the overall market.¹⁶ Managers can hold more cash or invest more in assets that are easily sold to better cope with investor buying and selling, but such steps come at the cost of deviating from any otherwise optimal asset allocation.¹⁷

Beyond the requirement to provide liquidity, mutual funds face many other regulatory requirements that might 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 funds are subject to investment restrictions, such as 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) showed 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) showed that “publicly available information of fund flows and holdings exposes mutual funds in distress to predatory trading” (p. 4931).

Estimating the total impact of these constraints on the value of active management is a daunting task. One approach is to examine the value of active management in portfolios less constrained than mutual funds, such as hedge funds and separate accounts. Although 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) suggested that hedge funds have an alpha of 3%–5% per year, indicating substantial value from active management in that industry. Aragon (2007); Fung, Hsieh, Naik, and Ramadorai (2008); Dichev and Yu (2011);

and Joenväärä, Kauppila, Kosowski, and Tolonen (forthcoming), however, estimated 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 (2014) found 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 the available data contain many problems.¹⁸ Granting those concerns, we note that Agarwal, Boyson, and Naik (2009); Clifford, Jordan, and Riley (2013); Huang and Wang (2013); Klement (2015); and Hartley (2017) all found that mutual funds that attempt to replicate “hedge fund style” investment strategies (e.g., absolute return funds, alternative strategy funds, and market-neutral funds) are unable to replicate the performance of actual hedge funds. These results support the idea that mutual fund managers, because of constraints, have a more limited ability than hedge fund managers to create value for investors through active management.

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Notes

1. Carhart (1997) has, according to Google Scholar, 14,758 citations as of 18 June 2019.
2. All data in this section are from the 2017 and 2018 Investment Company Institute handbooks except where noted.
3. For early evidence of persistence, 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 (1996a); and Wermers (1997).
4. In the section “The Appropriate Model for Evaluating Fund Performance,” we discuss in detail the merits of each of the common benchmarking approaches.
5. Riley (forthcoming) closely replicated the procedure that Kosowski et al. (2006) used to draw that particular conclusion and found “no evidence of stock selection ability in excess of costs” (p. 1) in recent years.
6. Baker and Wurgler (2006) stated that “one possible definition of investor sentiment is the propensity to speculate” (p. 1648).
7. Andrikogiannopoulou and Papakonstantinou (forthcoming) found that the “false discoveries” technique “underestimates the proportion of nonzero-alpha funds” because of “the low signal-to-noise ratio in fund returns” (p. 1).
8. 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.

9. De Silva, Sapra, and Thorley (2001) cautioned that performance evaluation requires adjustments for changes in “return dispersion over time” as “an excess return of ± 10 [percentage points] in a narrow-dispersion year like 1996 is a much more material indicator of performance than the same excess return in a wide-dispersion year like 1999” (p. 39).
10. Jiang and Verardo (2018), measuring “the tendency of fund managers to follow the trades of the institutional crowd,” found that the funds that do not follow the crowd outperform those that do “by over 2% per year” (p. 2229). Wei, Wermers, and Yao (2015) showed that the contrarian funds “generate superior performance both when they trade against and with the [non-contrarian funds]” (p. 2394).
11. Among other papers, the following studies provided additional empirical results that appear inconsistent with investors acting rationally with respect to capital allocations: 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); Solomon, Soltes, and Sosyura (2014); Barber, Huang, and Odean (2016); and Phillips, Pukthuanthong, and Rau (2016).
12. Several studies have considered the value of investing in individual securities based on socially responsible criteria. Examples are Hong and Kacperczyk (2009); Deng, Kang, and Low (2013); Eccles, Ioannou, and Serafeim (2014); Kim, Li, and Li (2014); Flammer (2015); and Nagy, Kassam, and Lee (2016).
13. O’Neal and Page (2000); Lin and Yung (2004); Chiang, Kozhevnikov, Lee, and Wisen (2008); Derwall, Huij, Brounen, and Marquering (2009); and Hartzell, Mühlhofer, and Titman (2010) found no evidence of outperformance. Gallo, Lockwood, and Rutherford (2000); Kallberg, Liu, and Trzcinka (2000); Fuerst and Marcato (2009); and Kaushik and Pennathur (2012) found some evidence of outperformance.
14. Funds that invest in domestic assets can calculate their daily NAVs by using that day’s closing market prices. Because of time zone differences, the prices used for international assets, however, may be stale or still fluctuating. Bhargava, Bose, and Dubofsky (1998); Bhargava and Dubofsky (2001); Goetzmann, Ivković, and Rouwenhorst (2001); Zitzewitz (2006); and Chua, Lai, and Wu (2008) showed how this issue can make the NAV inaccurate for international funds and demonstrated 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 “time zone arbitrage” strategies.
15. See, for example, diBartolomeo and Witkowski (1997); Kim, Shukla, and Tomas (2000); Elton et al. (2003); Hirt, Tolani, and Philips (2015); Bams, Otten, and Ramezanifar (2017); and Mateus, Mateus, and Todorovic (2017).
16. Edelen (1999); Johnson (2004); Greene, Hodges, and Rakowski (2007); Dubofsky (2010); Rakowski (2010); and Fulkerson and Riley (2017) focused on the cost of providing liquidity at the individual fund level. The studies of Chen, Goldstein, and Jiang (2010); Coval and Stafford (2007); Dyakov and Verbeek (2013); Shive and Yun (2013); Goldstein et al. (2017); and Parida and Teo (2018) have implications at the fund level but also discussed general market impacts.
17. 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.
18. 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, 2014b); Patton, Ramadorai, and Streatfield (2015); and Dimmock and Gerken (2016).

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