Financial Intermediaries vs. Capital Allocation: The Forgotten Role of Mutual Funds

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Abstract

Recent evidence challenges the allocational efficiency of firms (in allocating capital to more productive sectors). We investigate whether financial intermediaries can help achieve better allocation. We find domestic mutual funds exhibit significant allocational efficiency in their equity investments due to managers' active choices. Moreover, mutual funds can allocate capital more efficiently than real investments (made by firms) and a list of alternative sources (e.g., fund benchmarks and analyst forecasts). Allocational efficiency also allows funds to deliver superior performance, implying a novel source of managerial skills. Our results suggest that financial intermediation helps the market achieve efficiency in resource allocation.

JEL classification code: F36 G15 G23

Keywords: Allocational efficiency; Mutual Fund Investment; Capital Markets.

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Introduction

One essential premise of the financial market is to facilitate economic growth by allocating capital to more productive sectors (Schumpeter 1912; Tobin 1942). This classical view gains substantial empirical support from cross-country studies (e.g., Rajan and Zingales 1998 and Wurgler 2000; see Levine 2005 for a survey). Recent observations in the U.S., however, cast some doubt on this traditional wisdom. If anything, firm-level equity funding seems to flow *out of* high-productive sectors since the mid-1990s. This puzzling evidence invokes heated debates (Gutierrez and Philippon, 2017a,b; Alexander and Eberly, 2018; Frank and Yang, 2018; Lee, Shin, and Stulz, 2020)[1] and calls for renewed scrutiny about the degree of allocation efficiency achieved by the recent financial market.

We aim to shed light on financial market resource allocation by asking a closely related question. If the firm use of equity capital appears controversial, could financial intermediaries help achieve better resource allocation? This question is profound because the literature has long recognized the theoretical importance of financial intermediaries in resource allocation. As summarized in Levine (2005), the financial market can better allocate capital because it can effectively produce information—and financial intermediaries provide the infrastructure for the market to achieve this dual information-allocation role (Boyd and Prescott 1986; Greenwood and Jovanovic 1990). Moreover, when financial intermediaries produce better information to improve resource allocation, more individuals can afford to join and benefit from their service, generating a positive feedback loop between finance and the real economy (Greenwood and Jovanovic 1990). However, although both equity and debt intermediation (e.g., mutual funds and banks) should follow these theoretical arguments, empirical evidence on the former is scarce.[2]

[1] Lee, Shin, and Stulz (2020) attribute the observation to firms' life-cycle, consistent with Hoberg and Maksimovic's (2019) results based on texture analysis. Other interpretations involve various forms of market frictions, such as declining competition (Gutierrez and Philippon, 2017a,b), polarization (Alexander and Eberly, 2018), and the reliance on firm savings (Frank and Yang, 2018). In a recent survey, Eisfeldt and Shi (2018) point out a general disconnection between procyclical firm-level capital reallocation and measured productive reallocation opportunities, highlighting the importance of financial frictions.

[2] Existing studies typically focus on the allocation role of banks (e.g., Morck, Yavuz, and Yeung, 2011).

Our paper aims to fill this gap by exploring the allocational efficiency of U.S. mutual funds, our main focus of financial intermediaries in delegating equity flows. To carry out this investigation, we focus on the complete sample of actively managed U.S. open-end mutual funds from 1995 to 2015. Following Wurgler (2000), we use value-added growth to proxy for industry-level investment opportunities. We then explore the allocation efficiency of equity funds by estimating the elasticity of fund investment to contemporaneous investment opportunities. A positive elasticity indicates allocational efficiency, as more capital flows into industries with better opportunities. Alternatively, a negative elasticity can arise when intermediary capital flows out of good sectors.

We articulate several steps of analysis. We first assess the allocation efficiency of mutual funds. Our baseline result suggests that mutual funds exhibit a significantly positive investment elasticity (0.344). In economic terms, our results indicate that every 1% increase in value-added growth attracts 0.344% more capital flows from mutual funds. When we further decompose fund investment into two components—that attributable to managers' active portfolio management or retail investors' fund flows—we find that the allocation efficiency concentrates on the manager part (with an elasticity of 0.329). These observations lend initial support to the notion that equity financial intermediation, the service provided by professional fund managers, exhibits allocational efficiency.

Next, since real investment made by firms is traditionally considered efficient but invokes recent concerns, it is crucial to investigate how efficient mutual fund allocation is vis-à-vis that of firms. To achieve this goal, we follow Wurgler (2000) and estimate the elasticity of real investment flows made by firms based on industry-level fixed capital formation. Echoing the concerns on firm allocation efficiency, we first notice that the elasticity of real investments in our sample period (0.082) is relatively small compared to fund elasticity. To further quantify the difference, we examine the elasticity of the investment differential between mutual funds and real investments (i.e., fund-minus-real). We find a positive elasticity of the investment differential: the incremental elasticity of fund-minus-real amounts to 0.268, which more than triples the real investment elasticity.

We further observe that fund investment elasticity and incremental elasticity come mostly from fund managers' active portfolio management. In contrast, fund investors exhibit a negative incremental elasticity. In other words, fund managers can allocate capital more efficiently into high-productive industries than firms, whereas fund investors exhibit worse allocation. If a better capital allocation is part of the value that fund managers create due to their efforts and skills, the market can resort to their financial intermediary service (rather than firms) to achieve allocation efficiency.

The critical question to accomplish (or reject) the above economic picture hinges on the underlining mechanism. Does fund efficiency reflect fund managers' efforts or skills in active portfolio management? Alternatively, could fund managers simply follow other sources of information in allocating capital? In particular, fund managers may "passively" rebalance their portfolios following the benchmarks they track, corporate decisions they observe, and information produced elsewhere, noticeably by sell-side analysts. In this case, the above fund-level results may simply reflect the efficiency of these alternative sources.

We first scrutinize alternative explanations by asking whether we can observe an incremental elasticity of fund investments above and beyond those mechanisms. If so, the implied efficiency gain supports an active and beneficial role of mutual funds in allocation. We start with benchmarking. Traditional theories (e.g., the CAPM) suggest that the market portfolio and related indices can efficiently guide capital flows, including mutual fund investments. However, the popularity of mutual fund benchmarking (e.g., Wurgler, 2011) may also hurt information discovery, which reduces the related allocation efficiency. In other words, there are conflicting theoretical predictions on how benchmarking affects mutual fund allocational efficiency—an issue we can only resolve empirically.

To analyze benchmarking empirically, we zoom in on the subsample of (active) funds benchmarked against the S&P 500 Index—the leading market index tracked by equity mutual funds. We first observe that, without adjusting for benchmarking, the fund manager elasticity and manager-minus-real elasticity are 0.203 and 0.140, both statistically significant. These effects are comparable to our whole sample analysis with a smaller magnitude.[3] Moreover, fund managers exhibit substantial incremental elasticity compared

[3] The smaller magnitude is reasonable because firms included in the S&P index are likely the most widely scrutinized in the market. But even in this case, mutual fund managers contribute significantly to increasing allocational efficiency.

to index adjustments (i.e., the inclusion and exclusion of member firms), with manager-minus-index elasticity as high as 0.149.[4] In other words, fund managers can better allocate capital than the market index they track, presumably because fund managers may have processed allocation-related superior information above the market index.

Next, we examine whether fund allocation is more efficient than corporate decisions—we focus on net equity issuance, the most relevant corporate policy to equity allocation (Lee, Shin, and Stulz 2020)—and analyst forecasts. Although our previous tests compare fund allocation to real investment flows estimated from fixed capital formation, it remains a question of whether fund managers can also allocate capital more effectively than equity issuance, because firms often exhibit timing ability when implementing such capital structure management policies (e.g., Baker and Wurgler, 2002). Our results show that fund managers allocate capital better than implied by firm policies. In this regard, financial intermediation provides a market-based mechanism to reassure allocational efficiency *despite* the frictions behind firm policies. Meanwhile, less informed fund managers rely more on analyst recommendations (e.g., Kacperczyk and Seru 2007). In this regard, a more efficient fund allocation than analysts, as we observed empirically, also points to allocation-related superior information as a potential benefit provided by fund managers.

Since all the above analysis suggests that fund managers may have processed superior information to achieve allocational efficiency, which we refer to as the *information channel* (of resource allocation), we finally examine this mechanism more explicitly. The empirical challenge is that we do not observe how fund managers process information. However, we can use fund performance to provide indirect inference. Our intuition is as follows. Suppose fund managers achieve allocation efficiency via their skills to process allocation-related information. In this case, we should expect more skillful managers (who exhibit more efficiency) to generate better before-fee performance. In contrast, a failure to deliver performance makes it difficult to link fund allocation to superior information or related

[4] Index allocation can originate from price-induced weight changes and membership changes—the index allocate more capital into an industry when the index weight increases or when new industry members have been included. The first (weight) effect is mechanical due to realize industry returns, whereas the index publishers have a certain discretionary power in determining the inclusion and exclusion of index members. Our analysis controls for the first effect and hence focuses on the second effect..

managerial skills. In other words, the skill of processing allocation-related superior information can be validated (or rejected) by scrutinizing allocation-related fund performance.

Our empirical results strongly favor the information channel. We first observe a significant predicting power of investment elasticity on fund performance. In particular, a one-standard-deviation increase in allocational efficiency is associated with approximately 1.35% (1.23%) higher out-of-sample quarterly Fama-French five-factor-adjusted returns in panel (Fama-MacBeth) specifications. Alternative risk adjustments (e.g., the Fama-French-Carhart four factors) yield similar results.

More interestingly, we find that the influence of allocational efficiency applies to both before and after-fee performance. Strictly speaking, skillful managers (exhibiting more efficiency) should deliver before-fee performance, according to Berk and Green (2005). Whether fund managers are willing to share the economic rents with investors is a different issue. Our analysis suggests that investors benefit from allocational efficiency by receiving after-fee performance. Since investors typically allocate capital to good-performing mutual funds, the above observation is consistent with positive feedback between allocational efficiency and investors' capital, which is the key ingredient for the market to achieve market-wide allocation efficiency (Greenwood and Jovanovic, 1990).[5] Jointly, our results reveal a beneficial role of the mutual fund industry in promoting the efficiency of resource allocation in the equity market.

We finally conduct a list of additional analyses to shed more light on the economic ground and robustness. Our baseline results on allocational efficiency are robust to a list of alternative empirical specifications. We also observe that some fund characteristics, such as size, turnover, and expense ratios, can affect allocational efficiency. Indeed, the investment elasticity decreases in size, turnover, and expense ratios. These intriguing results are consistent with the information channel, as they show that allocational efficiency

[5] Using before-fee performance or alternative risk adjustments does not change our main results. Our results are also consistent with Gârleanu and Pedersen's (2018) prediction that a more informational efficient mutual fund industry helps enhance the pricing efficiency in the securities market.

is not an artifact of more trading. The negative influence of fund size is also consistent with diseconomies of scale typically associated with fund skills (e.g., Berk and Green 2005).

Last but not least, we ask whether we can attribute the information channel of allocation efficiency to known measures of managerial skills. For this goal, we expand our performance test into a two-stage analysis. In the first stage, we regress elasticity on a list of known skill measures, including industry concentration (Kacperczyk, Sialm, and Zheng 2005), return deviations from a multifactor benchmark (Amihud and Goyenko 2013), reliance on public information (Kacperczyk and Seru 2007), active shares (Cremers and Petajisto 2009), and return gap (Kacperczyk, Sialm, and Zheng 2008). The literature suggests that we can identify informed managers and information-based performance based on these measures. In the second stage, we link fund performance to the *residual elasticity* obtained from the first stage unexplained by these known measures. We find residual elasticity remains highly significant in predicting fund performance, suggesting that allocation efficiency may reveal a novel source of managerial skills.

Collectively, our results depict the unique role of mutual funds as an equity intermediary in helping the market achieve allocational efficiency. We contribute to several strands of the literature. Classical economic theories predict that the financial market, particularly its financial intermediaries, can help facilitate capital allocation (Schumpeter 1912; Tobin 1942; Boyd and Prescott 1986; Greenwood and Jovanovic 1990; Levine 2005 provides a recent survey). Existing empirical evidence mostly comes from cross-country studies (e.g., Rajan and Zingales 1998 and Wurgler 2000) focusing on banks that provide loan intermediation (e.g., Morck, Yavuz, and Yeung, 2011). To the best of our knowledge, we are the first to examine the allocational efficiency of mutual funds, the leading type of financial intermediaries that actively delegate equity investment.

In doing so, we shed light on the recent debate concerning whether and how firm-level equity capital flows away from sectors with good investment opportunities (Gutierrez and Philippon, 2017a,b; Alexander and Eberly, 2018; Frank and Yang, 2018; Lee, Shin, and Stulz 2020). We show that mutual funds can allocate capital more efficiently than firms. Economically speaking, firms may be micro-focused and bounded by various frictions, which prevent them from jointly achieving market-wide allocational efficiency. In contrast, market-wide allocation is among the goal of fund investment to begin with, which may incentivize managers to process related information. Their allocational efficiency gain highlights a missing element in the literature and completes the economic picture of how the financial market allocates resources. In a broad sense, these results also contribute to the literature examining the real impact of finance (e.g., King and Levine, 1993a, b; Demirguc-Kunt and Levine, 1996; Henry, 2000; Beck, Levine, and Loaiza, 2000; Beck and Levine, 2002; Bekaert, Harvey, and Lundblad, 2005, 2009).

Finally, we are related to the literature about mutual fund benchmarking and performance. Existing studies identify a list of off-benchmark practices, such as market timing, stock picking, active shares, performance gaps, and strategy shifting, that allow funds to deliver performance (see, among others, Kacperczyk, Nieuwerburgh, and Veldkamp, 2014; Kacperczyk, Sialm, and Zheng, 2008; Cremers, and Petajisto, 2009). We extend the literature by showing that fund managers' skill in allocating resources to the real economy also enables them to deliver superior fund performance.

The remainder of the paper proceeds as follows. Section II describes the data and variables we use in our analysis. Section III examines the mutual fund investment elasticity. Section IV conducts the fund-real investment comparison. Section V explores alternative explanations for our findings. We finally examine fund performance in Section VI, followed by a short conclusion.

II. The Data and the Main Variables

In this section, we describe our data and how we construct the main variables.

A. Data Sources

Our data are drawn from different sources. The mutual fund holdings data are from the Thomson Reuters Mutual Fund database, and the fund characteristics (such as management expenses, fund total net assets (TNA), fund turnover, etc.) are from CRSP Mutual Fund Database. We drop the index fund funds as our research question is on the actively managed mutual funds. We consolidate multiple share classes into portfolios by value-weighting share-class returns, fees, and turnover ratios based on share-class total net assets (TNA), where the TNA values are one month lagged.

The real capital allocation (Private Fixed Assets by Industry Sector) and real economic outcome (Value-Added by Industry Sector) are from the U.S. Bureau of Economic Analysis (BEA). In the test of allocational efficiency funds' benchmarking activities, we use the self-declared benchmark provided by Martijn Cremers' dataset library (Cremers and Petajisto, 2009). We obtain the index constituents from Compustat and Capital I.Q. The information for other variables comes from IBES, Compustat, and Capital I.Q. Our sample period is from 1980 to 2021, in which we have valid information for value-added and fixed asset investment by Industry Sector.

B. Main Variables

The main independent variable is *value added growth*, the proxy for industry-level investment opportunities. Following Wurgler (2000), we calculate the value of this variable as the logarithm change in value added, i.e., $VAG_{i,t} = ln\left(\frac{V_{i,t}}{V_{i,t-1}}\right)$, where $V_{i,t}$ is value added of industry i in year t. We define industry at the 3-digit NAICS level, as BEA reports value added and fixed assets using this industry classification. Next, in line with Wurgler (2000), we define industry investment made by firms as the growth (i.e., logarithm-change) in fixed assets, denoted as $I_{Real,i,t} = ln\left(\frac{F_{i,t}}{F_{i,t-1}}\right)$, where $I_{Real,i,t}$ refers to industry investment and $F_{i,t}$ refers to the fixed assets of industry i in year t.[6] In $I_{Real,i,t}$, we use the subscript "real" to indicate that the variable refers to the real investment made by firms. Likewise, we will use a subscript of "M.F." to indicate mutual fund investment in later analysis.

While Wurgler (2000) focuses on the elasticity of industry investment to value added growth, we extend the analysis to mutual fund investments. Hence, our main dependent variable becomes the industry investment made by mutual funds. In line with the above definition of industry investment, we denote the industry investment of a mutual fund as:

[6] Wurgler (2000) constructs industry investment based on gross fixed capital formation growth. We use fixed assets from the Bureau of Economic Analysis because the variable is available for more recent periods.

$$I_{MF,m,i,t} = ln\left(\frac{\widehat{H}_{m,i,t}}{H_{m,i,t-1}}\right), \qquad (1)$$

where $H_{m,i,t-1}$ refer to the value of portfolio holdings by a mutual fund m in stocks in industry i in year $t-1$, and $\widehat{H}_{m,i,t}$ refers to the counterfactual holding value in the same industry in year t (which we will discuss shortly). We then compute the industry investment of the mutual fund as the holding value growth in this industry.

In calculating last year's (i.e., $t-1$) industry holding value, we aggregate all stock investment value within the industry: i.e.,$H_{m,i,t-1} = \Sigma_{s\in i} N_{m,s,t-1} \times P_{s,t-1}$, where for each stock s belonging to the industry i, $N_{m,s,t-1}$ and $P_{s,t}$ denote, respectively, the number of shares held by the fund and the stock price. Both share number and price are dividends and split-adjusted. We calculate $\widehat{H}_{m,i,t} = \Sigma_{s\in i} N_{m,s,t} \times P_{s,t-1}$ as the counterfactual holding value of the current year to properly infer industry investment. The main difference between the counterfactual and real holding values is that we use $P_{s,t-1}$ to compute the counterfactual investment value of the current year. By doing so, we isolate the impact of the current-year asset prices on the mutual fund holdings. In other words, industry investment calculated this way reflects only the active change of portfolio holdings (i.e., when $N_{m,s,t}$ differs from $N_{m,s,t-1}$)—but not that due to the price changes in industry assets.[7]

Next, we decompose the above mutual fund industry investment into two components, the part attributable to fund managers and that to investors. Our key intuition is that mutual fund managers have the discretion to determine investment allocation weight for each industry, whereas mutual fund investors determine the size of a fund (i.e., total net asset or TNA) by their inflows/outflows. In this case, we can rewrite industry investment as $H_{m,i,t-1} = w_{m,i,t-1} \times S_{m,t-1}$, where $S_{m,t-1} = \Sigma_i H_{m,i,t-1}$ is the size (i.e., TNA) of the fund and $w_{m,i,t-1} = H_{m,i,t-1}/S_{m,t-1}$ is the portfolio weight. Similarly, $\widehat{H}_{m,i,t} = \widehat{w}_{m,i,t} \times \hat{S}_{m,t}$,

[7] We do not put any restrictions on what $N_{m,s,t}$ and $N_{m,s,t-1}$ could be. Hence, industry investment may load on popular strategies such as industry momentum. We control for industry momentum and other fund and stock characteristics in our empirical analysis.

where $\hat{S}_{m,t} = \Sigma_i \widehat{H}_{m,i,t}$ is the counterfactual size of the fund when we take out asset growth due to industry returns—i.e., when new capital is the only source of asset growth.

With these notations, our above intuition suggests that fund managers determine the portfolio investment policies, $w_{m,i,t-1}$ and $\widehat{w}_{m,i,t}$, whereas investors shape fund size $S_{m,t-1}$ and $\hat{S}_{m,i,t}$. We can accordingly decompose the industry investment of a mutual fund as:

$$
\begin{aligned}
I_{MF,m,i,t} &= ln\left(\frac{\widehat{H}_{m,i,t}}{H_{m,i,t-1}}\right) = ln\left(\frac{\widehat{w}_{m,i,t}}{w_{m,i,t-1}} \times \frac{\hat{S}_{m,t}}{S_{m,t-1}}\right) \\
&= ln\left(\frac{\widehat{w}_{m,i,t}}{w_{m,i,t-1}}\right) + ln\left(\frac{\hat{S}_{m,t}}{S_{m,t-1}}\right) \\
&= I_{MGR,m,i,t} + I_{Investor,m,i,t}, \qquad (2)
\end{aligned}
$$

where $I_{MGR,m,i,t} = ln\left(\frac{\widehat{w}_{m,i,t}}{w_{m,i,t-1}}\right)$ captures managers' discretionary industry investments, and $I_{Investor,m,i,t} = ln\left(\frac{\hat{S}_{m,i,t}}{S_{m,t-1}}\right) = I_{MF,m,i,t} - I_{MGR,m,i,t}$ reflects investors' influence on industry investments.

We also estimate industry investment implied by alternative mechanisms in a similar way. To calculate the industry investment implied by a market index, we replace the mutual fund industry holding in Equation (1) with the index industry holding.[8] Since our measure controls for price changes, the remaining index allocation change comes mainly from the inclusion of new stocks into the index and the exclusion of existing ones from the index. Next, we also estimate net equity issuance implied industry investment as $ln\left(\frac{Issuance_{i,t}}{Issuance_{i,t-1}}\right)$, where $Issuance_{i,t-1}$ is the value of net share issuance from all firms in industry i at year $t-1$, and $Issuance_{i,t}$ is estimated as $Issuance_{i,t} +$ Sale of Common and Preferred Stock (SSTK) during year $t -$ Purchase of Common and Preferred Stock (PRSTKC) during year t. Finally, to estimate sell-side analysts implied investment, we assume that analysts can induce an industry-level investment that is proportional to their consensus

[8] Specifically, for the S&P 500 index, the most popular benchmark of active mutual funds, we have $I_{BMK,i,t,sp500} = ln\left(\frac{\widehat{w}_{bmk,i,t}}{w_{bmk,i,t-1}}\right)$, where $w_{bmk,i,t-1}$ is the index investment weight in industry i at time $t-1$ and $\widehat{w}_{bmk,i,t}$ is the counterfactual investment weight in industry i at time t netting out the price impact.

recommendations. This implies that analysts-induced industry investment can be estimated as $ln\left(\frac{Rec_{i,t}}{Rec_{i,t-1}}\right)$, where $Rec_{i,t}$ is the equity market value-weighted average recommendation by analysts (recommendation score 1-5, with 5 being the most positive recommendation) for industry i in the December of year t.

Our later analysis also controls for mutual fund characteristics (i.e., size, turnover, expenses, and age) and industry-level characteristics (i.e., Tobin's Q, capital expenditure, cash dividends, operating income, and cash flows at the industry level). We provide the detailed variable definitions in Appendix I.

C. Summary Statistics

We now report the summary statistics in Table 1. In Panel A, we report the year-by-year summary statistics of industries, including the average value of fixed assets and value added in an industry, and the number of firms per industry. We see that the number of firms per industry remains largely the same over time. Both industry-level value added and fixed assets increased over our testing period, consistent with substantial growth in the real economy. As a comparison, we also report the number of active mutual funds and their aggregate asset under management (TNA) in the last two columns. We can see that mutual fund assets exhibit an even higher growth rate.

Panel B reports the distribution of our main variables. We first notice that all our main variables have reasonable distribution. For instance, the mean and standard deviation of value added growth are 0.038 and 0.095. Compared to the U.S. estimation in Wurgler (2000), our standard deviation is about the same. The mean value in our sample period is larger (yet still comparable in magnitude), presumably because the real economy has uncovered better investment opportunities in later years.

Next, we can see that mutual fund industry investment ($I_{MF,m,i,t}$) is more volatile than firm-based industry investment ($I_{Real,i,t}$). This is perhaps not surprising because rebalancing financial assets is much easier than rebalancing real assets. Since portfolio rebalancing often incurs extreme numbers, we winsorize mutual fund industry investment variables by the maximum absolute value of 2. Our results are robust to the winsorization threshold.

III. Mutual Fund Allocational Efficiency

A. Are Mutual Funds Allocationally Efficient?

We start by looking at the investment elasticity of mutual funds in the following panel specification:

$$I_{MF,m,i,t} = \eta_{MF} \times VAG_{i,t} + C \times \boldsymbol{X}_{i,t} + \epsilon_{m,i,t}, \qquad (3)$$

where $VAG_{i,t}$ is value added growth of industry i in year t and $I_{MF,m,i,t}$ refers to the industry investment made by the m^{th} mutual fund. The vector $\boldsymbol{X}_{i,t}$ stacks a list of fund and industry characteristics as control variables, including ln(TNA), turnover ratio, expense ratio, fund age, Tobin's Q, capital expenditure, dividend rate, operating income, and cash flows. In addition, we control for industry, fund and the year fixed effect and cluster standard errors at the fund level. Finally, we adopt the weighted least squares (WLS) method and use fund TNA as the weights. This empirical approach allows us to mitigate the potential influence of small funds. The coefficient of interest is η_{MF}, the investment elasticity of mutual funds to value added growth.

The results are reported in Table 2. Model (1) tabulates the baseline estimation of investment elasticity. Models (2) and (3) further estimate the investment elasticity of fund managers and investors by replacing $I_{MF,m,i,t}$ with $I_{MGR,m,i,t}$ and $I_{Investor,m,i,t}$ in Equation (3), respectively. We can see that mutual funds exhibit a positive investment elasticity of 0.344, which means that every 1% increase in value-added growth attracts 0.344% more capital flows from mutual funds. Furthermore, the elasticity of the fund managers (0.329) is much higher than that of investors (0.013). Indeed, fund managers seem to contribute to the majority of fund elasticity, suggesting that they can allocate investment into productive industry sectors.

Models (4) to (6) further control for lagged industry momentum. This additional control is important, because fund managers may use the public information of realized returns to infer industry-level investment opportunities. Hence, controlling for industry momentum allows us to focus on the investment elasticity of funds to value added growth not contained in the price information of industries. Empirically, mutual funds still exhibit significant and positive elasticity (0.293). Interestingly, fund investors exhibit negative elasticity (-0.008), suggesting that fund managers' elasticity (0.299) is high enough to offset the inefficiency that investors have created.

As a comparison, Model (7) estimates the elasticity of industry investment made by firms by replacing $I_{MF,m,i,t}$ with $I_{Real,m,i,t}$ in Equation (3). The elasticity of firm-conducted real investment in our sample period is 0.082, which is much smaller than that of mutual funds. This observation echoes the recent concerns on firm allocation efficiency (e.g., Gutierrez and Philippon, 2017a,b; Alexander and Eberly, 2018; Frank and Yang, 2018; Lee, Shin, and Stulz, 2020), and highlights a potentially active and beneficial role of mutual funds in helping the market achieve allocation efficiency.

B. Are Mutual Funds More Efficient Than Real Investments?

Till now, the results suggest that fund managers are allocational efficient. The question is whether such financial intermediation is more efficient than firms' allocation. The latter has traditionally been considered efficient (e.g., Wurgler, 2000). But more recently, firm-level efficiency has been declining and is under heated debate (e.g., Gutierrez and Philippon, 2017a,b; Alexander and Eberly, 2018; Frank and Yang, 2018; Lee, Shin, and Stulz, 2020). In this case, the extent to which financial intermediation can help improve the real efficiency of firms becomes a key issue to affect the overall allocational efficiency in the market.

To address this important question, we look at the investment of the funds (both fund overall and fund managers) net of the real investment. We regress mutual fund investment net of real investment on the logarithm-change in value added and a set of control variables. Specifically, we estimate:

$$I_{MF,m,i,t} - I_{Real,i,t} = \eta_{MF-Real} \times VAG_{i,t} + C \times \boldsymbol{X}_{i,t} + \beta_0 \text{ (2)},$$[9]

[9] This allows us to interpret the results as follows. Suppose that the true relationship between mutual funds investment and change in value added is $I_{MF,i,t} = \eta_{MF} \times \Delta Value\ Added_{i,t} + \beta_{MF,0}$ (A) and the true relationship between real investment and value added is $Real_{i,t} = \eta_{MF} \times \Delta Value\ Added_{i,t} + \beta_{Real,0}$ (B), where fund investment $F$is the logarithm-change of the investment holding of funds and real investment $I_{Real,i,t}$ is the logarithm-change of fixed assets in a given industry, and η_{MF} and η_{Real} are interpreted as the

where the fund controls variables include the average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry controls include Q, capital expenditure, dividend rate, operating income, cash flow. We control for industry, fund and year fixed effect in all the specifications. The regression is weighted by fund total asset under management. We cluster the standard errors at the fund level. The coefficient $\eta_{MF-Real}$ can be interpreted as the investment elasticity differential between mutual fund and real investment. We validate that $I_{MF,m,i,t}$ and $I_{Real,i,t}$ have very low correlation so the difference of the two variable has no econometrics concern.

We report the results in Table 3. The layout of the columns is the same as in the previous tables. We find a positive correlation between investment and changes in added value for the fund managers, across all the specifications. The investment elasticity differential between mutual funds (fund managers) and the real investment is 0.268 (0.253),[10] equivalent to 78% (77%) of the gross investment elasticity of mutual funds (fund managers). That is, the investment elasticity of overall fund investment (fund managers) is 0.268 (0.253) higher than that of real investment, and 78% (77%) of the investment efficiency attributed to the mutual funds (fund managers) is not explained by the real investment allocation.

If we focus on investor behavior, we find that the investment elasticity differential of fund investors and real investment is strongly negative (-0.063), suggesting that investors do way worse in allocational efficiency than real investment. These results show that fund managers are more allocationally efficient than real investment, while fund investors are way worse. The fact that the allocational efficiency of the fund managers is there, over and above that of the real investment has important policy and normative implications.

investment elasticities. If we subtract (B) from (A), then we have $I_{MF,i,t} - I_{Real,i,t} = (\eta_{MF} - \eta_{real}) \times \Delta Value\ Added_{i,t} + (\beta_{MF,0} - \beta_{real,0})$. That is, if we regress $I_{MF,i,t} - I_{Real,i,t}$ on $\Delta Value\ Added_{i,t}$, then we can interpret the coefficient $\eta_{MF} - \eta_{real}$ as the elasticity difference between mutual fund investment and real invest (i.e. the elasticity of mutual fund investment net of that of real investment). We denote $\eta_{MF} - \eta_{real}$ as $\eta_{MF-Real}$ in our regression models.

[10] Elasticity is defined so that 0.268 implies that every 1% increase in value added is related to 0.268% increase in investment.

IV. The Mechanisms Behind Mutual Fund Efficincy

A. Benchmarking as an Alternative Channel

Mutual funds track benchmarks. It may therefore be possible that the link between value added and investment is provided by the benchmarks themselves. To address this issue, we now consider whether the behavior of the mutual funds is driven by the benchmarks or by the action of the managers. We concentrate on the subset of U.S. actively managed funds that disclose the S&P500 as their prospectus benchmarks. We therefore estimate the investment elasticity of the mutual fund's actions net of its benchmarking action. We calculate it by regressing the fund investment net of passive benchmark allocation on the logarithm-change in value added and a set of control variables. Specifically, we start by estimating:

$$I_{MF,m,i,t} - I_{BMK,i,t,sp500} = \eta \times VAG_{i,t} + +C \times \boldsymbol{X}_{i,t} + \beta_0, \text{(3)}$$

where η is the estimated difference in investment elasticity between mutual funds and S&P 500 allocation, where fund investment I is the logarithm-change of the investment holding of funds, and $I_{BMK,i,t,sp500}$ is the logarithm-change of the investment holding of a portfolio with investment weights identical to S&P 500 index if assuming the managers of the S&P 500 funds simply allocate asset with the implied weights by S&P 500 index driven by index publisher who affects the benchmark weight by adding or dropping member firms. Fund controls variables include average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry controls include Q, capital expenditure, dividend rate, operating income, cash flow. The main results are tabulated in Table 4.

We first confirm that the results of Table 2 still hold in the subsample of mutual funds which claim S&P 500 as their prospectus benchmark in Models 1-2 and 4-5. Then, we report the results in Model 3 andd 6. Again, we find a positive investment elasticity differential between the fund managers and the prospectus benchmark, across all the specifications. The investment elasticity of the fund managers net of the investment elasticity of the benchmark investment is 0.149, equivalent to 73.40 of the gross value. This implies that 73.4% of the investment efficiency attributed to the mutual funds (fund managers) is not explained by the benchmark allocation. Again, the investment elasticity of fund investors net of the investment elasticity of real investment is strongly negative, suggesting that investors underperform the benchmark in selecting the best value added industries.

B. Capital Structure Management

We next consider the possible objection to our results is that they may be due to the changes induced by companies buying back their shares. Firms may affect the investment allocation by increasing or decreasing the availability of the investable assets and therefore indirectly affecting the investment choice. In particular, given that share repurchases exploit the information of the managers who are in fact insiders, their predictive power and link to Value Added may be quite high. In other words, we may expect to see that CEOs buy back their shares when their company is undervalued and therefore mutual fund managers sell their shares when companies are undervalued. Given that periods of undervaluation are linked to past low added value, this would explain a positive correlation between sales of shares and low added value and a positive one between buys (i.e., positive rebalancing) and prior low added value. It is therefore important to assess whether the effect comes from the asset managers or from the corporate managers (CEOs).

To address this issue, we net out the share issuance and repurchases from our data sample. More specifically, we re-estimate our baseline specification by subtracting a net share issuance (i.e. share issuance minus share repurchase) to calculate the fund investment of a given industry sector. We report the results in Table 5. Model 1 and 2 shows that the investment elasticity of funds and funds' managers, after netting out of the effects of equity issuance, still beats the real allocational efficiency by 0.228 and 0.219. Although the elasticity differential is reduced after we control for the industry sector returns, the differentials are still significant at 0.181 and 0.190 (Models 4 and 5). Model 3 and 6 shows that investors' elasticity is still lower than the real allocational efficiency by 0.06 and 0.07.

The allocational efficiency is positive with statistical significance, implying that fund managers achieve allocational efficiency going beyond corporate managers' decisions. In contrast, fund investors continue to exhibit less efficient allocation.

C. Analyst Forecasts

Is the behavior of the fund managers just proxying for analysts' information? We know from Kacpeckyck and Seru (2007) that uninformed fund managers follow analysts. It may therefore possible that our results can be explained in terms of analyst behavior. To rule out this alternative, we test whether the mutual fund and fund managers are still efficient when we net out the impact of the analysts. We hypothesize that the change in holdings by the mutual fund managers will follow the analyst recommendation if they passively tab the information contents of analysts. Specifically, the investment elasticity is estimated as the coefficient of the regression of the log-change in mutual fund holding net of the log-change in analyst recommendation on the log-change in value added.

We report the results in Table 6. They show that the allocational efficiency of mutual funds and fund managers still persists even net of analyst impact. In particular, Models 1 and 2 shows that the investment elasticity of funds and managers, when netting out the analysts' information, still beats the real allocational efficiency by 0.354 and 0.340. Although the elasticity differential is reduced after we control for the industry sector returns, the differentials are still significant at 0.295 and 0.301 (Models 4 and 5). These results suggest that mutual fund managers' allocation efficiency goes beyond analysts, suggesting that managers generate intrinsic value as opposed to just analyst followers.

D. The Information Channel and Fund Performance

In this last part, we focus on the link between allocational efficiency and the financial performance of the funds. We want to assess whether the funds that display better allocational efficiency are also the ones that deliver better performance. To investigate this issue, we regress measures of financial performance on allocational efficiency. We proxy for financial performance using fund investment returns. Following Kacperczyk, Nieuwerburgh, and Veldkamp (2014), we define the ability to select industry ("industry picking") as a function of changes in added value as: $Allocational\,Efficiency_{f,t} = \frac{1}{N}\Sigma_s^N\left(w_{f,s,t} - w_{m,s,t}\right) \times a_{s,t+1}$, where $w_{f,s,t}$ is the asset allocation weight of fund f in industry sector s at the end of quarter t, and $a_{s,t+1}$ is the shock to output of the industry sector s from the end of quarter *t+1* to the end of the quarter *t+2*. We follow Kacperczyk, Nieuwerburgh, and Veldkamp (2014) estimate the $a_{s,t+1}$ as the percentage change in the value added in the given industry sector.

We estimate both Fama Macbeth and Panel regressions of fund quarterly returns adjusted for Fama-French Five Factor Model (Fama and French (2015) on a proxy of the extent of the correlation between funds' active asset allocation and the corresponding real production output (i.e. sectoral value added). Specifically, we estimate the following regression:

$$Fund\ Performance_{f,t} = \beta_1 \times Allocational\ Efficiency_{f,t-1} + C \times \boldsymbol{X} + \beta_0 + \epsilon, (4)$$

where $Fund\ Performance_{f,t}$ is estimated as fund abnormal returns adjusted for Fama French Five Factor (Fama and French (2015)) and $Allocational\ Efficiency_{f,t-1}$ is the industry picking skill defined above. We control for lagged fund returns, fund size, turnover, expense ratio and age. We estimate the relationship between fund performance and the picking skill in both Fama Macbeth and pooled OLS specifications. The Fama Macbeth specification has the Newey-West adjustment of 4 quarters, and the pooled OLS regression includes quarter fixed effect and the errors are clustered at the quarter level. We control for the lagged fund performance, fund size, turnover, expenses and the fund age.

We report the results in Table 7. We report both Fama Macbeth regressions and pooled panel regressions. In addition, Online Appendix Table A4 report the subsample test by splitting fund sample into fund in above-median and below-median size of their fund families. Table A5 reports the subsample result in funds belong to fund family with above and below median percentage of bonds asset in their family portfolios. The results show a strong positive correlation between fund performance and picking skills. In particular, one standard deviation industry picking is related to between 1.33% and 1.36% (1.21% and 1.28%) per quarter basis point higher performance in the case of Fama MacBeth (Panel) specification. Size of the family or availability of information on both equity and bond do not make a difference.

These results suggest that fund that deliver better financial performance are also the ones better able to deliver allocational efficiency. This has important normative and policy implications as it shows that there is no conflict between delivering better performance for the investors and helping to better allocate resources.

V. Additional Analysis

A. Robustness and Fund Characteristics

We conduct several robustness checks in Table 8. Models (1) and (2) extend the baseline specification (Models 2 and 5 in Table 3) to further control for lagged Q. The difference between the two models is that the latter further controls for industry momentum. The estimated elasticity differentials (0.241 and 0.216) are very close to the baseline estimates (0.253 and 0.232) in Table 3. In Models 3 and 4, we impose a different winsorization scheme on the allocational variables (i.e. winsor at 5%). The new elasticity estimates (0.362 and 0.332) are higher than the baseline estimates, suggesting that our baseline results are conservative. Models 5 and 6 replace the concurrent fund and industry control variables with the lagged set of variables. The elasticity estimates are almost identical to the baseline estimates.

Noticably, our conditional estimates of the investment elasticity differential is still still significant (Model 7-8). In particular, in the conditional esitmates, we find that fund contribution increases in age and decreases in size, turnover, and expense ratios. It is perhaps not surprising to see a negative impact of fund size due to diseconomies of scale (e.g., Berk and Green 2005). The somewhat more intriguing result is that the allocational efficiency is associated with less trading (i.e., lower turnover/expense).

We also observe that some fund characteristics, such as size, turnover, and expense ratios, can affect allocational efficiency. Indeed, the investment elasticity decreases in size, turnover, and expense ratios. These intriguing results are consistent with the information channel, as they show that allocational efficiency is not an artifact of more trading. The negative influence of fund size is also consistent with diseconomies of scale typically associated with fund skills (e.g., Berk and Green 2005). Overall, our baseline results on allocational efficiency are robust to various alternative empirical specifications.

B. The Information Channel vs. Known Skill Measures

We lastly ask whether we can attribute the information channel of allocation efficiency to known measures of managerial skills. For this goal, we expand our performance test into a two-stage analysis. In the first stage, we regress elasticity on a list of well-known skill measures, including industry concentration (Kacperczyk, Sialm, and Zheng 2005), return deviations from a multifactor benchmark (Amihud and Goyenko 2013), reliance on public information (Kacperczyk and Seru 2007), active shares (Cremers and Petajisto 2009), and return gap (Kacperczyk, Sialm, and Zheng 2008). The literature suggests that we can identify informed managers and information-based performance based on these measures.

In the second stage, we link fund performance to the *residual elasticity* obtained from the first stage unexplained by these known measures. For briefty, we tabulate the second-stage results in Table 9 and report the first-stage results in the Internet Appendix.

Our main finding is that residual elasticity remains highly significant in predicting fund performance. Indeed, a one-standard-deviation increase in residual elasticity is associated with approximately 1.28% (1.48%) higher out-of-sample quarterly Fama-French five-factor-adjusted after-fee returns in panel (Fama-MacBeth) specifications. Alternative risk adjustments (e.g., the Fama-French-Carhart four factors) yield similar results. The economic impact is close to our baseline in Table 7. These results suggest that allocation efficiency may reveal a novel source of managerial skills uncovered in the literature.

Conclusion

Although a central premise of the financial market is to facilitate economic growth by allocating capital to more productive sectors, recent studies challenge the allocational efficiency of firms. We ask whether the intermediation of financial institutions on equity investments—i.e., mutual fund equity flows—can help establish allocational efficiency and, if this is the case, whether such efficiency gain reflects a value created by asset managers.

Using the complete sample of U.S. actively managed open-end mutual funds over the period from 1995 to 2015, we document that mutual fund investment has a strong positive elasticity of investment to investment opportunities. If we directly compare the allocational efficiency of fund investment and that of the real investment, we find a positive fund-minus-real incremental elasticity which more than triples the real investment elasticity.

This evidence suggests that financial intermediation helps the market achieve efficiency in resource allocation. In contrast, fund investors do way worse in allocational efficiency than real investment.

We further verify that fund-level allocation is not “passively” driven by other forces (benchmark, firm management, and analysts). Instead, the efficiency gain could be driven by managerial skills in the sense that funds with higher allocational efficiency also deliver superior performance. Such performance cannot be explained by known measures of managerial skills. These results suggest that fund allocation is, at least, partially related to their ability to understand the real economy.

Our results provide important food for thought to the debate on the role of financial intermediation and show that the public image of mutual funds—which traditionally focuses on its performance implications to investors—could be incomplete. Indeed, our results suggest a beneficial role of the mutual fund industry in promoting the efficiency of resource allocation in the equity market.

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Appendix I: Definition of Variables

Variable	Description
$I_{MF,m,i,t}$	Overall mutual fund investment is calculated as $ln\left(\frac{\widehat{H}_{m,i,t}}{H_{m,i,t-1}}\right)$. $H_{m,i,t-1} = w_{m,i,t-1} \times S_{m,t-1}$, where $S_{m,t-1} = \Sigma_i H_{m,i,t-1}$ is the size (i.e., TNA) of the fund and $w_{m,i,t-1} = H_{m,i,t-1}/S_{m,t-1}$ is the portfolio weight. Similarly, $\widehat{H}_{m,i,t} = \widehat{w}_{m,i,t} \times \hat{S}_{m,t}$, where $\hat{S}_{m,t} = \Sigma_i \widehat{H}_{m,i,t}$ is the counterfactual size of the fund when we take out asset growth due to industry returns.
$I_{MGR,m,i,t}$	We argue that fund managers, taking the total asset under management as given, can decide the allocational weights into each industry so we compute managers' discretionary industry investments as $ln\left(\frac{\widehat{w}_{m,i,t}}{w_{m,i,t-1}}\right)$.
$I_{Investor,m,i,t}$	We can decompose $I_{MF,m,i,t}$ as: $$I_{MF,m,i,t} = ln\left(\frac{\widehat{H}_{m,i,t}}{H_{m,i,t-1}}\right) = ln\left(\frac{\widehat{w}_{m,i,t}}{w_{m,i,t-1}} \times \frac{\hat{S}_{m,t}}{S_{m,t-1}}\right) = ln\left(\frac{\widehat{w}_{m,i,t}}{w_{m,i,t-1}}\right) + ln\left(\frac{\hat{S}_{m,t}}{S_{m,t-1}}\right) = I_{MGR,m,i,t} + I_{Investor,m,i,t},$$ Therefore, we can estimate fund investors' influence on industry investments as $I_{MF,m,i,t} - I_{MGR,m,i,t}$.
$I_{Real,i,t}$	Fixed capital investment is calculated as $ln\left(\frac{F_{i,t}}{F_{i,t-1}}\right)$, where $F_{i,t}$ is fixed asset of industry *i* in time *t*.
$VAG_{i,t}$	Value added growth in industry *i* of time *t*, calculated as $ln\left(\frac{V_{i,t}}{V_{i,t-1}}\right)$, where $V_{i,t}$ is the value added of industry *i* in time *t*.
$I_{BMK,i,t,sp500}$	Hypothetical investment of mutual fund if assuming the managers of the S&P 500 funds simply allocate asset with the implied weights by S&P 500 index driven by index publisher who affects the benchmark weight by adding or dropping member firms. Specifically, it is calculated as $I_{BMK,i,t,sp500} = ln\left(\frac{\widehat{w}_{bmk,i,t}}{w_{bmk,i,t-1}}\right)$. $w_{bmk,i,t-1}$ is the investment weight into industry *i* at time *t-1* implied by S&P 500 index constituent. Accordingly, $\widehat{w}_{bmk,i,t}$ is the investment weight into industry *i* at time *t-1*, where the price and shares outstanding at *t-1* are used to compute the investment weights.

$I_{Issuance,i,t}$	Investment allocation implied by the net issuance of equity by companies. It is calculated as $ln\left(\frac{Issuance_{i,t}}{Issuance_{i,t-1}}\right)$, where the net share issue is $Issuance_{i,t-1}$ is the total equity of firm i in year t-1, and $Issuance_{i,t}$ is estimated as $Issuance_{i,t-1}$ + Sale of Common and Preferred Stock (SSTK) during year t-Purchase of Common and Preferred Stock (PRSTKC) during year t.
$I_{Analyst,i,t}$	Investment allocation implied by the analyst recommendations. It is calculated as $ln\left(\frac{Rec_{i,t}}{Rec_{i,t-1}}\right)$, $Rec_{i,t}$ is the equity market value weighted average recommendation by analysts (recommendation score 1-5 with 5 to be the most positive recommendation) for industry sector i in December of year t.
$Fund\ Return_{f,t}$	Returns of fund f in time t. We report both before-fee and after-fee returns adjusted for both Fama French four factors in addition to Momentum factor and Fama French five factors.
$Allocational\ Efficiency_{f,t}$	Allocational efficiency of mutual funds. We measure it as the comovement of the asset allocation and the production outcome. Specifically, we calculate it as $\Sigma_s^N\left(w_{f,s,t} - w_{m,s,t}\right) \times \left(\%\Delta Value\ Added_{s,t+1}\right)$, where $w_{f,s,t}$ is the asset allocation weight of fund f in industry sector s at the end of quarter t, and $\%\Delta Value\ Added_{s,t+1}$ is the percentage change in value added from the end of quarter t+1 to the end of the quarter t+2.
$Log(TNA_{f,t})$	Logarithm of the total net asset (TNA) of fund f in year t.
$Fund\ Turnover_{f,t}$	Turnover of fund f in year t.
$Fund\ Expense\ Ratio_{f,t}$	Expense ratio of fund f in year t
$Fund\ Age_{f,t}$	Years after the inception of f as of year t.
$Capital\ Expenditure\ _{i,t}$	Average capital expenditure ratio of industry i in year t. The capital expenditure ratio of an individual firm is calculated as $\frac{Capital\ Expenditure_t}{Total\ Asset_{t-1}}$. The average value is weighted by the equity market value of firms in the industry.
$Cash\ Dividend_{i,t}$	Average cash dividend ratio of industry i in year t. The cash dividend ratio of an individual firm is calculated as $\frac{Dividends\ Common_t + Dividends\ Preferred_t}{Total\ Asset_{t-1}}$. The average value is weighted by the equity market value of firms in the industry.
$Operating\ Income_{i,t}$	Average operating income ratio of industry i in year t. The operating income ratio of an individual firm is calculated as $\frac{Operating\ Income\ Before\ Depreciation_t}{Total\ Asset_{t-1}}$. The average value is weighted by the equity market value of firms in the industry.
$Cash\ Flow_{i,t}$	Average cash flow ratio of industry i in year t. The cash flow ratio of an individual firm is calculated as $\frac{Cash\ Flow_t}{Total\ Asset_{t-1}}$, $Cash\ Flow_t = Operating\ Income\ Before\ Depreciation_t - Interest\ and\ Related\ Expense_t - Income\ Taxes_t - Dividends\ Common_t$ .The average value is weighted by the equity market value of firms in the industry.

$Industry\ Momentum_{i,t}$	Average industry momentum of industry i in year t. The industry momentum of an individual firm is calculated as the total return in year t-1. The average value is weighted by the equity market value of firms in the industry.
$Q_{i,t}$	Average Q of industry i in year t. Q of an individual firm is calculated as $\frac{Mkt_t}{Total\ Asset_{t-1}}$, where $Mkt_t = (Total\ \ Asset_t - Common\ Equity - Deferred\ Taxes\ and\ Investment\ Tax\ Credit_t) + Market\ Equity\ Value_t$. The average value is weighted by the equity market value of firms in the industry.

Table 1: Summary Statistics

This table reports the summary statistics. Panel A reports the industry sample coverage, including fixed asset, value added, number of firms per industry, number of funds, and aggregated asset under funds' management. Panel B summarizes the distribution of various investment flows and the fund level characteristics.

Panel A: Industry Statistics

Year	Fixed Asset (Billion $)	Value Added (Million $)	# Firm/Industry	#Funds	TNA (Billion $)
1995	268.76	110997.63	74.84	974	354.26
1996	282.5	117756.62	74.12	1092	572.27
1997	298.25	139804.06	85.93	1320	828.93
1998	316.27	147811.3	88.12	1501	1043.16
1999	337.35	157272.58	83.29	1721	1324.52
2000	360.85	167568.27	86.07	1803	1649.60
2001	382.59	173079.27	81.55	2027	1480.96
2002	401.99	178811.72	79.69	2221	1371.23
2003	425.52	187526.19	78.4	2315	1257.02
2004	468.31	200295.23	75.58	2341	1709.73
2005	516.8	213950.39	74.81	2319	2006.64
2006	555.83	226814.86	77.7	2331	2142.53
2007	575.13	236812.39	78.95	2254	2336.28
2008	587.97	240564.88	79.55	2514	2402.55
2009	571.48	235158.34	76.05	2515	1509.97
2010	579.67	243959.55	74.38	2320	1942.88
2011	593.72	253684.53	73.05	2216	2199.01
2012	612.43	265110.97	71.11	2159	2084.68
2013	645.25	274653.75	69.42	2005	2437.39
2014	673.77	286649.19	71.12	1923	3313.71
2015	686.66	298203.09	73.16	1807	3139.21

Panel B: Industry Sectoral Investment Flow								
Variable	N	Mean	STD	5%	25%	50%	75%	95%
Real Output								
$\Delta Value\ Added_{i,t}$	894,791	0.038	0.095	-0.116	0.001	0.039	0.074	0.187
Real Investment								
$I_{Real,i,t}$	905,068	0.043	0.04	-0.017	0.02	0.041	0.063	0.109
All Active Funds								
$I_{MF,i,t}$ (Total)	915,148	0.061	1.275	-2	-0.633	0.025	0.822	2
$I_{MF,i,t}$ (Fund Managers)	915,148	-0.012	1.229	-2	-0.624	-0.024	0.596	2
$I_{MF,i,t}$ (Fund Investors)	915,148	0.071	0.346	-0.382	-0.048	0	0.154	0.723
Active Funds with S&P 500 as Prospectus Benchmark								
$I_{MF,i,t}$ (Total)	180,095	-0.27	1.011	-2	-0.741	-0.07	0.296	1.262
$I_{MF,i,t}$ (Fund Managers)	180,095	-0.32	0.934	-2	-0.691	-0.109	0.199	1.023
$I_{MF,i,t}$ (Fund Investors)	180,095	0.05	0.343	-0.422	-0.099	0	0.152	0.659
$I_{BMK,i,t,sp500}$	174,340	-0.306	0.921	-2.01	-0.668	-0.107	0.204	1.026
Fund Characteristics								
Fund Returns	323,477	0.005	0.041	-0.059	-0.014	0.004	0.023	0.074
Log(TNA)	331,635	6.307	2.13	2.738	4.895	6.345	7.773	9.731

Turnover Ratio	307,999	1.495	125.853	0.074	0.28	0.577	1.039	2.404
Expense Ratio	319,622	0.012	0.01	0.003	0.008	0.011	0.015	0.021
Fund Age	333,339	11.034	12.138	1	4	8	14	33

Table 2: Capital Allocation Efficiency of Mutual Fund

This table reports the estimates of the investment elasticity of mutual fund. The investment elasticity is estimated as the coefficient of the regression of the log-change in mutual fund holding on the log-change in value added. Specifically, the regression model is as follows:

$$I_{MF,m,i,t} = \eta_{MF} \times VAG_{i,t} + C \times \boldsymbol{X}_{i,t} + \beta_0,$$

where η_{MF} is the estimated investment elasticity of mutual funds, where we estimate I as the overall, fund manager driven, and fund investor driven mutual fund investment. $VAG_{i,t}$ is value added growth of industry i in year t and $I_{MF,m,i,t}$ refers to the industry investment made by the m^{th} mutual fund. We also report, in the last column, the allocational efficiency of real investment. The vector $\boldsymbol{X}_{i,t}$ stacks a list of fund and industry characteristics as control variables, including ln(TNA), turnover ratio, expense ratio, fund age, Tobin's Q, capital expenditure, dividend rate, operating income, cash flows, and the industry momentum. In addition, we control for industry, fund and the year fixed effect and cluster standard errors at the fund level. Finally, we adopt the weighted least squares (WLS) method and use fund TNA as the weights. Standard errors are in parentheses, and standard errors are clustered at the fund, and *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total	Manager	Investor	Total	Manager	Investor	Real
VAG, t	0.344***	0.329***	0.013***	0.293***	0.299***	-0.008***	0.082***
	(0.020)	(0.019)	(0.003)	(0.020)	(0.020)	(0.003)	(0.012)
Log(TNA), t	-0.001	-0.006***	0.005**	-0.002	-0.007***	0.005**	
	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	
Fund Turnover, t	-0.317	0.690***	-1.243***	-0.328	0.683***	-1.247***	
	(0.462)	(0.200)	(0.375)	(0.464)	(0.200)	(0.376)	
Fund Expense Ratio, t	-4.782***	-1.829***	-2.281**	-4.774***	-1.824***	-2.277**	
	(1.393)	(0.556)	(1.047)	(1.391)	(0.555)	(1.047)	
Fund Age, t	-0.517***	-0.028	-0.478***	-0.518***	-0.029	-0.478***	
	(0.110)	(0.042)	(0.087)	(0.111)	(0.042)	(0.087)	
Capital Expenditure, t	1.213***	1.565***	-0.354***	1.678***	1.839***	-0.165**	-0.722**
	(0.342)	(0.335)	(0.066)	(0.337)	(0.330)	(0.065)	(0.355)
Cash Dividend, t	-0.025	0.005	-0.027***	-0.001	0.019	-0.018***	-0.085**
	(0.029)	(0.028)	(0.005)	(0.028)	(0.028)	(0.005)	(0.039)
Operating Income, t	0.009	-0.014	0.019***	-0.015	-0.028	0.010**	0.075**
	(0.028)	(0.028)	(0.005)	(0.028)	(0.028)	(0.005)	(0.035)
Cash Flow, t	-0.048	2.554	-2.283***	2.722	4.187	-1.156**	-8.215**
	(2.879)	(2.857)	(0.467)	(2.873)	(2.854)	(0.463)	(3.739)
Industry Momentum, t-1				0.116***	0.068***	0.047***	
				(0.013)	(0.013)	(0.002)	
Constant	0.184***	0.039**	0.135***	0.165***	0.028	0.127***	0.039***
	(0.037)	(0.018)	(0.028)	(0.037)	(0.018)	(0.028)	(0.002)
Observations	846,510	846,510	846,510	846,510	846,510	846,510	1,570
R-squared	0.018	0.006	0.181	0.018	0.006	0.182	0.597

Table 3: Compare Capital Allocation Efficiency of Mutual Fund and Real Investment

This table reports the estimates of the difference in investment elasticity between mutual fund and real investment. Specifically, the regression model is as follows:

$$I_{MF,m,i,t} - I_{Real,i,t} = \eta_{MF-Real} \times VAG_{i,t} + C \times \boldsymbol{X}_{i,t} + \beta_0,$$

where $\eta_{MF-Real}$ is the estimated investment elasticity differentials of mutual funds and the real capital investment, where we estimate I as the overall, fund manager driven, and fund investor driven mutual fund investment. $VAG_{i,t}$ is value added growth of industry i in year t and $I_{MF,m,i,t}$ refers to the industry investment made by the m^{th} mutual fund. $I_{Real,i,t}$ refers to the real industry investment. We also report, in the last column, the allocational efficiency of real investment. The vector $\boldsymbol{X}_{i,t}$ stacks a list of fund and industry characteristics as control variables, including ln(TNA), turnover ratio, expense ratio, fund age, Tobin's Q, capital expenditure, dividend rate, operating income, cash flows, and the industry momentum. In addition, we control for industry, fund and the year fixed effect and cluster standard errors at the fund level. Finally, we adopt the weighted least squares (WLS) method and use fund TNA as the weights. Standard errors are in parentheses, and standard errors are clustered at the fund, and *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)
	Total minus Real	Manager minus Real	Investor minus Real	Total minus Real	Manager minus Real	Investor minus Real
VAG, t	0.268***	0.253***	-0.063***	0.226***	0.232***	-0.075***
	(0.020)	(0.019)	(0.003)	(0.020)	(0.020)	(0.003)
Log(TNA), t	-0.002	-0.007***	0.005*	-0.002	-0.007***	0.005*
	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
Fund Turnover, t	-0.323	0.684***	-1.248***	-0.332	0.680***	-1.251***
	(0.463)	(0.200)	(0.376)	(0.464)	(0.200)	(0.377)
Fund Expense Ratio, t	-4.765***	-1.811***	-2.263**	-4.757***	-1.808***	-2.261**
	(1.392)	(0.556)	(1.046)	(1.391)	(0.555)	(1.046)
Fund Age, t	-0.515***	-0.026	-0.476***	-0.515***	-0.027	-0.476***
	(0.111)	(0.042)	(0.087)	(0.111)	(0.042)	(0.087)
Capital Expenditure, t	1.847***	2.198***	0.279***	2.234***	2.395***	0.392***
	(0.342)	(0.335)	(0.066)	(0.337)	(0.330)	(0.065)
Cash Dividend, t	0.020	0.051*	0.018***	0.040	0.061**	0.024***
	(0.029)	(0.028)	(0.005)	(0.028)	(0.028)	(0.005)
Operating Income, t	-0.031	-0.053*	-0.020***	-0.050*	-0.063**	-0.026***
	(0.028)	(0.028)	(0.005)	(0.028)	(0.028)	(0.005)
Cash Flow, t	4.509	7.110**	2.274***	6.819**	8.285***	2.941***
	(2.881)	(2.861)	(0.466)	(2.876)	(2.858)	(0.465)
Industry Momentum, t-1				0.097***	0.049***	0.028***
				(0.013)	(0.013)	(0.002)
Constant	0.145***	0.001	0.096***	0.130***	-0.007	0.092***
	(0.037)	(0.018)	(0.028)	(0.037)	(0.018)	(0.028)
Observations	846,510	846,510	846,510	846,510	846,510	846,510
R-squared	0.018	0.007	0.178	0.018	0.007	0.178

Table 4: Allocational Efficiency of Mutual Funds (S&P 500 Funds)

This table reports the estimates of the investment elasticity of mutual fund with S&P 500 as the prospectus benchmark. In Model 1 and 2, the investment elasticity is estimated as the coefficient of the regression of the log-change in mutual fund holding on the log-change in value added. Specifically, the regression model is as follows: $I_{i,t} = \eta_{MF} \times VAG_{i,t} + C \times \boldsymbol{X}_{i,t} + \beta_0$, where η_{MF} is the estimated investment elasticity of mutual funds, where we estimate $I_{i,t} \in \{I_{MF,m,i,t}, I_{MF,m,i,t} - I_{Real,i,t}, I_{MF,m,i,t} - I_{BMK,i,t,sp500}\}$. $VAG_{i,t}$ is value added growth of industry i in year t and $I_{MF,m,i,t}$ refers to the industry investment made by the m^{th} mutual fund. We also report, in the last column, the allocational efficiency of real investment. The vector $\boldsymbol{X}_{i,t}$ stacks a list of fund and industry characteristics as control variables, including ln(TNA), turnover ratio, expense ratio, fund age, Tobin's Q, capital expenditure, dividend rate, operating income, cash flows, and the industry momentum. In addition, we control for industry, fund and the year fixed effect and cluster standard errors at the fund level. Finally, we adopt the weighted least squares (WLS) method and use fund TNA as the weights. Standard errors are in parentheses, and standard errors are clustered at the fund, and *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)
	Manager	Manager minus Real	Manager minus Index Changes due to Stock Inclusion/Exclusion	Manager	Manager minus Real	Manager minus Index Changes due to Stock Inclusion/Exclusion
VAG, t	0.203***	0.140***	0.149***	0.156***	0.097***	0.101***
	(0.027)	(0.027)	(0.026)	(0.027)	(0.027)	(0.027)
Log(TNA), t	0.012**	0.011**	0.010*	0.011**	0.011**	0.010*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Fund Turnover, t	-1.644***	-1.638***	-1.642***	-1.640***	-1.634***	-1.637***
	(0.508)	(0.507)	(0.501)	(0.510)	(0.510)	(0.503)
Fund Expense Ratio, t	2.169	2.240	1.653	2.272	2.331	1.753
	(1.734)	(1.754)	(1.614)	(1.744)	(1.763)	(1.623)
Fund Age, t	0.160	0.159	0.170	0.157	0.157	0.167
	(0.150)	(0.150)	(0.143)	(0.149)	(0.149)	(0.143)
Capital Expenditure, t	0.840	1.314**	0.896	1.313**	1.733***	1.357**
	(0.599)	(0.599)	(0.598)	(0.596)	(0.596)	(0.593)
Cash Dividend, t	-0.008	0.011	0.023	-0.006	0.013	0.025
	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)	(0.048)
Operating Income, t	0.064	0.017	0.061	0.008	-0.032	0.004
	(0.071)	(0.071)	(0.072)	(0.071)	(0.071)	(0.072)
Cash Flow, t	-5.502	-0.395	-5.309	0.457	4.884	0.798
	(7.096)	(7.069)	(7.196)	(7.106)	(7.088)	(7.219)
Industry Sector Returns, t-1				0.139***	0.123***	0.140***
				(0.020)	(0.020)	(0.020)
Constant	-0.455***	-0.488***	-0.423***	-0.474***	-0.505***	-0.441***
	(0.057)	(0.058)	(0.055)	(0.057)	(0.058)	(0.056)
Observations	175,391	175,391	169,843	175,391	175,391	169,843
R-squared	0.093	0.092	0.087	0.093	0.093	0.088

Table 5: Capital Allocation Efficiency of Mutual Funds and Net Share Repurchase

This table reports robustness test of capital allocation efficiency net of the net share issuance. We control for industry, fund and the year fixed effect in all specification. The regression is weighted by fund total asset under management. Standard errors are in parentheses, and standard errors are clustered at the fund and year level, and *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)
	Total -Issuance -Real	Manager -Issuance -Real	Investor -Issuance -Real	Total -Issuance -Real	Manager -Issuance -Real	Investor -Issuance -Real
VAG, t	0.228***	0.219***	-0.060***	0.181***	0.190***	-0.070***
	(0.019)	(0.019)	(0.003)	(0.020)	(0.019)	(0.003)
Log(TNA), t	-0.005	-0.006***	0.002	-0.005	-0.007***	0.002
	(0.004)	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)
Fund Turnover, t	0.341	0.888***	-0.841**	0.330	0.881***	-0.843**
	(0.433)	(0.224)	(0.363)	(0.435)	(0.223)	(0.363)
Fund Expense Ratio, t	-6.973***	-2.107***	-4.035***	-6.958***	-2.097***	-4.031***
	(1.968)	(0.631)	(1.499)	(1.965)	(0.630)	(1.498)
Fund Age, t	-0.510***	-0.045	-0.439***	-0.511***	-0.046	-0.439***
	(0.154)	(0.052)	(0.121)	(0.154)	(0.052)	(0.121)
Capital Expenditure, t	2.059***	2.327***	0.422***	2.495***	2.602***	0.514***
	(0.357)	(0.349)	(0.070)	(0.353)	(0.345)	(0.069)
Cash Dividend, t	-0.088***	-0.086***	0.022***	-0.087***	-0.085***	0.022***
	(0.033)	(0.033)	(0.006)	(0.033)	(0.033)	(0.006)
Operating Income, t	-0.171***	-0.234***	-0.012	-0.237***	-0.275***	-0.026***
	(0.046)	(0.046)	(0.007)	(0.046)	(0.046)	(0.007)
Cash Flow, t	18.607***	25.088***	1.607**	25.569***	29.475***	3.085***
	(4.584)	(4.563)	(0.732)	(4.563)	(4.544)	(0.714)
Industry Sector Returns, t-1				0.117***	0.074***	0.025***
				(0.014)	(0.014)	(0.003)
Constant	0.220***	0.054***	0.143***	0.206***	0.045**	0.140***
	(0.048)	(0.021)	(0.037)	(0.048)	(0.020)	(0.037)
Observations	710,019	710,019	710,019	710,019	710,019	710,019
R-squared	0.019	0.007	0.184	0.019	0.008	0.184

Table 6: Capital Allocation Efficiency of Mutual Fund Net of Analyst Recommendation

This table reports the estimates of the investment elasticity of mutual fund net of analysts' information. The investment elasticity is estimated as the coefficient of the regression of the log-change in mutual fund holding on the log-change in value added. Specifically, the regression model is as follows:

$$I_{MF,m,i,t} - I_{Analyst,i,t} = \eta_{MF-Analyst} \times AVG_{i,t} + \beta_I \times Industry\_Controls + \beta_0,$$

where η_{MF} is the estimated investment elasticity of mutual funds, where we estimate I as the overall, fund manager driven, and fund investor driven mutual fund investment. $VAG_{i,t}$ is value added growth of industry i in year t and $I_{MF,m,i,t}$ refers to the industry investment made by the m^{th} mutual fund. $I_{Analyst,i,t}$ refers to investment allocation implied by the analyst recommendations. We also report, in the last column, the allocational efficiency of real investment. The vector $\boldsymbol{X}_{i,t}$ stacks a list of fund and industry characteristics as control variables, including ln(TNA), turnover ratio, expense ratio, fund age, Tobin's Q, capital expenditure, dividend rate, operating income, cash flows, and the industry momentum. In addition, we control for industry, fund and the year fixed effect and cluster standard errors at the fund level. Finally, we adopt the weighted least squares (WLS) method and use fund TNA as the weights. Standard errors are in parentheses, and standard errors are clustered at the fund, and *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)
	Total-Analyst-Real	Manager-Analyst-Real	Investor-Analyst-Real	Total-Analyst-Real	Manager-Analyst-Real	Investor-Analyst-Real
VAG, t	0.354***	0.340***	0.034***	0.295***	0.301***	0.008***
	(0.020)	(0.020)	(0.003)	(0.020)	(0.020)	(0.003)
Log(TNA), t	-0.004	-0.007***	0.003	-0.005	-0.007***	0.003
	(0.004)	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)
Fund Turnover, t	-0.140	0.730***	-1.128***	-0.153	0.721***	-1.134***
	(0.457)	(0.210)	(0.370)	(0.458)	(0.210)	(0.371)
Fund Expense Ratio, t	-5.953***	-1.969***	-3.143**	-5.935***	-1.957***	-3.135**
	(1.704)	(0.586)	(1.279)	(1.700)	(0.585)	(1.277)
Fund Age, t	-0.510***	-0.019	-0.464***	-0.510***	-0.019	-0.465***
	(0.135)	(0.045)	(0.110)	(0.135)	(0.045)	(0.110)
Capital Expenditure, t	2.951***	3.339***	1.212***	3.543***	3.727***	1.464***
	(0.347)	(0.339)	(0.069)	(0.342)	(0.335)	(0.068)
Cash Dividend, t	0.031	0.060**	0.050***	0.058**	0.078***	0.062***
	(0.029)	(0.028)	(0.005)	(0.029)	(0.028)	(0.005)
Operating Income, t	-0.037	-0.058**	-0.055***	-0.063**	-0.074***	-0.066***
	(0.028)	(0.028)	(0.005)	(0.028)	(0.028)	(0.005)
Cash Flow, t	6.096**	8.509***	6.564***	9.202***	10.543***	7.887***
	(2.898)	(2.881)	(0.469)	(2.901)	(2.885)	(0.470)
Industry Momentum, t-1				0.140***	0.092***	0.060***
				(0.014)	(0.013)	(0.003)
Constant	0.163***	-0.000	0.103***	0.141***	-0.015	0.093***
	(0.042)	(0.019)	(0.032)	(0.042)	(0.019)	(0.032)
Observations	766,688	766,688	766,688	766,688	766,688	766,688
R-squared	0.019	0.007	0.188	0.019	0.007	0.189

Table 7: Allocational Efficiency and Mutual Fund Performance

This table investigate the relationship between funds' real allocation and their financial performance. In Panel A, we report both a pooled panel regression and a Fama Macbeth regression of fund quarterly before-fee returns (risk adjusted with Fama-French 5 Factors) on a measure of the extent of the correlation between funds' active asset allocation and the corresponding real production output (i.e. sectoral value added). Specifically, the industry picking is calculated as $Allocational\ Efficiency_{f,t} = \frac{1}{N}\Sigma_s^N\left(w_{f,s,t} - w_{m,s,t}\right) \times \left(\%\Delta DVA_{s,t+1}\right)$, where $w_{f,s,t}$ is the asset allocation weight of fund f in industry sector s at the end of quarter t, and $\%\Delta Value\ Added_{s,t+1}$ is the percentage change in value added from the end of quarter t+1 to the end of the quarter t+2. Fama Macbeth regression has the Newey-West adjustment of 4 quarters, and the pooled OLS regression has the quarter fixed effect and error estimation is clustered at quarter. In Panel B, we report the result of after-fee returns. The regressions control for the lagged fund performance, fund size, turnover, expenses and the fund age. The sample period is 1995-2015.

Panel A: Before Fee Fund Performance Predicted by Allocational Efficiency

	(1)	(2)	(3)	(4)	(5)	(6)
		Pooled OLS			Fama MacBeth	
Allocational Efficiency, t-1	0.801***	0.792***	0.807***	0.767***	0.726***	0.737***
	(0.154)	(0.158)	(0.159)	(0.143)	(0.132)	(0.130)
Fund Ret, t-1		0.064*	0.057		0.076**	0.070**
		(0.034)	(0.034)		(0.034)	(0.032)
Log(TNA), t-1			0.006			-0.090
			(0.253)			(0.184)
Turnover, t-1			-0.019			-0.009
			(0.029)			(0.025)
Expense Ratio, t-1			-0.170***			-0.278***
			(0.042)			(0.074)
Fund Age, t-1			0.002			0.001
			(0.004)			(0.003)
Constant	0.001***	0.001***	0.003	0.001	0.001	0.005***
	(0.000)	(0.000)	(0.002)	(0.003)	(0.002)	(0.002)
Observations	91,590	91,579	85,948	91,590	91,579	85,948
R-squared	0.148	0.152	0.154	0.032	0.071	0.090

Panel B: After Fee Fund Performance Predicted by Allocational Efficiency

	(1)	(2)	(3)	(4)	(5)	(6)
		Pooled OLS			Fama MacBeth	
Allocational Efficiency, t-1	0.789***	0.782***	0.801***	0.753***	0.716***	0.732***
	(0.153)	(0.158)	(0.159)	(0.141)	(0.131)	(0.128)
Fund Ret, t-1		0.064*	0.056		0.079**	0.068**
		(0.034)	(0.034)		(0.034)	(0.032)
Log(TNA), t-1			0.067			-0.063
			(0.250)			(0.182)
Turnover, t-1			-0.022			-0.011
			(0.029)			(0.025)
Expense Ratio, t-1			-0.314***			-0.459***
			(0.043)			(0.080)
Fund Age, t-1			0.002			0.001
			(0.004)			(0.003)
Constant	-0.002***	-0.002***	0.002	-0.002	-0.002	0.004***
	0.000	0.000	(0.002)	(0.002)	(0.002)	(0.001)
Observations	86,604	86,408	85,761	86,604	86,408	85,761
R-squared	0.144	0.147	0.155	0.032	0.071	0.098

Table 8: Robustness Checks and Fund Characteristics

This table reports various robustness checks for Table 3. We report the results for investment driven by fund managers in this table and report the test on other investment. In Online Appendix 1 (Table A1). Specifically, Model 1 and 2 adds Q as the additional controls to the main specification. Model 3 and 4 conduct the robustness test with a higher winsorization (5%). Model 5 and 6 estimate the investment elasticity conditional on the fund and fund family characteristics. Model 7 and 8 report the robustness test with the lagged control variables. All models control for fund average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry capital expenditure, dividend rate, operating income, cash flow. We control for industry, fund and the year fixed effect in all specification. We also control for the industry momentum. The regression is weighted by fund total asset under management. Standard errors are in parentheses, and standard errors are clustered at the fund, and *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Control For Q		Winsor 5PCT		Lagged Control		Fund and Family Chars	
VAG, t	0.241***	0.216***	0.362***	0.332***	0.257***	0.234***	0.788***	0.780***
	(0.020)	(0.020)	(0.026)	(0.026)	(0.020)	(0.020)	(0.116)	(0.116)
VAG x Log(TNA), t							-0.034**	-0.034**
							(0.014)	(0.014)
VAG x Fund Turnover, t							-0.043*	-0.042*
							(0.024)	(0.024)
VAG x Fund Expense Ratio, t							-7.355*	-7.293*
							(4.286)	(4.279)
VAG x Fund Age, t							0.001	0.001
							(0.002)	(0.002)
VAG x Family Log(TNA), t							-0.019*	-0.019*
							(0.010)	(0.010)
VAG x Family %Bond Holding, t							0.001	0.001
							(0.002)	(0.002)
Industry Momentum, t-1		0.055***		0.056***		0.049***		0.019
		(0.013)		(0.014)		(0.014)		(0.015)
Q, t-1	-0.296***	-0.306***						
	(0.033)	(0.033)						
Fund and Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	846,396	846,396	846,510	846,510	816,428	816,428	585,221	585,221
R-squared	0.007	0.007	0.007	0.007	0.007	0.007	0.012	0.012

Table 9: The Information Channel vs. Traditional Measures of Managerial Skills

This table investigates the relationship between funds' real allocation skill (net of the known managerial skills of fund managers) and their financial performance. Specifically, allocational efficiency net of known skill measures is calculated as the residual of the following regression $AllocationEfficiency = \beta + \beta_1\ Concentration + \beta_2\ AmihudR^2 + \beta_3\ RPI + \beta_4\ ActiveShare + \beta_5\ RetGap + \epsilon$, where the traditional measures of managerial skill include funds' holding concentration, Amihud r-square, Reliance on Public Information (RPI), and the gap between the reported and holding-implied fund returns. $Allocational\ Efficiency_{f,t} = \frac{1}{N}\Sigma_s^N\left(w_{f,s,t} - w_{m,s,t}\right) \times \left(\%\Delta DVA_{s,t+1}\right)$, where $w_{f,s,t}$ is the asset allocation weight of fund f in industry sector s at the end of quarter t, and $\%\Delta Value\ Added_{s,t+1}$ is the percentage change in value added from the end of quarter t+1 to the end of the quarter t+2. Fama Macbeth regression has the Newey-West adjustment of 4 quarters, and the pooled OLS regression has the quarter fixed effect and error estimation is clustered at quarter. The sample period is 1995-2015.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Before Fee FF4		After Fee FF5		Before Fee FF4+MOM		Before Fee FF4+MOM	
	Pooled_OLS	Fama_MacBeth	Pooled_OLS	Fama_MacBeth	Pooled_OLS	Fama_MacBeth	Pooled_OLS	Fama_MacBeth
Picking, t-1	0.383***	0.443***	0.383***	0.442***	0.322***	0.385***	0.323***	0.385***
	(0.11)	(0.10)	(0.11)	(0.10)	(0.11)	(0.10)	(0.11)	(0.10)
Fund Ret, t-1	0.042	0.054	0.042	0.054	0.076***	0.079**	0.077***	0.080**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Log(TNA), t-1	0.398**	-0.183	0.407**	-0.176	0.248	-0.176	0.18	-0.208
	(0.19)	(0.37)	(0.19)	(0.37)	(0.17)	(0.24)	(0.17)	(0.24)
Turnover, t-1	-0.047*	-0.063**	-0.047*	-0.064**	-0.002	-0.013	0.001	-0.011
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Expense Ratio, t-1	-0.171***	-0.413***	-0.250***	-0.491***	-0.287***	-0.575***	-0.145***	-0.398***
	(0.04)	(0.09)	(0.04)	(0.09)	(0.04)	(0.10)	(0.04)	(0.10)
Fund Age, t-1	0.004	0.001	0.004	0.001	0.001	-0.004	0.001	-0.005
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Constant	0	0.009**	0	0.009**	0	0.009*	0.001	0.010*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Observations	77,572	77,572	77406	77406	77,406	77,406	77572	77572
R-squared	0.138	0.091	0.14	0.095	0.136	0.101	0.132	0.092