

# **Financial Intermediaries vs. Capital Allocation:**

## **The Forgotten Role of Mutual Funds**

### **Abstract**

We investigate whether financial intermediaries can help allocate equity capital to industries with good investment opportunities in the real economy. Drawing on the sample of domestic mutual funds, we find that delegated equity investment exhibits significant allocational efficiency due to managers' active investment choices. Moreover, funds allocate capital more efficiently than real investments and a list of alternative channels, including fund benchmarks, firms' capital structure management, and analyst forecasts. Allocational efficiency also allows funds to deliver superior performance. Our results confirm the importance of financial intermediation in resource allocation and have important normative implications.

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

## 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 supports from cross-country studies (e.g., Rajan and Zingales 1998 and Wurgler 2000; see Levine 2005 for a survey). However, a recent phenomenon casts some doubt on this notion. In the U.S., firm-level equity funding seems to flow out of high-productive sectors since the mid-1990s. This puzzling observation invokes heated debates (Gutierrez and Philippon, 2017a,b; Alexander and Eberly, 2018; Frank and Yang, 2018; Lee, Shin, and Stulz 2020)<sup>1</sup> 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 fundamental 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

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<sup>1</sup> 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.

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.<sup>2</sup>

Our paper aims to fill in 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 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. Our baseline analysis suggests that mutual funds exhibit a significantly positive fund 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 investment 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 financial intermediation exhibits allocational efficiency.

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<sup>2</sup> Existing studies typically focus on the allocation role of banks (e.g., Morck, Yavuz, and Yeung, 2011).

Since real investment made by firms is traditionally considered efficient but invokes recent concerns, it is crucial to investigate fund efficiency vis-a-vis firms. To achieve this goal, we first notice that the real investment elasticity (0.082) is smaller in magnitude than fund elasticity, where the real investment flows are estimated at the industry level based on fixed capital formation following Wurgler (2000). To further quantify the difference, we examine the elasticity of the investment differential between mutual funds and real investment flows (i.e., fund-minus-real). We find a positive elasticity of the investment differential: the incremental elasticity of fund-minus-real (manager-minus-real) amounts to 0.268 (0.253), which more than triples the efficiency of real investment. In contrast, fund investors exhibit a negative incremental elasticity.

These observations suggest that mutual funds do not only help the market achieve allocational efficiency. More importantly, the contribution of funds well exceeds that of firms, suggesting that the market relies more on its financial intermediaries to allocate equity capital in our sample period. We also find that fund contribution 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).

Before scrutinizing superior information, we examine a battery of alternative channels that may affect our interpretations. In particular, we ask whether fund allocational efficiency could be simply a manifestation of benchmarking, corporate capital structure management, or information produced elsewhere—most noticeably, sell-side analysts. All these alternative channels have important normative implications. For instance, the

popularity of benchmarking (e.g., Wurgler, 2011) may give rise to the concern of hurting information discovery and allocational efficiency.

We therefore estimate the incremental elasticity of fund investments above those alternative sources. To understand benchmarking, we focus on (active) funds benchmarked against the S&P 500 index. For these funds, the mutual fund manager elasticity and manager-minus-real incremental elasticity are, respectively, 0.203 and 0.140. These effects are comparable to our whole sample analysis with a smaller magnitude. The latter observation 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 the allocational efficiency. Moreover, mutual funds, particularly fund managers, also exhibit significant incremental elasticity compared to index adjustments (i.e., the inclusion and exclusion of member firms).

We further show that fund allocation is more efficient than corporate capital structure management (proxied by the net issuance of equity) and analyst forecasts. The former effect addresses the concern that firm equity capital may flow out of sectors with good investment opportunities (e.g., via equity issuance and particularly share repurchase based on Lee, Shin, and Stulz 2020). Our results suggest that financial intermediation provides a market-based mechanism to reassure allocation despite the frictions or rationale behind firm activities. Meanwhile, less informed fund managers are known to rely on analyst recommendations (e.g., Kacperczyk and Seru 2007). Hence, a more efficient allocation than analysts points again to superior information as a channel to achieve allocational efficiency.

To complete our economic picture, therefore, we finally examine the information channel in allocation. Our main idea is that this information channel can be validated (or rejected) by scrutinizing fund performance. If superior information is the driving force for allocation efficiency, we should expect more efficient allocation to allow managers (who are more informed) to deliver better performance. In contrast, a failure to observe performance makes it difficult to relate good allocation to superior information.

Consistent with the information channel, we observe a strong 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 the Fama-French five factor-adjusted performance in panel (Fama-MacBeth) specifications. Alternative risk adjustments (e.g., the Fama-French-Carhart four factors) yield similar results. Note that the influence of allocational efficiency applies to both before and after-fee performance. Hence, financial intermediation on capital allocation feeds back to investors, which is the key ingredient for the market to achieve allocation efficiency in Greenwood and Jovanovic (1990).<sup>3</sup>

Collectively, our results depict a 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.,

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<sup>3</sup> 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.

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 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 financial intermediaries allocate capital more efficiently than firms. This additional efficiency highlights a missing element in the debate 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; Demircuc-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 timing, stock picking, active shares, performance gaps, 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 conduces 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 used in the analysis.

### **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 adding share class net assets together and by value weighting share class returns, fees and turnover ratios based on share class total net assets (TNA).

More specifically, to compute returns, we obtain fund total returns net of fees. When a portfolio has multiple share classes, we compute its total return as the total net asset (TNA)-weighted return of all the share classes of the portfolio, where 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-CapitalIQ.



The other variables are derived from, IBES, and Compustat-CapitalIQ. Our sample is restricted to the 1980–2015 period.

## B. Main Variables

The main independent variable is the change in value added – or more precisely the logarithm change in value added. This has been constructed, following Wurgler (2000) as  $Log\left(\frac{V_{i,t}}{V_{i,t-1}}\right)$ , where  $V_{i,t}$  is the value added of industry  $i$  in time  $t$  and we define industry at the 3-digits NAICS level (as BEA reports value added and fixed asset at 3 digits NAICS level). The variable measures the growth in production output of a given industry. Similarly, we define the real investment allocation ( $I_{Real,i,t}$ ) as the Logarithm-change in fixed capital investment calculated as  $Log\left(\frac{R_{i,t}}{R_{i,t-1}}\right)$ , where  $R_{i,t}$  is fixed asset of industry  $i$  in time  $t$  from BEA. We also control for mutual fund characteristics (i.e., size, turnover, expenses, and age) and industry level characteristics (i.e., Tobin’s Q, capital expenditure, cash dividends, operation income and cash flow at industry level). In the next section, we introduce the main dependent variable.

## C. Variables on Portfolio Rebalancing of Fund, Investors and Benchmarks

We now explain our proxies of investment by fund managers, fund investors as well as benchmarks. We can denote the investment of a mutual fund  $MF$  into industry sector  $i$  over year  $t$  as  $I_{MF,i,t} = Log\left(\frac{H_{MF,i,t}}{HL_{MF,i,t-1}}\right)$ , where  $H_{MF,i,t} = \sum_{s \in i} N_{MF,s,t} \times P_{s,t-1}$  and  $HL_{MF,i,t-1} = \sum_{s \in i} N_{MF,s,t-1} \times P_{s,t-1}$ .

$N_{MF,s,t}$  is the number of shares held by fund  $MF$  and  $P_{s,t}$  is the stock price of stock  $s$  in  $t$ .

In order to isolate the impact of asset prices on the mutual fund holdings, we need to control for the price movement. We use the  $P_{s,t-1}$  to compute the investment value of both the current year and the previous year.

Multiple forces (e.g. mutual fund managers, mutual fund investors, market prices) affect the investment by mutual funds into stocks. Mutual fund managers have the discretion to determine investment allocation weight for each stock in the portfolio by changing the shares held ( $N_s$ ), while mutual fund investors can determine the size of a fund (i.e. total asset undermanagement) by their inflows/outflows. Moreover, even if fund managers do not rebalance their shares held and fund investors do not withdraw or top-up in a fund, the investment value will still change if the market prices of the assets move.

We argue that the fund managers can determine the number of shares held for each stock, but the number of shares held is also affected by the total net asset under management (TNA). Therefore, in order to isolate the impact of fund inflow from fund investors, we keep the TNA constant for the current year and the past year by using the past year TNA for both, and estimate the fund investment driven by fund manager as the logarithm change in the investment weights. Specifically, we estimate the fund investment

driven by the fund managers as  $Log\left(\frac{HM_{MF,i,t}}{HML_{MF,i,t-1}}\right)$ , where  $HM_{MF,i,t} =$

$$\frac{\sum_{s \in i} N_{MF,s,t} \times P_{s,t-1}}{\sum_{i \in Industry} \sum_{s \in i} N_{MF,s,t} \times P_{s,t-1}} \text{ and } HML_{MF,i,t-1} = \frac{\sum_{s \in i} N_{MF,s,t-1} \times P_{s,t-1}}{\sum_{i \in Industry} \sum_{s \in i} N_{MF,s,t-1} \times P_{s,t-1}} .$$

When we estimate the stock index implied investment, we replace the shares held with the total shares outstanding. We summarize the detailed definition of various investment and holdings in Appendix I.

## D. Summary Statistics

We now report the summary statistics in Table 1. In Panel A, we report the industry sample coverage, including the number of industries, number of firms per industry, value added, and fixed asset per industry, while in Panel B, we report the summary statistics of the various investment allocation. We note that the change in portfolio holdings is much more volatile than the real investment. For example, the 95 percentile of  $I_{Real,i,t}$  is 0.109. But the same quantile value for  $I_{MF,i,t}$  is more than 2. In other words, the big swing in financial holdings can be very extreme. This is not surprising because the rebalancing of financial assets is much easier than the rebalance of real fixed assets.

## III. Allocational Efficiency and Investor Behavior

We start by looking at the investment elasticity of the funds. For Funds  $M.F.$ , industry  $i$  in time  $t$ , we estimate:

$$I_{MF,i,t} = \eta_{MF} \times \Delta Value Added_{i,t} + \beta_F \times Fund\_Controls + \beta_I \times \\ Industry\_Controls + \beta_0, (1)$$

where  $\Delta Value Added_{i,t}$  is the logarithm-change of value added and  $I_{MF,i,t}$  is the mutual fund investment (i.e. the logarithm-change of the holdings) by fund M.F. into industry  $i$  at time  $t$ . This specification – similar to the one in Wurgler (2000) – allows us to interpret  $\eta_{MF}$  as the estimated investment elasticity of mutual funds. We consider how  $I_{MF,i,t}$  is driven by various forces (fund managers, investor of funds, etc.) more in detail in Appendix I. The goal is to capture the different components of such “investment” – i.e., the one due

to the action of the fund managers, the ones due to the fund investors as well as the overall one.

The fund controls include average logarithm of total net asset, turnover ratio, expense ratio, and the fund age. The industry controls include Tobin's Q, capital expenditure, dividend rate, operating income, cash flow. We also control for return momentum over the previous year. Controlling for momentum allows us to focus on the fund reaction to added value over and above the one already contained in the price of the stocks. All these control variables are defined as the average of the value of the individual stocks over each industry sector of each year. We run weighted least squares (WLS) and use fund total asset under management as the weights. We control for industry, fund and the year fixed effect in all the specifications and we cluster the standard errors at the fund level.

We report the results in Table 2. We report the investment elasticity of the mutual fund overall, asset managers, and investors in the fund (these measures are defined in II.C and Appendix I). The results show that funds have a positive elasticity of investment (0.344) because the fund manager can allocate investment into productive industry sectors.

As it can be clearly seen, the elasticity of the fund managers (0.329) is way higher than that of ordinary investors (0.013). In fact, ordinary investors have a negative elasticity (-0.008) when we control for the industry momentum. Nevertheless, in both cases, the scale of elasticity of the fund investor (0.013 and -0.008) is negligible compared to the elastic of the managers (0.344 and 0.293). That is, if fund managers were not actively allocating investment, their fund portfolio would drift due to fund inflows/outflows and quickly become inefficient. It could still be that fund managers' reaction is driven by some factors

that proxy for the real economic drivers – e.g., analyst or market sentiment in general. We will get back to this point later.

#### IV. Funds versus Real Investment

Till now, the results suggest that fund managers are allocationally efficient. The next question is whether they are more efficient than real investment. The latter has been traditionally considered to be efficient (e.g., Wurgler, 2000). We therefore 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:

$$I_{MF,i,t} - I_{Real,i,t} = \eta_{MF-Real} \times DVA_{i,t} + \beta_F \times Fund\_Controls + \beta_I \times Industry\_Controls + \beta_0 \quad (2),^4$$

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

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<sup>4</sup> 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  $Real_{i,t} = \eta_{Real} \times \Delta Value Added_{i,t} + \beta_{Real,0}$  (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  $\eta_{MF}$  and  $\eta_{Real}$  are interpreted as the 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.

$\eta_{MF-Real}$  can be interpreted as the investment elasticity differential between mutual fund and real investment. We validate that  $I_{MF,i,t}$  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),<sup>5</sup> 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.

We conduct several robustness checks in Table 4. Our results are robust to the lagged fund and industry controls, Q, and a different winsorization scheme (Model 1-6). Noticably, our conditional estimates of the investment elasticity differential is still still significant

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<sup>5</sup> Elasticity is defined so that 0.268 implies that every 1% increase in value added is related to 0.268% increase in investment.

(Model 7-8). In particular, in the conditional estimates, 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).

## V. Alternative Explanations

### A. Benchmarking

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:

$$I_{MF,i,t} - I_{BMK,i,t,sp500} = \eta \times \Delta Value\ Added_{i,t} + \beta_F \times Fund\_Controls + \beta_{Industry} \times Industry\_Controls + \beta_0, (3)$$

where  $\eta$  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.

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 Model 1-2 and 4-5. Then, we report the results in Model 3 and 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 base 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 6. The allocational efficiency is still positive with statistical significance, implying that fund managers achieve the allocational efficiency not only by passively following corporate managers' decision. The results show that that investors have no link to added value. In fact, investors are inefficient net of share issuance – i.e., they are very passively reacting to share issuance and repurchase. In other words, all the ability of the individual investors to have an efficient capital allocation is due to the fact that they are buying during new share issuance or selling during share repurchases – i.e., they buy(sell) after periods of high(low) added value. However, when the net issuance are netted out of the sample, the effect disappears.

### **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 net of 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 7. They show that the allocational efficiency of mutual funds and fund managers still persists even net of analyst impact. This supports the notation that mutual fund managers own their own credits in efficiently allocating resources. This is also consistent with Kacperczyk and Seru (2007) which shows that only the uninformed fund managers follow more closely the analyst recommendations. In other words, our results confirm the intrinsic value generated by the fund managers – most likely from the informed fund managers as opposed to just analyst followers.

## VI. Fund Allocational Efficiency and Fund Performance

In this last part, we focus on the link between allocational efficiency and 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:  $Allocational\ Efficiency_{f,t} = \frac{1}{N} \sum_s^N (w_{f,s,t} - w_{m,s,t}) \times a_{s,t+1}$ , 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:

$$\begin{aligned} &Fund\ Performance_{f,t} \\ &= \beta_1 \times Allocational\ Efficiency_{f,t-1} + Controls + \beta_0 + \epsilon, (4) \end{aligned}$$

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 8. 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.

## **Conclusion**

We study the allocational efficiency of the financial industry. We ask whether financial investment – i.e., investment by delegated investors as opposed to real direct investment – is allocational efficient and whether is this is the case, such efficiency is related to the behavior of the asset managers, to the investment behavior of the investors in the funds that allocate the flows or just to the way capital investment is “passively” driven by other forces (benchmark, firm management, and analysts).

Using the complete sample of U.S. actively managed open-end mutual funds over the period from 1995 to 2015, we document that financial investment – i.e., mutual fund investment – has a strong positive elasticity of investment to the real value of the economy (“added value”). This applies to both the fund managers and the fund investors. The elasticity of professional money managers is way higher than that of ordinary investors, both in terms of economic significance and in terms of statistical significance.

If we directly compare the allocational efficiency of the financial investors and that of the real investment, we find a positive correlation between (net of real) investment and added value for the fund managers. However, if the focus on investor behavior, we find that it is strongly negative, suggesting that investors do way worse in allocational efficiency than real investment.

Next, we investigate whether the allocational efficiency is fully driven by benchmark. We find that the investment allocation of funds net of the allocation implied by the benchmark is strongly positive, suggesting that the source of the allocational efficiency of funds is not solely benchmark.

Next, we consider the link between allocational efficiency and share issuance and repurchases. Given that share issuance and repurchase exploit the information of the managers who are in fact insiders, their predictive power and link to added value may be quite high. We therefore net out the share repurchases from our data sample. We find that, while the elasticity of the fund managers to added value is still both statistically and economically significant, the link between investors and added value disappears.

Also, to the elasticity of investment to added value for the main investors there does not correspond a similar elasticity of the reaction of analyst behavior. Indeed, the analyst market does not react in the same way as the fund market. Indeed, either there is no statistical link between adjustments in analyst market and added value or the link is negative.

Finally, we document that funds with higher allocational efficiency also deliver higher financial performance. The result suggesting that funds' financial return 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 investment and show that, far from what regulators and the press would suggest, financial investment is good for the economy, being allocational efficient. In fact, financial investment is even more allocational efficient than the real investment itself.

## References

- Alexander, L. and J. Eberly (2018). Investment hollowing out. *IMF Economic Review*
- Bae, K.-H., A. Ozoguz, H. Tan, and T. S. Wirjanto, 2012, Do Foreigners Facilitate Information Transmission In Emerging Markets? *Journal of Financial Economics* 105, 209–227.
- Bartram, S. M., J. M. Griffin, T.-H. Lim, and D. T. Ng, 2015, How Important Are Foreign Ownership Linkages for International Stock Returns? *Review of Financial Studies* 28, 3036–3072.
- Beck, T., Levine, R., 2002. Industry growth and capital allocation: does having a market- or bank-based system matter? *Journal of Financial Economics* 64, 147–180.
- Beck, T., Levine, R., Loayza, N., 2000. Finance and the sources of growth. *Journal of Financial Economics* 58, 261–300.
- Bekaert, G., and C. R. Harvey, 2000, Foreign Speculators and Emerging Equity Markets, *Journal of Finance* 55, 565–613.
- Bekaert, G., C. R. Harvey, and C. Lundblad, 2005, Does Financial Liberalization Spur Growth? *Journal of Financial Economics* 77, 3–55.
- Bekaert, G., C. R. Harvey, and C. Lundblad, 2009, Financial Openness and Productivity, *World Development* 39, 1–19.
- Berk, J. B., and R. C. Green, 2004, Mutual Fund Flows and Performance in Rational Markets, *Journal of Political Economy* 112, 1269–1295.
- Boyd, J.H., Prescott, E.C. (1986). “Financial intermediary-coalitions”. *Journal of Economics Theory* 38, 211–232.
- Boyer, B., 2011, Style-Related Comovement: Fundamentals or Labels? *Journal of Finance* 66, 307–332.
- Cremers, KJ Martijn, and Antti Petajisto. “How active is your fund manager? A new measure that predicts performance.” *The review of financial studies* 22, no. 9 (2009): 3329-3365.
- Demirguc-Kunt, A., Levine, R., 1996. Stock markets, corporate finance, and economic growth: an overview. *World Bank Economic Review* 10, 223–239.
- Fama, Eugene F., and Kenneth R. French. “A five-factor asset pricing model.” *Journal of financial economics* 116, no. 1 (2015): 1-22.
- Frank, M. Z., and K. Yang, 2018. Does finance flow to high productivity firms? Working paper.
- Greenwood, Jeremy and Jovanovic, Boyan. “Financial Development, Growth, and the Distribution of Income.” *Journal of Political Economy*, October 1990, 98(5), pp. 1076-107.
- Griffin, J. M., P. J. Kelly, and F. Nardari, 2010, Do Market Efficiency Measures Yield Correct Inferences? A Comparison of Developed and Emerging Markets, *Review of Financial Studies* 23, 3225–3277.
- Gutierrez, G. and T. Philippon, 2017a, Declining Competition and Investment in the U.S., NBER W.P.
- Gutiérrez, G. and T. Philippon (2017b). Investment-less growth: An empirical investigation. *Brookings Papers on Economic Activity* Fall.
- Henry, P. B., 2000, Do Stock Market Liberalizations Cause Investment Booms? *Journal of Financial Economics* 58, 301–334.

- Kacperczyk, Marcin, and Amit Seru. "Fund manager use of public information: New evidence on managerial skills." *The Journal of Finance* 62, no. 2 (2007): 485-528.
- Kacperczyk, Marcin, Clemens Sialm, and Lu Zheng. "Unobserved actions of mutual funds." *The Review of Financial Studies* 21, no. 6 (2008): 2379-2416.
- Kacperczyk, Marcin, Stijn Van Nieuwerburgh, and Laura Veldkamp. "Time - varying fund manager skill." *The Journal of Finance* 69, no. 4 (2014): 1455-1484.
- King, R. , Levine, R. , 1993a. Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics* 108, 717-737 .
- King, R. , Levine, R. , 1993b. Finance, entrepreneurship, and growth. *Journal of Monetary Economics* 32, 513-542 .
- Jotikasthira, C., C. Lundblad, and T. Ramadorai, 2012, Asset Fire Sales and Purchases and the International Transmission of Funding Shocks, *Journal of Finance* 67, 2015-2050.
- Lee, Dong, Han Shin, and René M. Stulz. 2020. Why Does Equity Capital Flow Out of High Tobin's q Industries? *Review of Financial Studies*, forthcoming.
- Morck, R., M. D. Yavuz, and B. Yeung, 2011. Banking system control, capital allocation, and economy performance. *Journal of Financial Economics* 100, 264-283.
- Puckett, A., & Yan, X. (2011). The interim trading skills of institutional investors. *The Journal of Finance*, 66(2), 601-633.
- Rajan, R.G. and L. Zingales, 1998. Financial dependence and growth. *American Economic Review* 88(3), 559-586.
- Schumpeter, J.A., 1912. *Theorie der Wirtschaftlichen Entwicklung* [The theory of economic development] (1934 trans. Edition). Harvard University Press, Cambridge, MA.
- Wahal, S., and A. Wang, 2011, Competition among Mutual Funds, *Journal of Financial Economics* 99, 40-59.
- Wurgler, Jeffrey. "Financial markets and the allocation of capital." *Journal of financial economics* 58, no. 1-2 (2000): 187-214.



## Appendix I: Definition of Variables

Variable	Description
$I_{MF,i,t}$	<p>Overall mutual fund investment computed as <math>I_{MF,i,t} = \text{Log} \left( \frac{H_{MF,i,t}}{HL_{MF,i,t}} \right)</math>, where <math>H_{MF,i,t} = \sum_{s \in i} N_{MF,s,t} \times P_{s,t-1}</math> and <math>HL_{MF,i,t} = \sum_{s \in i} N_{MF,s,t-1} \times P_{s,t-1}</math>. <math>P_{s,t}</math> is Share price of stock s at the end of year t. <math>TN_{s,t}</math> is total shares outstanding for stock s at the end of year t. <math>N_{MF,s,t}</math> is shares of stock s held by the mutual fund at the end of year t.</p> <p>Mutual fund investment driven by fund managers. We argue that fund managers, taking the total asset under management as given, can decide the allocational weights into each industry so we compute the manager driven investment as <math>\text{Log} \left( \frac{HM_{MF,i,t}}{HML_{MF,i,t-1}} \right)</math>, where <math>HM_{MF,i,t} = \frac{\sum_{s \in i} N_{MF,s,t} \times P_{s,t-1}}{\sum_{i \in \text{Industry}} \sum_{s \in i} N_{MF,s,t} \times P_{s,t-1}}</math> and <math>HML_{MF,i,t-1} = \frac{\sum_{s \in i} N_{MF,s,t-1} \times P_{s,t-1}}{\sum_{i \in \text{Industry}} \sum_{s \in i} N_{MF,s,t-1} \times P_{s,t-1}}</math>.</p> <p>Mutual fund investment driven by fund investors, computed as the difference between the overall fund investment and manager-driven fund investment.</p>
$I_{Real,i,t}$	<p>Logarithm-change in fixed capital investment calculated as <math>\text{Log} \left( \frac{R_{i,t}}{R_{i,t-1}} \right)</math>, where <math>R_{i,t}</math> is fixed asset of industry i in time t.</p>
$\Delta \text{Value Added}_{i,t}$	<p>Logarithm-change in value added in industry i of time t, calculated as <math>\text{Log} \left( \frac{V_{i,t}}{V_{i,t-1}} \right)</math>, where <math>V_{i,t}</math> is the value added of industry i in time t.</p>
$I_{BMK,i,t,sp500}$	<p>Hypothetical investment of mutual fund if assuming the managers of the S&amp;P 500 funds simply allocate asset with the implied weights by S&amp;P 500 index driven by index publisher who affects the benchmark weight by adding or dropping member firms. Specifically, it is calculated as <math>BMK_{i,t,sp500} = \text{Log} \left( \frac{HBP_{MF,i,t}}{HBPL_{MF,i,t}} \right)</math>, where <math>HBP_{i,t} = \frac{\sum_{s \in i \text{ and } s \in S\&amp;P500_t} TN_{s,t-1} \times P_{s,t-1}}{\sum_{i \in \text{Industry}} \sum_{s \in i \text{ and } s \in S\&amp;P500_t} TN_{s,t-1} \times P_{s,t-1}}</math> and <math>HBPL_{i,t} = \frac{\sum_{s \in i \text{ and } s \in S\&amp;P500_{t-1}} TN_{s,t-1} \times P_{s,t-1}}{\sum_{i \in \text{Industry}} \sum_{s \in i \text{ and } s \in S\&amp;P500_{t-1}} TN_{s,t-1} \times P_{s,t-1}}</math>.</p>
$I_{Issuance,i,t}$	<p>Investment allocation implied by the net issuance of equity by companies. It is calculated as <math>\text{Log} \left( \frac{Issuance_{i,t}}{Issuance_{i,t-1}} \right)</math>, where the net share issue is <math>Issuance_{i,t-1}</math> is the total equity of firm i in year t-1, and <math>Issuance_{i,t}</math> is estimated as <math>Issuance_{i,t-1} + \text{Sale of Common and Preferred Stock (SSTK) during year t} - \text{Purchase of Common and Preferred Stock (PRSTKC) during year t}</math>.</p>
$I_{Analyst,i,t}$	<p>Investment allocation implied by the analyst recommendations. It is calculated as <math>\text{Log} \left( \frac{Rec_{i,t}}{Rec_{i,t-1}} \right)</math>, <math>Rec_{i,t}</math> is the equity market value weighted</p>

	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.
<i>Fund Return<sub>f,t</sub></i>	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.
<i>Allocational Efficiency<sub>f,t</sub></i>	Allocational efficiency of mutual funds. We measure it as the comovement of the asset allocation and the production outcome. Specifically, we calculate it as $\sum_s^N (w_{f,s,t} - w_{m,s,t}) \times (\% \Delta Value Added_{s,t+1})$ , where $w_{f,s,t}$ is the asset allocation weight of fund f in industry sector s at the end of quarter t, and $\% \Delta Value Added_{s,t+1}$ is the percentage change in value added from the end of quarter t+1 to the end of the quarter t+2.
<i>Log(TNA<sub>f,t</sub>)</i>	Logarithm of the total net asset (TNA) of fund f in year t.
<i>Fund Turnover<sub>f,t</sub></i>	Turnover of fund f in year t.
<i>Fund Expense Ratio<sub>f,t</sub></i>	Expense ratio of fund f in year t
<i>Fund Age<sub>f,t</sub></i>	Years after the inception of f as of year t.
<i>Capital Expenditure<sub>i,t</sub></i>	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.
<i>Cash Dividend<sub>i,t</sub></i>	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.
<i>Operating Income<sub>i,t</sub></i>	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.
<i>Cash Flow<sub>i,t</sub></i>	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.
<i>Industry Momentum<sub>i,t</sub></i>	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.
<i>Q<sub>i,t</sub></i>	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 number of industries, number of firms per industry, value added, and fixed asset per industry. 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	Total 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%
<b>Real Output</b>								
$\Delta Value Added_{i,t}$	894,791	0.038	0.095	-0.116	0.001	0.039	0.074	0.187
<b>Real Investment</b>								
$I_{Real,i,t}$	905,068	0.043	0.04	-0.017	0.02	0.041	0.063	0.109
<b>All Active Funds</b>								
$I_{MF,i,t}$ (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
<b>Active Funds with S&amp;P 500 as Prospectus Benchmark</b>								
$I_{MF,i,t}$ (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
<b>Fund Characteristics</b>								
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:

$$I_{MF,i,t} = \eta_{MF} \times \Delta Value Added_{i,t} + \beta_F \times Fund\_Controls + \beta_I \times Industry\_Controls + \beta_0,$$

where  $\eta_{MF}$  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. We also report, in the last column, the allocational efficiency of real investment. Fund controls variables include average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry controls 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)
	Total	Manager	Investor	Total	Manager	Investor	Real
$\Delta Value Added, t$	0.344*** (0.020)	0.329*** (0.019)	0.013*** (0.003)	0.293*** (0.020)	0.299*** (0.020)	-0.008*** (0.003)	0.082*** (0.012)
$Log(TNA), t$	-0.001 (0.003)	-0.006*** (0.002)	0.005** (0.003)	-0.002 (0.003)	-0.007*** (0.002)	0.005** (0.003)	
$Fund Turnover, t$	-0.317 (0.462)	0.690*** (0.200)	-1.243*** (0.375)	-0.328 (0.464)	0.683*** (0.200)	-1.247*** (0.376)	
$Fund Expense Ratio, t$	-4.782*** (1.393)	-1.829*** (0.556)	-2.281** (1.047)	-4.774*** (1.391)	-1.824*** (0.555)	-2.277** (1.047)	
$Fund Age, t$	-0.517*** (0.110)	-0.028 (0.042)	-0.478*** (0.087)	-0.518*** (0.111)	-0.029 (0.042)	-0.478*** (0.087)	
$Capital Expenditure, t$	1.213*** (0.342)	1.565*** (0.335)	-0.354*** (0.066)	1.678*** (0.337)	1.839*** (0.330)	-0.165** (0.065)	-0.722** (0.355)
$Cash Dividend, t$	-0.025 (0.029)	0.005 (0.028)	-0.027*** (0.005)	-0.001 (0.028)	0.019 (0.028)	-0.018*** (0.005)	-0.085** (0.039)
$Operating Income, t$	0.009 (0.028)	-0.014 (0.028)	0.019*** (0.005)	-0.015 (0.028)	-0.028 (0.028)	0.010** (0.005)	0.075** (0.035)
$Cash Flow, t$	-0.048 (2.879)	2.554 (2.857)	-2.283*** (0.467)	2.722 (2.873)	4.187 (2.854)	-1.156** (0.463)	-8.215** (3.739)
$Industry Momentum, t-1$				0.116*** (0.013)	0.068*** (0.013)	0.047*** (0.002)	
Constant	0.184*** (0.037)	0.039** (0.018)	0.135*** (0.028)	0.165*** (0.037)	0.028 (0.018)	0.127*** (0.028)	0.039*** (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:

$$I_{MF,i,t} - I_{Real,i,t} = \eta_{MF-Real} \times \Delta Value Added_{i,t} + \beta_I \times Industry\_Controls + \beta_0,$$

where  $\eta_{MF vs Real}$  is the estimated difference in investment elasticity between mutual funds and real capital allocation, where we estimate  $I$  as the overall, fund manager driven, and fund investor driven mutual fund investment, and  $Real$  is the fixed asset investment. Fund controls variables include average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry controls include 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) Total minus Real	(2) Manager minus Real	(3) Investor minus Real	(4) Total minus Real	(5) Manager minus Real	(6) Investor minus Real
$\Delta Value Added, t$	0.268*** (0.020)	0.253*** (0.019)	-0.063*** (0.003)	0.226*** (0.020)	0.232*** (0.020)	-0.075*** (0.003)
$Log(TNA), t$	-0.002 (0.003)	-0.007*** (0.002)	0.005* (0.003)	-0.002 (0.003)	-0.007*** (0.002)	0.005* (0.003)
$Fund Turnover, t$	-0.323 (0.463)	0.684*** (0.200)	-1.248*** (0.376)	-0.332 (0.464)	0.680*** (0.200)	-1.251*** (0.377)
$Fund Expense Ratio, t$	-4.765*** (1.392)	-1.811*** (0.556)	-2.263** (1.046)	-4.757*** (1.391)	-1.808*** (0.555)	-2.261** (1.046)
$Fund Age, t$	-0.515*** (0.111)	-0.026 (0.042)	-0.476*** (0.087)	-0.515*** (0.111)	-0.027 (0.042)	-0.476*** (0.087)
$Capital Expenditure, t$	1.847*** (0.342)	2.198*** (0.335)	0.279*** (0.066)	2.234*** (0.337)	2.395*** (0.330)	0.392*** (0.065)
$Cash Dividend, t$	0.020 (0.029)	0.051* (0.028)	0.018*** (0.005)	0.040 (0.028)	0.061** (0.028)	0.024*** (0.005)
$Operating Income, t$	-0.031 (0.028)	-0.053* (0.028)	-0.020*** (0.005)	-0.050* (0.028)	-0.063** (0.028)	-0.026*** (0.005)
$Cash Flow, t$	4.509 (2.881)	7.110** (2.861)	2.274*** (0.466)	6.819** (2.876)	8.285*** (2.858)	2.941*** (0.465)
$Industry Momentum, t-1$				0.097*** (0.013)	0.049*** (0.013)	0.028*** (0.002)
Constant	0.145*** (0.037)	0.001 (0.018)	0.096*** (0.028)	0.130*** (0.037)	-0.007 (0.018)	0.092*** (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 Fund Managers: Robustness Check**

This table reports various robustness checks for Table 3. We report the results for investment driven by fund managers in Table 4 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	
$\Delta$ Value Added, t	0.241*** (0.020)	0.216*** (0.020)	0.362*** (0.026)	0.332*** (0.026)	0.257*** (0.020)	0.234*** (0.020)	0.788*** (0.116)	0.780*** (0.116)	
$\Delta$ Value Added x Log(TNA), t							-0.034** (0.014)	-0.034** (0.014)	
$\Delta$ Value Added x Fund Turnover, t							-0.043* (0.024)	-0.042* (0.024)	
$\Delta$ Value Added x Fund Expense Ratio, t							-7.355* (4.286)	-7.293* (4.279)	
$\Delta$ Value Added x Fund Age, t							0.001 (0.002)	0.001 (0.002)	
$\Delta$ Value Added x Family Log(TNA), t							-0.019* (0.010)	-0.019* (0.010)	
$\Delta$ Value Added x Family %Bond Holding, t							0.001 (0.002)	0.001 (0.002)	
Industry Momentum, t-1		0.055*** (0.013)		0.056*** (0.014)		0.049*** (0.014)			0.019 (0.015)
Q, t-1	-0.296*** (0.033)	-0.306*** (0.033)							
Fund and Industry Controls	Yes	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 5: 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:

$$I_{MF,i,t} = \eta_{MF} \times \Delta Value Added_{i,t} + \beta_I \times Industry\_Controls + \beta_0,$$

where  $\eta_{MF}$  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. Fund controls variables include average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry controls include capital expenditure, dividend rate, operating income, cash flow. In Model 3 and 4, we estimate the investment elasticity of fund managers' action deviating from S&P 500 index and companies' share issuance and repurchase. We also control for the industry momentum. 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 \*, \*\*, \*\*\* 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
$\Delta Value Added, t$	0.203*** (0.027)	0.140*** (0.027)	0.149*** (0.026)	0.156*** (0.027)	0.097*** (0.027)	0.101*** (0.027)
$Log(TNA), t$	0.012** (0.005)	0.011** (0.005)	0.010* (0.005)	0.011** (0.005)	0.011** (0.005)	0.010* (0.005)
$Fund Turnover, t$	-1.644*** (0.508)	-1.638*** (0.507)	-1.642*** (0.501)	-1.640*** (0.510)	-1.634*** (0.510)	-1.637*** (0.503)
$Fund Expense Ratio, t$	2.169 (1.734)	2.240 (1.754)	1.653 (1.614)	2.272 (1.744)	2.331 (1.763)	1.753 (1.623)
$Fund Age, t$	0.160 (0.150)	0.159 (0.150)	0.170 (0.143)	0.157 (0.149)	0.157 (0.149)	0.167 (0.143)
$Capital Expenditure, t$	0.840 (0.599)	1.314** (0.599)	0.896 (0.598)	1.313** (0.596)	1.733*** (0.596)	1.357** (0.593)
$Cash Dividend, t$	-0.008 (0.048)	0.011 (0.048)	0.023 (0.048)	-0.006 (0.048)	0.013 (0.048)	0.025 (0.048)
$Operating Income, t$	0.064 (0.071)	0.017 (0.071)	0.061 (0.072)	0.008 (0.071)	-0.032 (0.071)	0.004 (0.072)
$Cash Flow, t$	-5.502 (7.096)	-0.395 (7.069)	-5.309 (7.196)	0.457 (7.106)	4.884 (7.088)	0.798 (7.219)
$Industry Sector Returns, t-1$				0.139*** (0.020)	0.123*** (0.020)	0.140*** (0.020)
Constant	-0.455*** (0.057)	-0.488*** (0.058)	-0.423*** (0.055)	-0.474*** (0.057)	-0.505*** (0.058)	-0.441*** (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 6: 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) Total -Issuance -Real	(2) Manager -Issuance -Real	(3) Investor -Issuance -Real	(4) Total -Issuance -Real	(5) Manager -Issuance -Real	(6) Investor -Issuance -Real
$\Delta$ Value Added, t	0.228*** (0.019)	0.219*** (0.019)	-0.060*** (0.003)	0.181*** (0.020)	0.190*** (0.019)	-0.070*** (0.003)
Log(TNA), t	-0.005 (0.004)	-0.006*** (0.002)	0.002 (0.003)	-0.005 (0.004)	-0.007*** (0.002)	0.002 (0.003)
Fund Turnover, t	0.341 (0.433)	0.888*** (0.224)	-0.841** (0.363)	0.330 (0.435)	0.881*** (0.223)	-0.843** (0.363)
Fund Expense Ratio, t	-6.973*** (1.968)	-2.107*** (0.631)	-4.035*** (1.499)	-6.958*** (1.965)	-2.097*** (0.630)	-4.031*** (1.498)
Fund Age, t	-0.510*** (0.154)	-0.045 (0.052)	-0.439*** (0.121)	-0.511*** (0.154)	-0.046 (0.052)	-0.439*** (0.121)
Capital Expenditure, t	2.059*** (0.357)	2.327*** (0.349)	0.422*** (0.070)	2.495*** (0.353)	2.602*** (0.345)	0.514*** (0.069)
Cash Dividend, t	-0.088*** (0.033)	-0.086*** (0.033)	0.022*** (0.006)	-0.087*** (0.033)	-0.085*** (0.033)	0.022*** (0.006)
Operating Income, t	-0.171*** (0.046)	-0.234*** (0.046)	-0.012 (0.007)	-0.237*** (0.046)	-0.275*** (0.046)	-0.026*** (0.007)
Cash Flow, t	18.607*** (4.584)	25.088*** (4.563)	1.607** (0.732)	25.569*** (4.563)	29.475*** (4.544)	3.085*** (0.714)
Industry Sector Returns, t-1				0.117*** (0.014)	0.074*** (0.014)	0.025*** (0.003)
Constant	0.220*** (0.048)	0.054*** (0.021)	0.143*** (0.037)	0.206*** (0.048)	0.045** (0.020)	0.140*** (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 7: 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:

$$I_{MF,i,t} - I_{Analyst,i,t} = \eta_{MF-Analyst} \times \Delta Value Added_{i,t} + \beta_i \times Industry\_Controls + \beta_0,$$

where  $\eta_{MF}$  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 and  $Rec_{i,t}$  is the equity market value weighted average recommendation by analysts for industry sector  $i$  in December of year  $t$ . Fund controls variables include average logarithm of total net asset, turnover ratio, expense ratio, and the fund age, and the industry controls include capital expenditure, dividend rate, operating income, cash flow. We also control for the industry momentum. 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 \*, \*\*, \*\*\* represent significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1995-2015.

	(1) Total- Analyst-Real	(2) Manager- Analyst-Real	(3) Investor- Analyst-Real	(4) Total- Analyst-Real	(5) Manager- Analyst-Real	(6) Investor- Analyst-Real
$\Delta Value Added, t$	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 8: 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  $Allocational\ Efficiency_{f,t} = \frac{1}{N} \sum_s^N (w_{f,s,t} - w_{m,s,t}) \times (\% \Delta DVA_{s,t+1})$ , where  $w_{f,s,t}$  is the asset allocation weight of fund f in industry sector s at the end of quarter t, and  $\% \Delta Value\ Added_{s,t+1}$  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*** (0.154)	0.792*** (0.158)	0.807*** (0.159)	0.767*** (0.143)	0.726*** (0.132)	0.737*** (0.130)
Fund Ret, t-1		0.064* (0.034)	0.057 (0.034)		0.076** (0.034)	0.070** (0.032)
Log(TNA), t-1			0.006 (0.253)			-0.090 (0.184)
Turnover, t-1			-0.019 (0.029)			-0.009 (0.025)
Expense Ratio, t-1			-0.170*** (0.042)			-0.278*** (0.074)
Fund Age, t-1			0.002 (0.004)			0.001 (0.003)
Constant	0.001*** (0.000)	0.001*** (0.000)	0.003 (0.002)	0.001 (0.003)	0.001 (0.002)	0.005*** (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*** (0.153)	0.782*** (0.158)	0.801*** (0.159)	0.753*** (0.141)	0.716*** (0.131)	0.732*** (0.128)
Fund Ret, t-1		0.064* (0.034)	0.056 (0.034)		0.079** (0.034)	0.068** (0.032)
Log(TNA), t-1			0.067 (0.250)			-0.063 (0.182)
Turnover, t-1			-0.022 (0.029)			-0.011 (0.025)
Expense Ratio, t-1			-0.314*** (0.043)			-0.459*** (0.080)
Fund Age, t-1			0.002 (0.004)			0.001 (0.003)
Constant	-0.002*** 0.000	-0.002*** 0.000	0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	0.004*** (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