2023 ABFER

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

Massimo Massa (INSEAD)
Yanbo Wang (SKK GSB)
Hong Zhang (Singapore Management University)

Motivation

- A key premise of the financial market: to facilitate economic growth by **allocating capital to more productive sectors** (Schumpeter 1912; Tobin 1942).
  - Supported by **cross-country studies** (e.g., Rajan and Zingales 1998 and Wurgler 2000; see Levine 2005 for a survey).
  - Challenged by recent **US** evidence: firm-level **equity** funding seems to **flow out of** high-productive sectors since the mid-1990s (Gutierrez and Philippon, 2017a,b; Alexander and Eberly, 2018; Frank and Yang, 2018; Lee, Shin, and Stulz, 2020).
- Hence the question: what can we say about the allocational efficiency in the US equity market?

Key Intuitions

- Financial intermediaries play a critical role
  - Levine (2005): the financiamayl market can better allocate capital because it can effectively produce **information**
  - Financial intermediaries help the market to achieve this dual **information-allocation** role (Boyd and Prescott 1986).
  - When individuals can benefit from allocation, **a positive feedback loop** is created between finance and the real economy (Greenwood and Jovanovic 1990).
- Who are the intermediaries for capitals?
  - Debt ➔ by **banks**, which improve debt allocation (Morck, Yavuz, and Yeung, 2011).
  - Equity ➔ by **mutual funds** (a missing link in the literature)

Preview of our results

- Mutual funds exhibit **significant allocational efficiency** in their equity investments (better than firms and a few alternative sources)
- Mutual fund allocation is largely due to managers' **active choices**.
- Allocational efficiency also helps funds deliver superior performance, implying **a novel source of managerial skills** and **a positive feedback loop** .
- Our results suggest that financial intermediation helps the equity market achieve efficiency in resource allocation, complementing international and bank evidence.

Roadmap

- Data and variables
- Mutual fund allocation
- Alternative explanations
- Allocation as a skill and positive externality

2. Data and variables

- Active Mutual funds: CRSP + Thomson Reuters (holdings)
- Stocks: CRSP + COMPUSTAT
- Capital allocation related: the U.S. Bureau of Economic Analysis (BEA)
- Other data sources: IBES and Capital I.Q.
- Sample period (current version):1980 to 2016

Data and variables (2)

- How to measure allocation efficiency?

$$INV_{i,t} = \eta \times VAG_{i,t} + C \times \boldsymbol{X}_{i,t} + \epsilon_{m,i,t}$$

Investment flows into **industry *i*** in **year *t***

Investment opportunity of the industry in year t

This elasticity measures allocation efficiency

Wurgler (2000):

$I_{Real,i,t} = ln\left(\frac{F_{i,t}}{F_{i,t-1}}\right)$, the log-change in **fixed capital formation**

$VAG_{i,t} = ln\left(\frac{V_{i,t}}{V_{i,t-1}}\right)$, the log-growth of **value-added**.

Data and variables (3)

- We keep value-added growth; but we use mutual fund investment flows instead.

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

Price-adjusted (active) MF investments

counterfactual holding value in year t (assuming no price change)

portfolio holding value by a mutual fund m in stocks in industry i in year $t-1$

$$= ln\left(\frac{\hat{w}_{m,i,t}}{w_{m,i,t-1}}\right) + ln\left(\frac{\hat{S}_{m,t}}{S_{m,t-1}}\right)$$

Port weight changes by managers

New capital by fund investors

Two resources of MF investment flows from:
1) managers (holding-changes) and
2) investors (flow-driven).

Roadmap

- Data and variables
- Mutual fund allocation
- Alternative explanations
- Allocation as a skill and positive externality

3. Mutual fund allocation:
the baseline results

	(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

MF investments exhibit positive elasticity

A **1% increase** in value-added growth attracts **0.344%** more MF capital flow

Real investments, proxied by log-change in **fixed assets** from BEA (in spirit of Wurgler 2000), exhibit a much smaller elasticity

Industry momentum does not explain the allocation efficiency

Incremental Elasticity (vs. Real):

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

	(1) Total minus Real	(2) Manager minus Real	(3) Investor minus Real	(4) Total minus Real	(5) Manager minus Real	(6) 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

MF& Manager-directed inv exhibit incremental efficiency; Investors' relative efficiency is negative

Industry momentum has little impact on incremental efficiency

Three alternative sources of allocation

- Benchmark adjustment
  - When price is fixed, benchmark capital may change due to the **inclusion (exclusion)** of new (old) membership firms.
  - We test this for MFs following S&P 500 index as their benchmark.
- Following corporate policies
  - We have seen **aggregate** real investments from fixed assets.
  - Could funds follow **firm-level** equity policies (i.e., net issuance, Lee, Shin, and Stulz 2020)?
- Following public information
  - Mutual funds are known to rely on public information generated by **analysts** (Kacperczyk and Seru 2007).

We further net out related capital flows

	(1) Manager	(2) Manager minus Real	(3) Manager minus Index Changes due to Stock Inclusion/Exclusion
VAG, t	0.203***	0.140***	0.149***
	(0.027)	(0.027)	(0.026)

Adjust for **index changes** have little impact.

	(1) Total -Issuance -Real	(2) Manager-Issuance-Real	(3) Investor-Issuance-Real
VAG, t	0.228***	0.219***	-0.060***
	(0.019)	(0.019)	(0.003)

Firm-level equity policies have little impact.

We find analysts exhibit **negative elasticity**. Hence, managers cannot follow them.

Allocation as a skill and positive externality

- We measure fund-level allocation efficiency in terms of market timing skills (e.g., Kacperczyk, Nieuwerburgh, and Veldkamp 2014):

$$Allocational\ Efficiency_{f,t} = \frac{1}{N}\Sigma_s^N\left(w_{f,i,t} - w_{m,i,t}\right) \times VAG_{i,t+1}$$

- We then link fund performance $(t+1)$ to lagged allocational efficiency (t) of a fund.
  - Note: value-added information in (t+1) is used. A conservative interpretation is that we try to provide an in-sample description of how allocation contributes to realized fund performance.
  - However, the right-side only involve MF's past allocation. Value-added information is also common to all funds. In this regard, the test can also be loosely interpreted as predictive from policy to performance.

Before-fee Performance
(Fama-French 5-Factor Adjusted)

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

Fund performance increases in Allocational Efficiency

The 1std impact is between **1.33%** and **1.36%** per year

After-fee Performance (Fama-French 5-Factor Adjusted)

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

Allocational Efficiency explains **after-fee** fund performance

Expense ratio reduces after-fee perf more than before-fee perf. But it does not absorb the performance.

The existence of after-fee perf implies **a positive feedback effect** to attract capital to enhance market efficiency. The current observations suggest the benefits of allocation are not diminishing yet.

Additional Analyses

- On MF allocational efficiency
  - Our results are robust to alternative empirical specifications (e.g., controlling of Tobin's Q, winsorization, and use lagged controls).
  - MF elasticity decreases in **size**, **expense ratios,** and **turnover**.
    - The first two are consistent with Berk and Green (2005).
    - The last suggest allocation efficiency does not mean excessive trading
- On MF allocation as a skill: what about traditional proxies for managerial skills?

Do traditional measures give rise to allocational efficiency?

- The literature suggests a list of measures for MFskills:
  - Industry concentration (Kacperczyk, Sialm, and Zheng 2005),
  - Deviations from a factor model (Amihud and Goyenko 2013),
  - Reliance on public information (Kacperczyk and Seru 2007),
  - Active shares (Cremers and Petajisto 2009),
  - Return gap (Kacperczyk, Sialm, and Zheng 2008).

- We first regress allocation on these measures in the cross-section, and use the residual to conduct our analysis

Before- and after-fee performance predicted by the residual

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Before Fee FF4		After Fee FF5		Before Fee FF5+MOM		Before Fee FF5+MOM	
	Pooled_OLS	Fama_MacBeth	Pooled_OLS	Fama_MacBeth	Pooled_OLS	Fama_MacBeth	Pooled_OLS	Fama_MacBeth
Allocation, 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)

Our results are robust using residuals,or known strategy-adjusted allocation efficiency.

Conclusions

- Mutual funds exhibit **significant allocational efficiency** in their equity investments, which is better than firms' real investments, benchmark adjustment, and analyst information.
- Mutual fund allocation is largely due to managers' **active choices**, which may imply **a novel source of managerial skills** and **a positive feedback loop** .
- Our results suggest that mutual funds play a positive role of financial intermediation in the equity market, helping that sector of the market to achieve resource allocation.

Thank you very much!