Labor Mobility and Capital Misallocation in the Mutual Fund Industry

Maxime Bonelli

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Mutual funds

- Mutual funds play a major role in the economy

  (about 1/4 of all financial assets of U.S. households $\approx$ \$20 trillion)

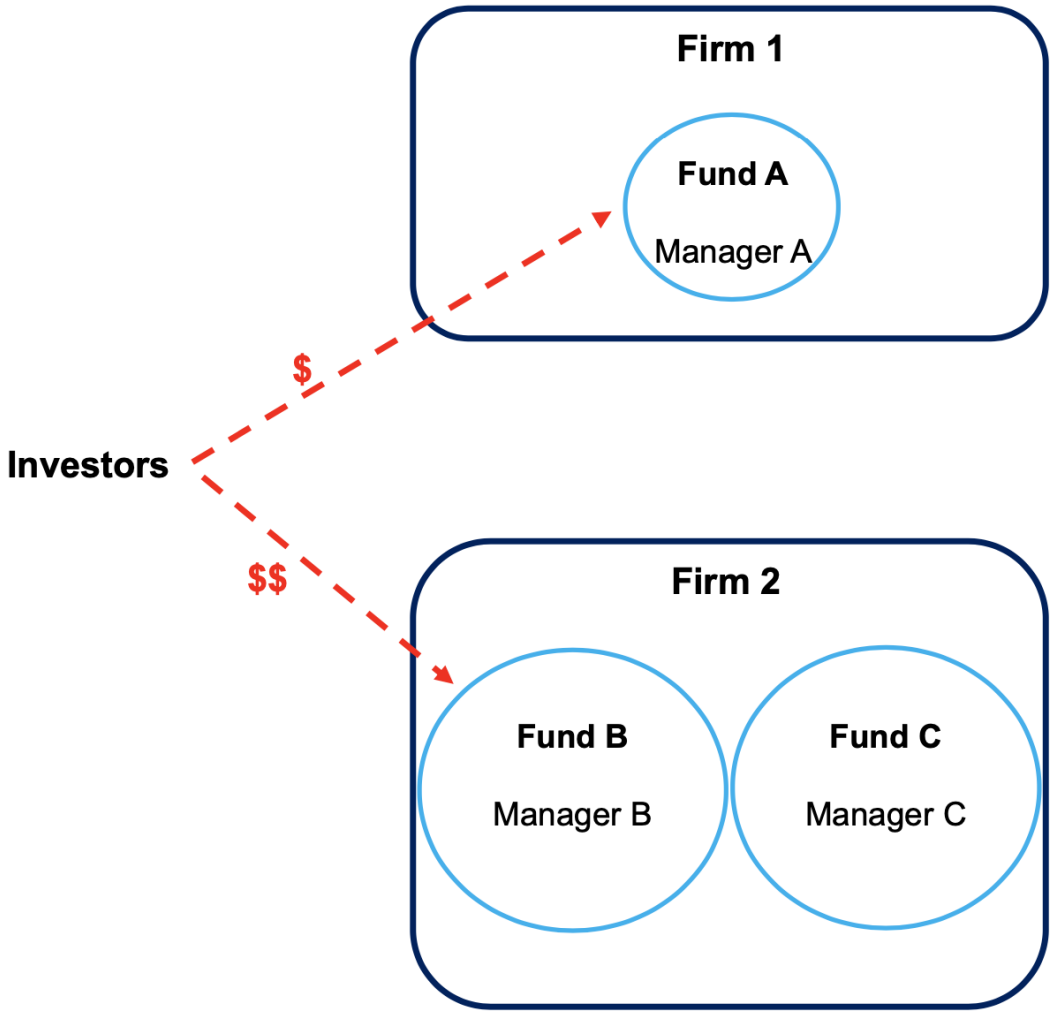
- Mutual fund managers vary greatly in skills

  (Berk and van Binsbergen, 2015: from 1962 to 2011 the median fund lost \$20k/month while the fund at the 90th percentile created \$750k/month)

$\Rightarrow$ The value added of the mutual fund industry for investors depends on the allocation of capital *across* fund managers

How capital matches skill

Capital $\rightarrow$ ***Managers*:**



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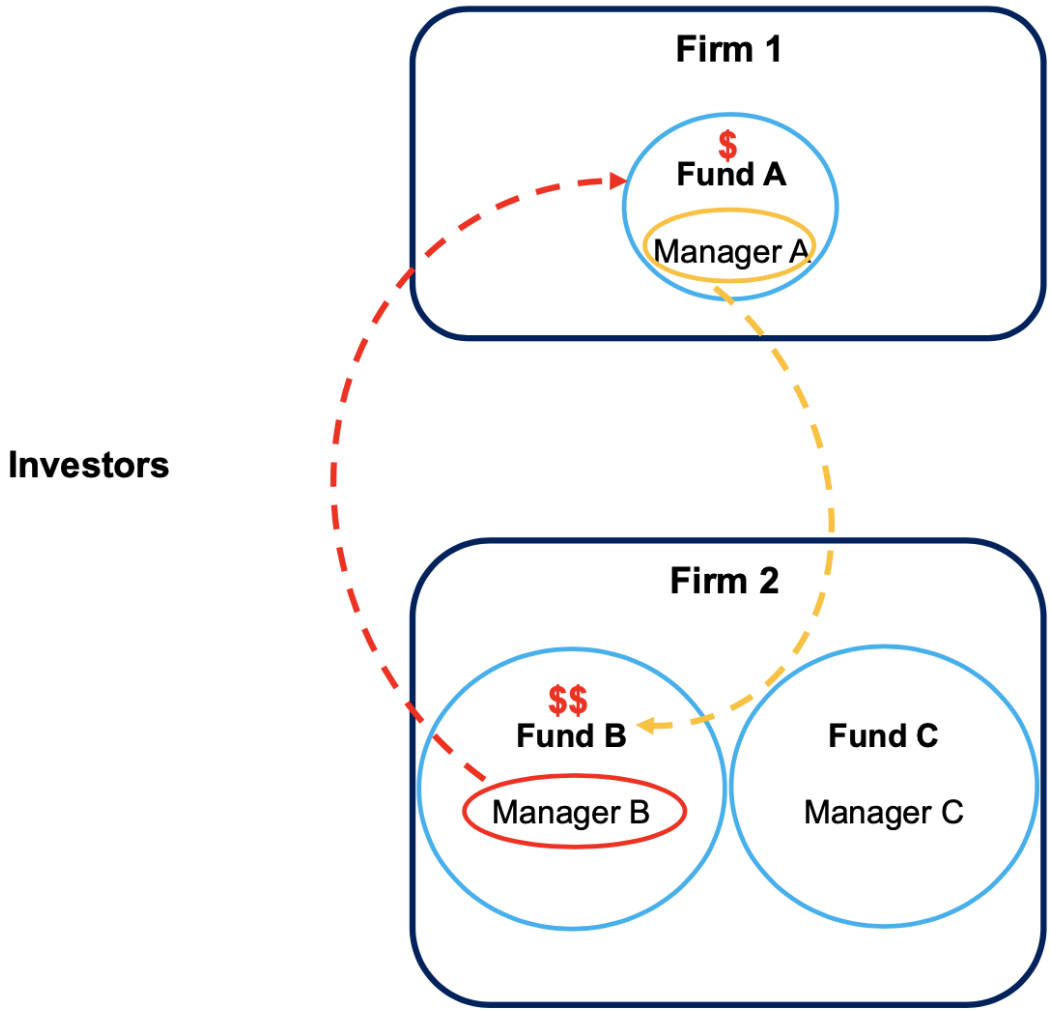

This paper

Main finding: Fund manager mobility across firms improves the capital allocation efficiency across managers

Manager level:

- the capital "mismatch" of a manager predicts her switching firms
- when a manager switches firms:
  - capital "mismatch" $\downarrow$ by 30%
  - value added $\uparrow$ by \$0.8 million/month

Aggregate level:

- Manager mobility affects mutual fund misallocation and productivity
- When a US state $\uparrow$ non-compete clauses enforceability ($\downarrow$ mobility)
  - capital misallocation across fund managers $\uparrow$ by 9% to 12%
  - state-level value added of fund managers $\downarrow$ by \$25 million/month

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1. Capital-skill match

   Berk & Green (2004), Fang et al (2014), Berk et al (2017), Song (2020)

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2. Labor market for fund managers

   Khorana (1996), Chevalier & Ellison (1999), Acharya et al. (2016), Ellul et al. (2020)

   - This paper: Labor market affects capital allocation

3. Labor market frictions and aggregate productivity

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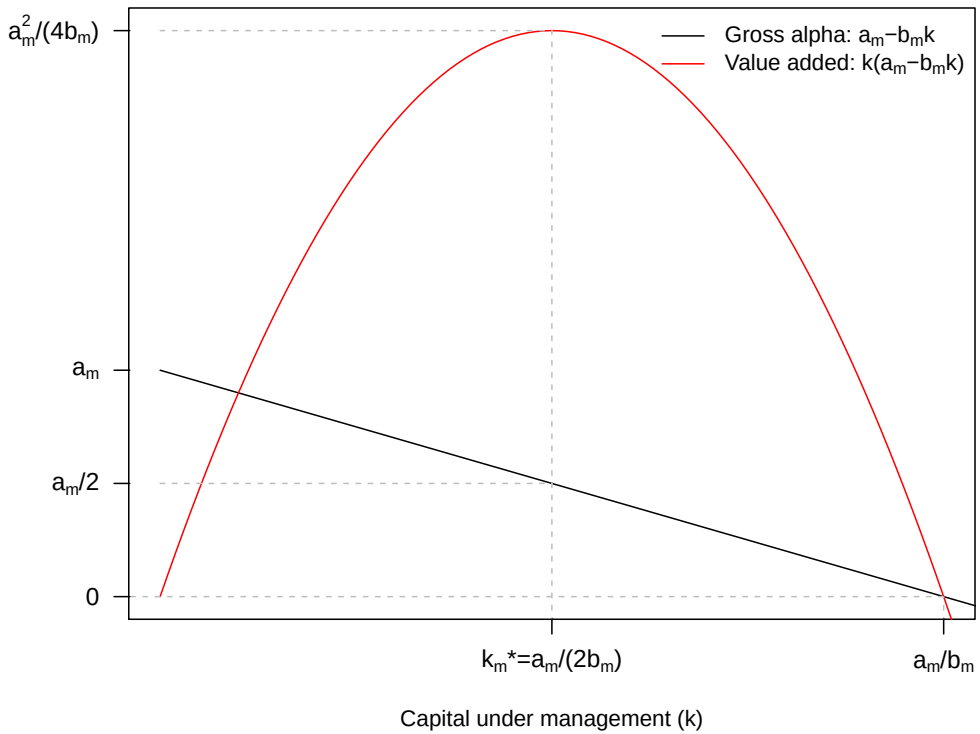
Roadmap

1. Model
2. Data
3. Manager mobility and capital misallocation
4. Non-compete agreements

The model

Each manager m is employed by a firm f_m and generates value added:

$$v_m(k) = \underbrace{k}_{\text{capital}} \times \underbrace{\alpha_m(k)}_{\% \text{ gross alpha}} \qquad \text{with } \alpha_m{}'(.) < 0$$



$\Rightarrow$ Optimal amount of capital $k_m^* = \arg\max_k v_m(k)$ s.t. $\quad v_m{}'(k_m^*) = 0$

The match between capital and managers

Frictionless capital markets $\Rightarrow$ Investors allocate capital to managers such that the marginal products of capital (MPK) are *equalized*:

$$\forall m, v'_m(k_m) = \lambda \quad \Rightarrow \quad \text{No role for manager mobility}$$

Capital market friction $\Rightarrow$ MPK across managers can still be equalized through manager mobility:

- *within* firm $\Rightarrow v'_m(k_m) = \lambda_f$ (Berk et al, 2017)
- *across* firms $\Rightarrow \frac{\partial \lambda_f}{\partial f} = 0 \iff v'_m(k_m) = \lambda$

Manager mobility frictions $\Rightarrow$ Dispersion in MPK

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Data

1) CRSP Survivorship Bias Free Mutual Fund Database

2) Morningstar mutual funds data

3) S&P Capital IQ-People Intelligence: profiles of professionals with individual ID, company affiliation, office address

$\Rightarrow$ 5,500+ active equity fund managers with a track record of at least two years between 2000 and 2018:

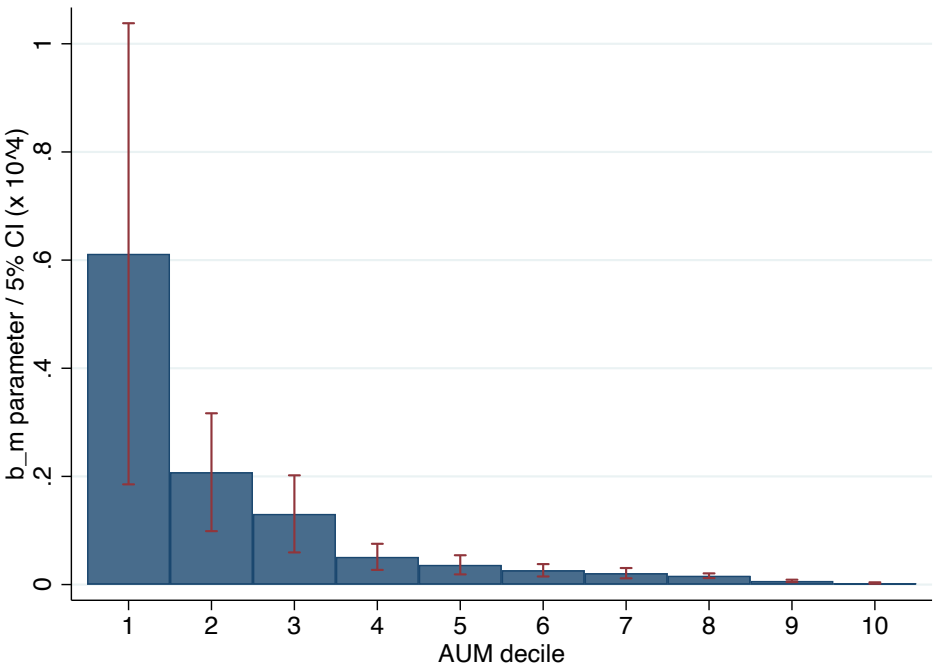
- track fund managers across time, firms and locations
- monitor their performance and assets under management (AUM)
- about 20% of managers switch firms, with large changes in AUM ($500 million on average, $107 million at the median)

Manager value added function

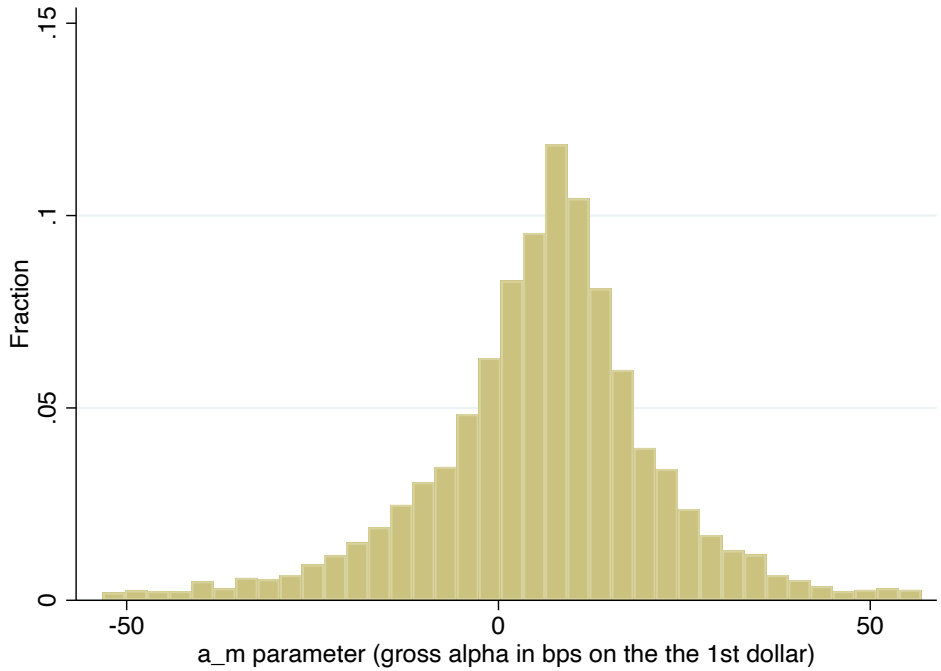
- Gross alpha: $\alpha_m(k) = a_m - b_m k$

- Estimate parameters a_m and b_m at the manager level (Pástor et al., 2015; Zhu ,2018)

Estimates of b_m



Distribution of a_m



Measuring misallocation

With estimates of a_m and b_m, one can compute a given manager's:

- optimal amount of capital k_m^*:

$$v_m'(k_m^*) = 0 \quad \Rightarrow \quad k_m^* = \frac{a_m}{2b_m}$$

- marginal product of capital (MPK) for capital k:

$$v_m'(k) = a_m - 2b_m k$$

Two measures of manager-level misallocation:

1) absolute value of MPK (i.e., $v_m'(k) \neq 0$)
2) \$Misallocation: $|k_m - k_m^*|$ (difference between actual and optimal AUM)

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Misallocation predicts switching

$$Switch_{m,t} = \beta \log(Misallocation_{m,t}) + \gamma X_{m,t} + \delta_t + \lambda_m + \eta_{style} + \theta_f + \epsilon_{m,t}$$

	Switch					
	(1)	(2)	(3)	(4)	(5)	(6)
log $\lvert MPK \rvert$		0.0004***			0.0003***	
		(0.0001)			(0.0001)	
log($*Misallocation*)			0.0003***			0.0003***
			(0.0001)			(0.0001)
log(TNA)	-0.0003**	-0.0004***	-0.0004***	-0.0005***	-0.0006***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
log(#Funds)	-0.0037***	-0.0038***	-0.0038***	-0.0036***	-0.0036***	-0.0036***
	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0006)
log(#Comanagers)	-0.0003	-0.0002	-0.0002	-0.0002	-0.0001	-0.0002
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Flow	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
log(Tenure)	0.0021***	0.0022***	0.0022***	0.0021***	0.0021***	0.0021***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
log(Experience)	-0.0030***	-0.0029***	-0.0029***	-0.0023***	-0.0023***	-0.0023***
	(0.0004)	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0003)
Internal.Realloc	0.0044***	0.0044***	0.0044***	0.0041***	0.0041***	0.0041***
	(0.0004)	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0005)
Retail.Share	0.0009	0.0009*	0.0009*	0.0007	0.0007	0.0007
	(0.0006)	(0.0005)	(0.0005)	(0.0006)	(0.0006)	(0.0006)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Manager FE	Yes	Yes	Yes	Yes	Yes	Yes
Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes	Yes
Observations	573,152	573,152	573,152	573,015	573,015	573,015
R^2	0.02	0.02	0.02	0.04	0.04	0.04

Switch $\Rightarrow$ Misallocation drops

$$\log(\textit{Misallocation})_{m,t} = \beta\{\textit{Switch} \times \textit{Post}\}_{m,t} + \textit{Control}_{m,t} + \delta_t + \lambda_m + \eta_{style} + \theta_f + \epsilon_{m,t}$$

	log($*Misallocation*)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Switch × *Post*	-0.382***	-0.397***			-0.281***	-0.297***		
	(0.068)	(0.068)			(0.069)	(0.070)		
SwitchLowRetail × *Post*			-0.086	-0.107			-0.142	-0.163
			(0.099)	(0.099)			(0.104)	(0.104)
SwitchHighRetail × *Post*			-0.517***	-0.528***			-0.345***	-0.359***
			(0.074)	(0.074)			(0.076)	(0.077)
log(Experience)		0.127***		0.125***		0.091***		0.091***
		(0.021)		(0.021)		(0.021)		(0.021)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes	Yes	Yes
Observations	573,153	573,153	573,153	573,153	573,016	573,016	573,016	573,016
R^2	0.75	0.76	0.75	0.76	0.80	0.80	0.80	0.80

Switch $\Rightarrow$ Value added increases

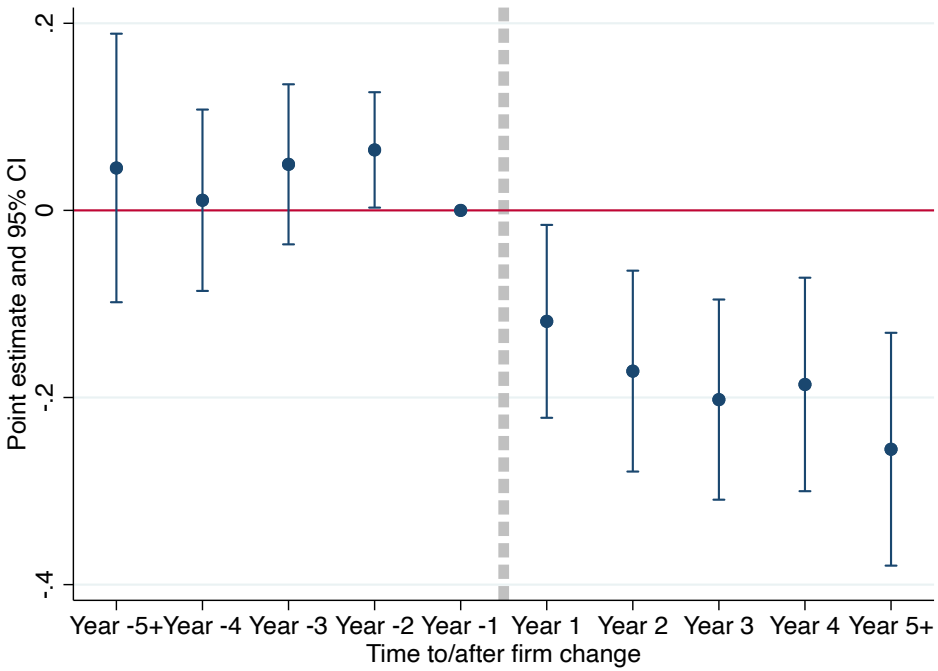
$$ValueAdded_{m,t} = \beta\{Switch \times Post\}_{m,t} + Control_{m,t} + \delta_t + \lambda_m + \eta_{style} + \theta_f + \epsilon_{m,t}$$

	Value Added							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Switch × *Post*	0.912***	0.932***			0.818***	0.838***		
	(0.152)	(0.154)			(0.157)	(0.162)		
SwitchLowRetail × *Post*			0.564***	0.592***			0.405**	0.431**
			(0.168)	(0.168)			(0.197)	(0.199)
SwitchHighRetail × *Post*			1.070***	1.086***			1.010***	1.027***
			(0.179)	(0.180)			(0.184)	(0.188)
log(Experience)		-0.171**		-0.169**		-0.116		-0.114
		(0.074)		(0.074)		(0.081)		(0.081)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes	Yes	Yes
Observations	573,153	573,153	573,153	573,153	573,016	573,016	573,016	573,016
R^2	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04

Trend before vs after a firm switch

$$Y_{m,t} = \sum_k \beta_k \{Switch \times year\ k\ to\ switch\}_{m,t} + \delta_t + \lambda_m + \eta_{style} + \theta_f + \epsilon_{m,t}$$

log(Misallocation)



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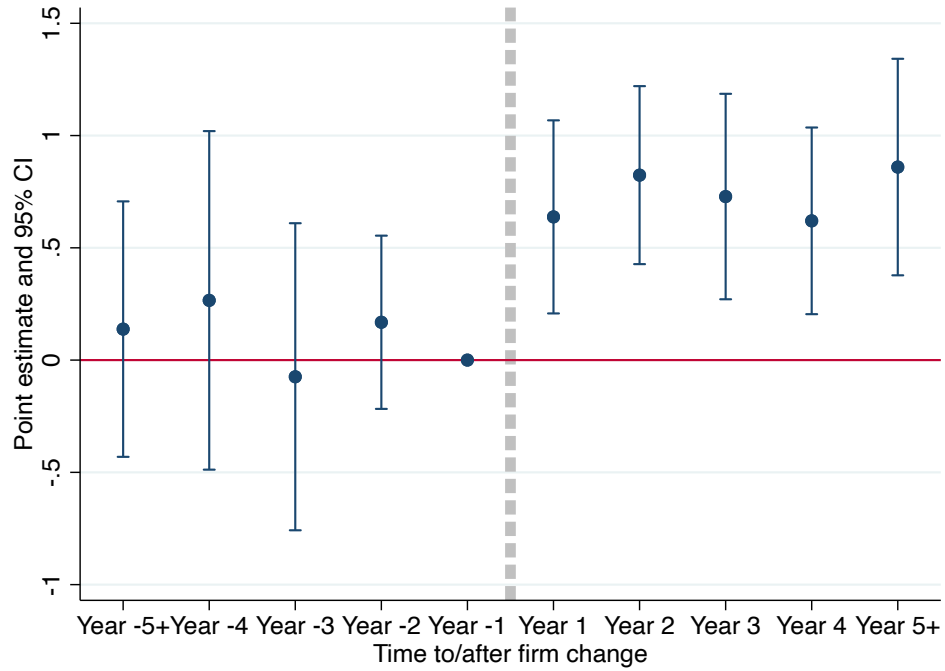

Non-Compete Clauses (NCCs)

Switches might be correlated with unobserved variables

- NCCs: labor contract clauses $\Rightarrow$ employee cannot join or found competitor within one–year of leaving
- Use staggered US state-level variations in NCCs enforceability as shocks to mobility costs

$\Rightarrow$ Diff-in-diff: Test whether in states where NCCs enforceability $\uparrow$:

1) managers' mobility $\downarrow$
2) capital misallocation across managers $\uparrow$
3) sum of managers' value added $\downarrow$

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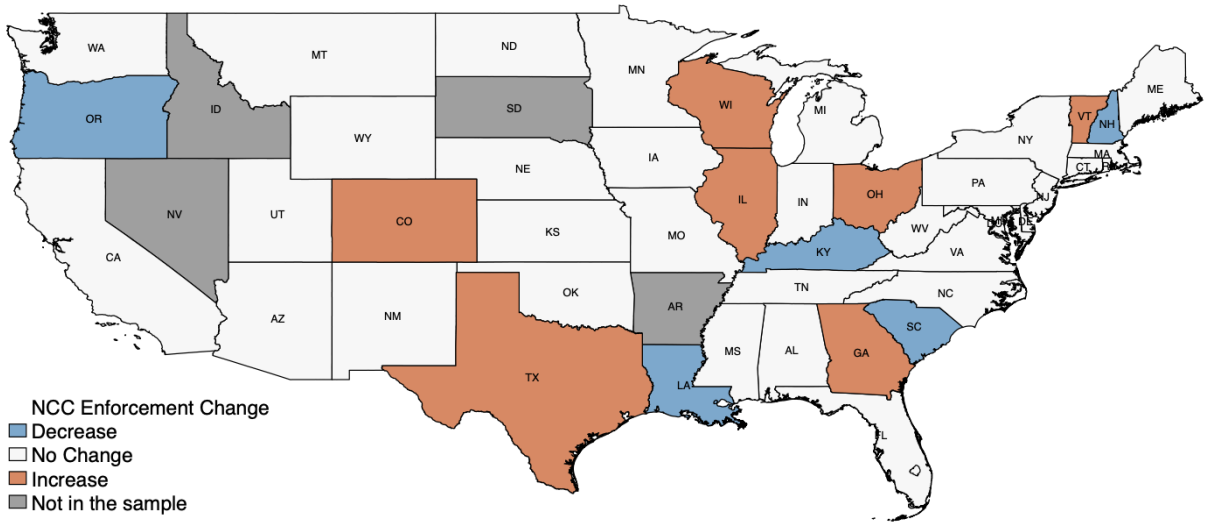
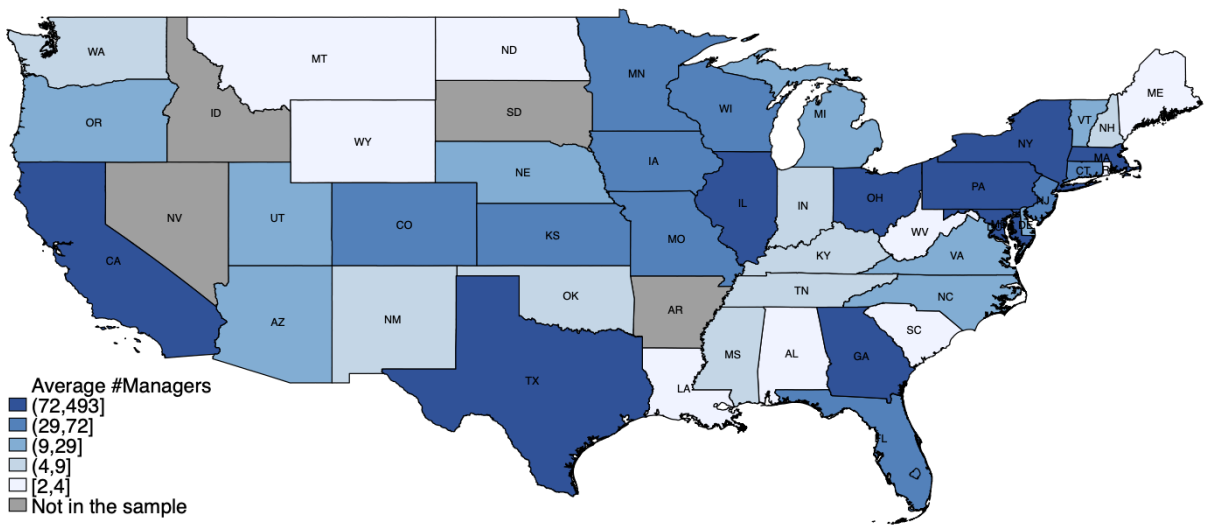
States affected by NCCs law changes

NCCs enforcement changes



Average number of managers over the period



NCCs enforceability ↑ ⇒ mobility ↓

$$100 \times \left(\frac{\#Switches}{\#Managers} \right)_{s,t} = \beta \{ Treated \times Post \}_{s,t} + \gamma X_{s,t-1} + \theta_s + \delta_t + \epsilon_{s,t}$$

	100 × (#Switches/#Managers)			
	(1)	(2)	(3)	(4)
Treated × *Post*	-0.042**	-0.046**	-0.049***	-0.053***
	(0.016)	(0.017)	(0.018)	(0.018)
log(#Managers)			0.036	0.038
			(0.024)	(0.023)
log(#Firms)			0.060**	0.057**
			(0.025)	(0.025)
log(TNA)			-0.008	-0.009
			(0.011)	(0.011)
log(#Funds)			-0.040	-0.038
			(0.027)	(0.027)
Drop NY, MA, CA	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	9,488	8,804	9,451	8,770
R^2	0.14	0.13	0.14	0.13

NCCs enforceability ↑ ⇒ misallocation ↑, value added ↓

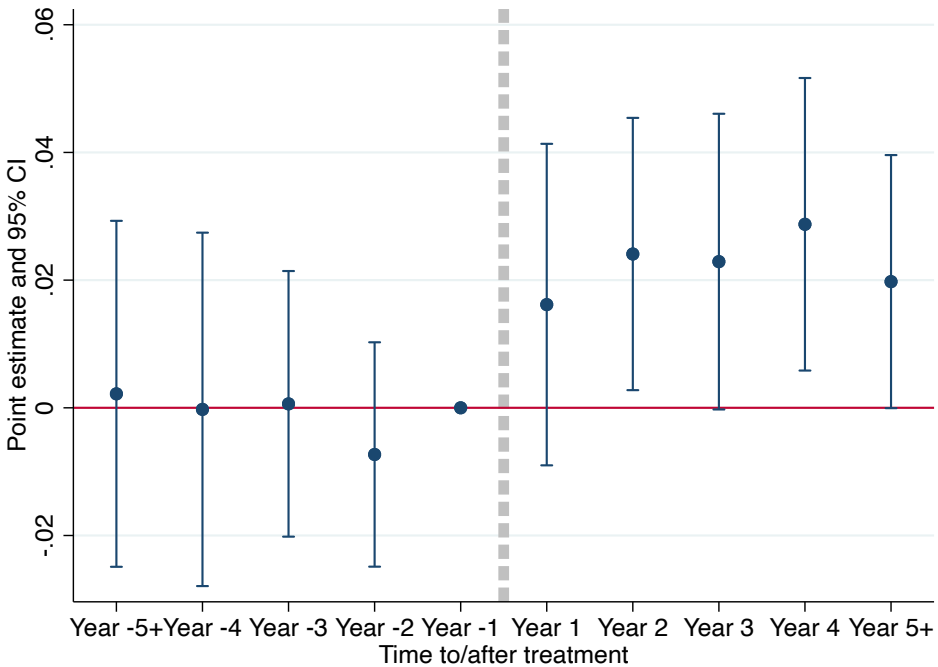
$$Y_{s,t} = \beta \{ Treated \times Post \}_{s,t} + \gamma X_{s,t-1} + \theta_s + \delta_t + \epsilon_{s,t}$$

	$100 \times \sigma(MPK)$		$100 \times (MPK\ 75 - 25)$		Value Added	
	(1)	(2)	(3)	(4)	(5)	(6)
Treated × *Post*	0.021**	0.021**	0.045***	0.046***	-26.940**	-25.860**
	(0.009)	(0.009)	(0.015)	(0.015)	(12.799)	(11.708)
log(#Managers)	-0.024	-0.024	-0.073**	-0.074**	16.327	10.306
	(0.022)	(0.022)	(0.028)	(0.029)	(17.916)	(11.072)
log(#Firms)	0.034	0.034	0.052	0.053	0.213	-9.063
	(0.023)	(0.023)	(0.035)	(0.035)	(12.743)	(7.090)
log(TNA)	0.024*	0.024*	0.029	0.029	-15.058*	-8.151**
	(0.014)	(0.014)	(0.020)	(0.020)	(8.847)	(3.951)
log(#Funds)	-0.002	-0.002	0.006	0.006	-2.423	-5.820
	(0.023)	(0.023)	(0.029)	(0.030)	(9.197)	(5.833)
Drop NY, MA, CA	No	Yes	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,451	8,770	9,451	8,770	9,451	8,770
R^2	0.61	0.61	0.54	0.54	0.17	0.17

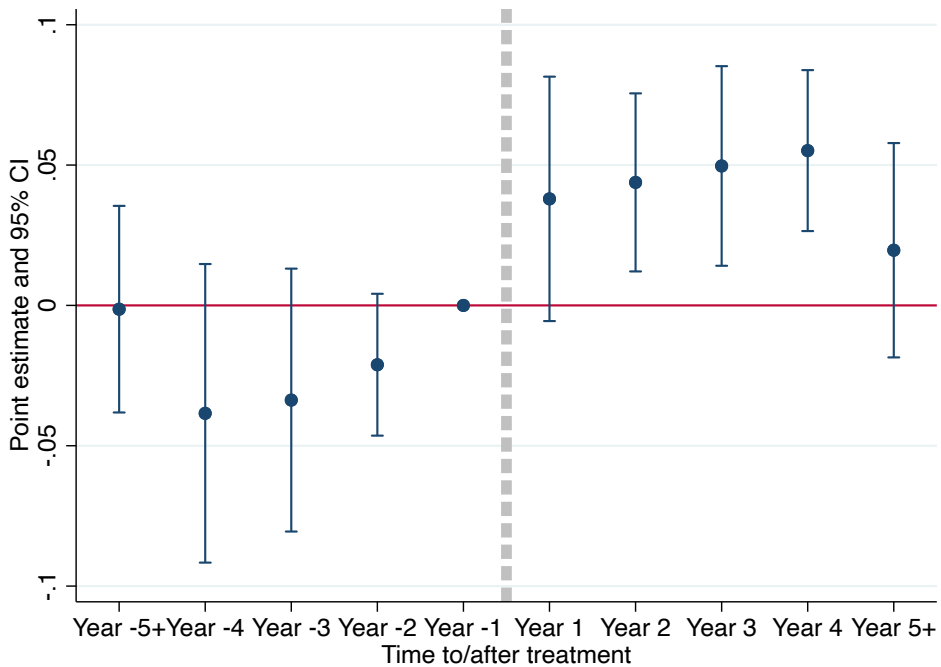
Trend before vs after NCCs law changes

$$Y_{s,t} = \sum_k \beta_k \{Treated \times year\ k\ to\ treatment\}_{s,t} + Control_{s,t-1} + \delta_t + \theta_s + \epsilon_{s,t}$$

$\sigma(MPK)$



$MPK\ 75th - 25th\ perc.$



Conclusion

$\rightarrow$ Skills go to capital: fund managers' mobility across firms is important to capital allocation efficiency in the mutual fund industry

$\rightarrow$ Inter-firm mobility frictions have real consequences:

- larger mismatch between capital and skill among mutual fund managers (capital misallocation $\uparrow$ by 10%)
- lower productivity in the mutual fund industry: state-level value added $\downarrow$ by \$25 million/month ($=$ 79th percentile of its distribution)

Appendix

Frictionless capital markets

- Continuum of managers $m \in [0, M]$ with density $\mu(m)$
- Investors maximize the NPV of investment by allocating capital $(\tilde{k}_m)$ to the different managers in the economy:

$$\tilde{k}_m = \arg\max_{k_m} \int_0^M \mu(i) \left[v_i(k_i) - W_i \right] di, \tag{1}$$

subject to

$$\int_0^M \mu(i) k_i di \leq \mathbf{K}. \tag{2}$$

$\Rightarrow$ FOC: $v_m'(\tilde{k}_m) = \lambda$

Back

(Quick) Derivation

Continuum of firms $f \in [0, F]$ employing managers and generating profit:

$$\int_0^M L_m(f)\,[v_m(k_m(f)) - W_m]\,dm,$$

- $L_m(f)$: mass of manager m employed by firm f
- $k_m(f)$: amount of capital managed by manager m in firm f
- W_m: compensation of manager m

1. Firm f chooses the amount of capital $k_m(f)$ to be managed by managers m, taking W_m and $L_m(f)$ as given $\Rightarrow \quad v_m'(k_m(f)) = \lambda_f$
2. Firm f optimizes its labor demand $L_m(f)$, taking $k_m(f)$ from step 1.

$\Rightarrow \; W_m = v_m(k_m(f)) - \lambda_f k_m(f)$

3. Manager m chooses employer $f_m = \arg\max_f \; v_m(k_m(f)) - \lambda_f k_m(f)$

$\Rightarrow \; \frac{\partial \lambda_f}{\partial f} = 0 \iff v_m'(k_m(f_m)) = \lambda$

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$\Rightarrow \; W_m = v_m(k_m(f)) - \lambda_f k_m(f)$

3. Manager m chooses employer $f_m = \arg\max_f \; v_m(k_m(f)) - \lambda_f k_m(f)$

$\Rightarrow \; \frac{\partial \lambda_f}{\partial f} = 0 \iff v_m'(k_m(f_m)) = \lambda$

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The Impact of Moving Costs

Assume that manager m faces cost $c_m(f)$ if moving to firm f

- manager $m \in [0, M]$ now chooses employer f_m s.t.

$$f_m = \arg\max_f \; v_m(k_m(f)) - \lambda_f k_m(f) - c_m(f)$$

$\Rightarrow$ FOC ($+$ algebra)

$$\frac{\partial \lambda_f}{\partial f} = -\frac{\mathcal{C}(f_m)}{Q(f_m)},$$

where

$$\mathcal{C}(f) = \int_0^M L_m(f) \frac{\partial c_m(f)}{\partial f} dm$$

$\Rightarrow$ introduction of a moving cost causes capital misallocation, i.e., there is a dispersion in marginal products of capital

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Summary statistics (fund manager level)

	Obs	Mean	Sd	5%	25%	50%	75%	95%
TNA (mill)	573,154	1,029.3	3,054.6	10.3	50.2	197.3	734.9	4,765.8
#Funds	573,154	2.1	2.0	1.0	1.0	1.0	2.0	5.0
#Comanagers	573,154	3.7	5.6	0.0	1.0	2.0	4.0	14.0
Gross alpha (%)	573,154	-0.0	1.7	-2.3	-0.7	-0.0	0.6	2.2
Value Added (mill)	573,154	-0.8	16.4	-20.5	-1.3	-0.0	1.0	16.1
Flow (mill)	573,154	0.5	116.1	-35.6	-3.9	-0.3	1.1	29.1
Experience (years)	573,154	8.2	6.1	1.1	3.3	6.8	11.8	20.0
Tenure (years)	573,154	4.9	4.5	0.3	1.5	3.5	6.8	14.1

Summary statistics of skill parameters

Group	Avg. AUM	#Mgrs	Obs	$b_m(\times 10^4)$	$t(b_m)$	a_m $(\times 10^4)$						
						mean	std.	5%	25%	50%	75%	95%
1	27	559	32,107	0.612	2.81	8.30	45.79	-28.97	1.91	14.04	22.33	38.85
2	48	559	42,481	0.208	3.74	7.56	17.39	-17.04	0.22	8.13	13.86	33.33
3	78	559	46,219	0.131	3.59	6.69	23.77	-27.08	0.55	8.71	15.95	33.69
4	123	558	49,878	0.051	4.16	3.26	20.53	-29.11	-3.24	4.90	11.74	27.07
5	186	559	56,594	0.036	4.04	2.09	19.32	-25.76	-5.31	3.63	10.08	29.37
6	280	559	58,969	0.026	4.51	3.26	19.98	-26.38	-5.52	4.42	11.74	31.43
7	423	558	60,126	0.021	4.34	3.65	20.04	-30.70	-3.24	6.15	13.16	30.12
8	676	559	65,363	0.016	7.47	6.36	18.22	-25.94	0.37	8.33	14.25	30.42
9	1,220	559	68,009	0.007	5.95	4.62	15.97	-20.76	-1.24	5.77	11.93	26.28
10	4,984	558	79,044	0.003	4.09	9.69	18.66	-19.90	0.11	9.11	18.41	38.40

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Summary statistics (state level)

	Obs	Mean	Sd	5%	25%	50%	75%	95%
#Managers	9,488	60.3	104.7	2.0	5.0	20.0	64.0	297.0
#Firms	9,488	20.0	30.1	1.0	3.0	8.0	22.0	81.0
TNA (bill)	9,488	62.1	150.2	0.1	0.9	9.7	48.0	365.1
#Funds	9,488	50.0	88.3	1.5	4.2	16.4	56.3	209.4
Value Added (mill)	9,488	-48.0	382.9	-466.2	-51.2	-0.7	14.4	238.6
#Switches	9,488	0.1	0.5	0.0	0.0	0.0	0.0	1.0
100 $\times$ (#Switches/#Managers)	9,488	0.2	1.8	0.0	0.0	0.0	0.0	0.4

Treated Vs. Control states

	Control		Treated		
	Obs	Mean	Obs	Mean	t
#Managers	312	38.1	120	27.1	1.87
#Firms	312	19.6	120	16.9	0.97
TNA (bill)	312	44.6	120	28.3	1.84
#Funds	312	35.1	120	26.4	1.56
Value Added (mill)	312	82.4	120	61.6	0.70
#Switches	312	0.2	120	0.1	0.92
100 $\times$ (#Switches/#Managers)	312	0.5	120	0.3	0.98

Non-Competes in the U.S. Labor Force

Source: Starr, Bishara and Prescott (2018), using nationally representative survey data on 11,505 labor force participants in the US in 2014

Figure A1: Incidence of noncompetes by industry and occupation