Skin or Skim? Inside Investment and Hedge Fund Performance

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NBER Long-Term Asset Management

Does Skin in the Game Matter?

- **Do funds outperform when insiders have more of their own assets in the fund?**

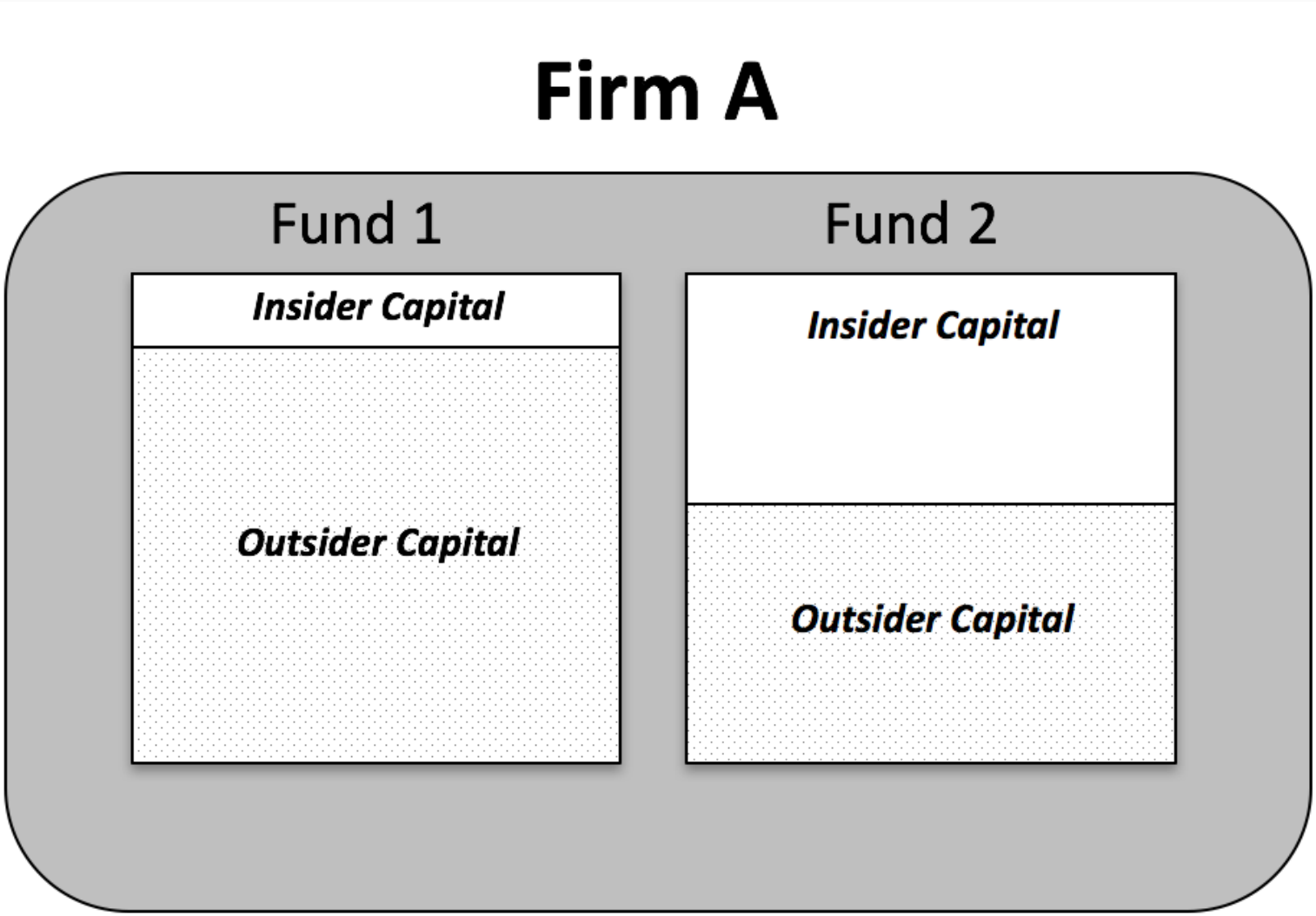
- **Model to capture effects of investment capacity**
  - Berk + Green model; add insider capital, multiple funds
  - Two period, partial equilibrium model
  - Friction: limited commitment, decreasing return to scale

- **Capacity constraints, internal capital enables rents**
  - Insider capital in funds with lower capacity constraints
  - $\rightarrow$ greater α

Research Strategy Compares High, Low Skin Funds within Firm

1 SD Increase in inside investment across funds in same firm

$\rightarrow$ 1.26% in annual α

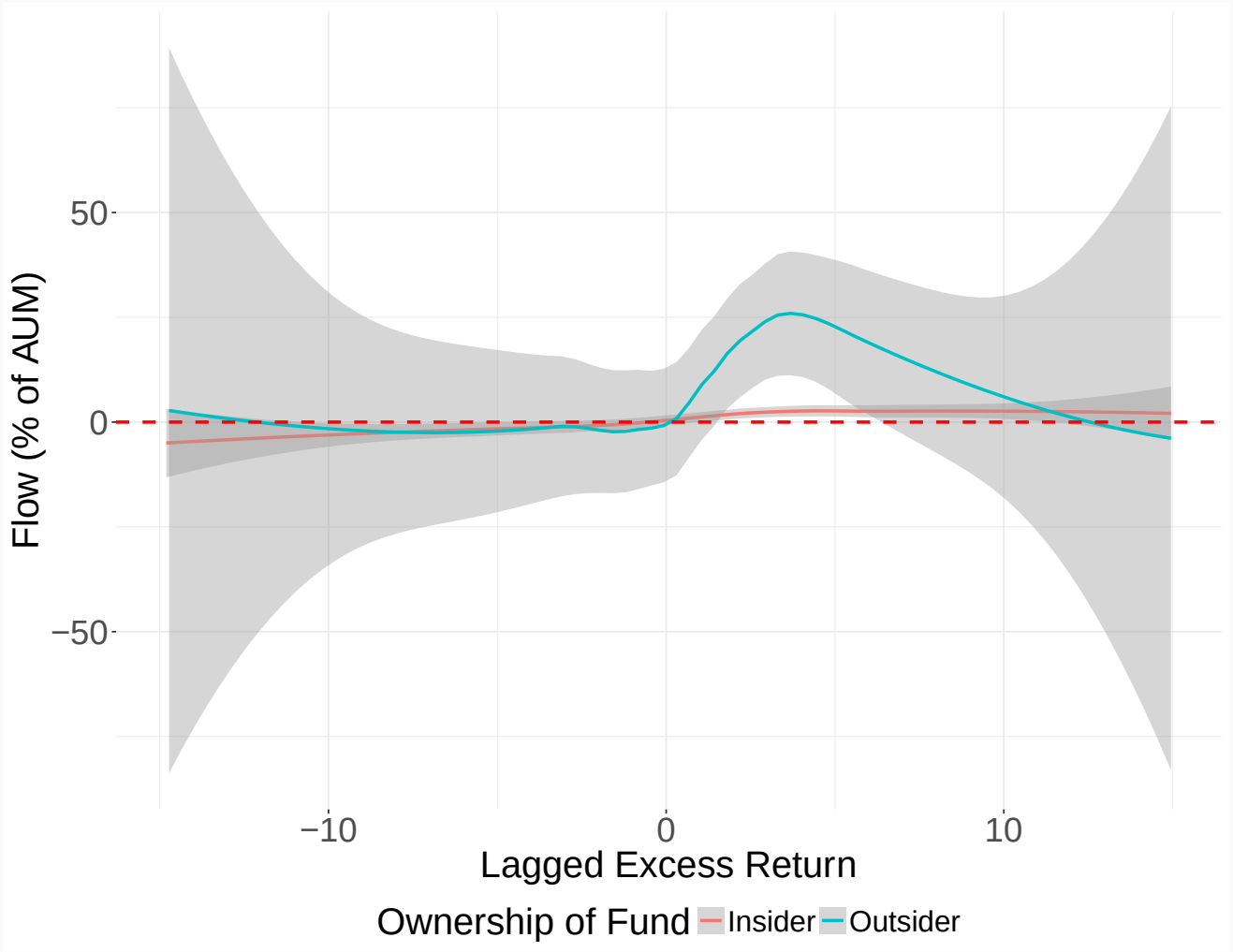


1. Motivating the Model

Evidence on hedge fund return persistence and flow performance

Capacity Constraints

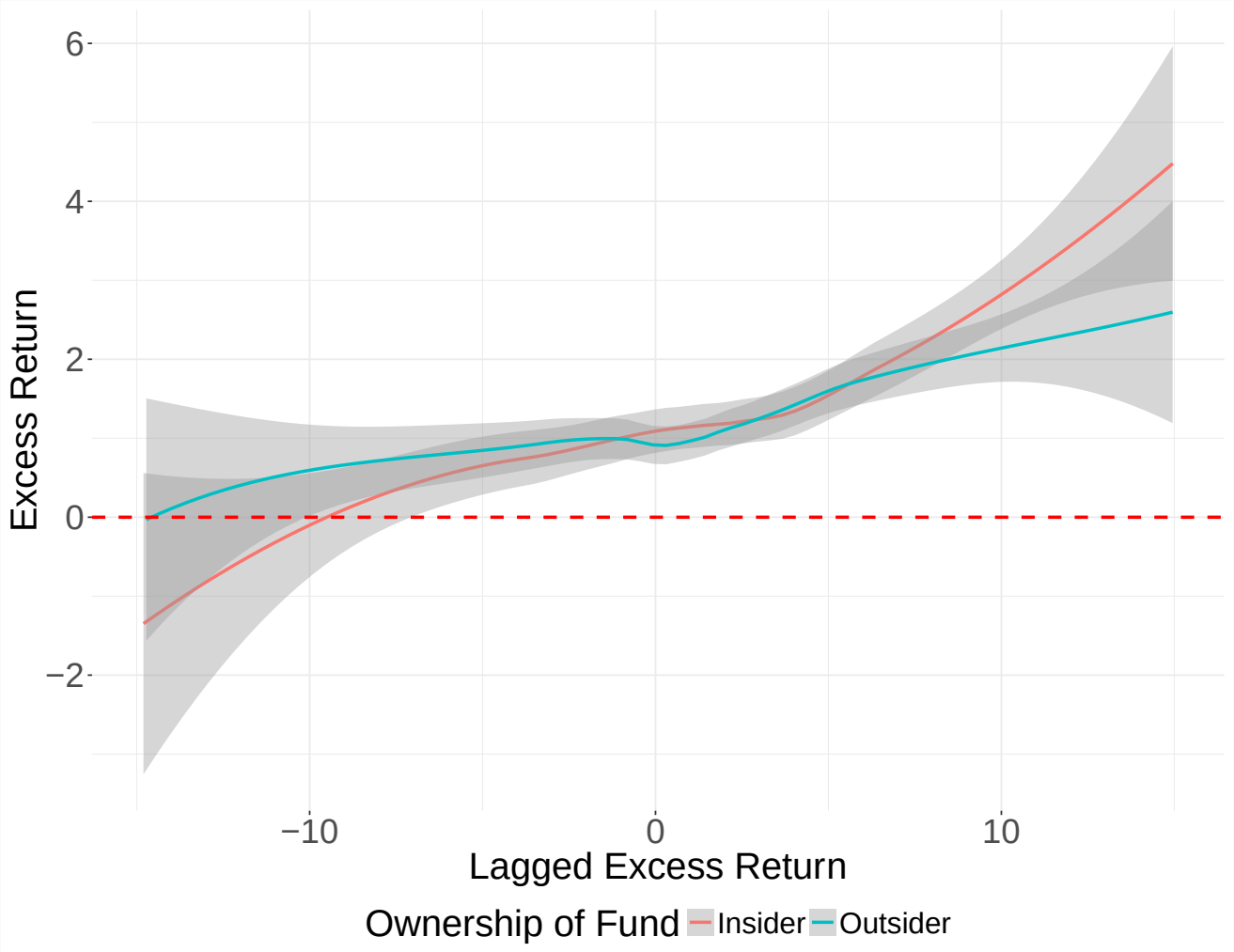
Dynamic Evidence of Binding Capacity Constraints: Flow Performance



High Inside Investment Funds Don’t Expand when Returns are High

Capacity Constraints

Dynamic Evidence of Binding Capacity Constraints: Return Persistence



High Inside Investment Funds have Persistent Outperformance

2. Model

Framework for understanding the relationship between inside investment and fund performance

Decreasing Return to Scale for an Investment Strategy

- An active manager specializes in N strategies:

$$R_{n,t+1} = \alpha_n - C_n\left(q_{n,t}^T\right)$$

- Cost function:

$$C_n\left(q_{n,t}^T\right) = \frac{a_n}{2}\left(q_{n,t}^T\right)^2$$

- Alpha, 'α', has standard interpretation
  Scale cost 'a' captures the scalability of the strategy

- Capital by insiders (I) and outsiders (O): $q_n^T \equiv q_n^I + q_n^O$
  (no borrowing)

Insiders Tradeoff Benefit from Fees vs. Cost of Outside Capital

Insider's value add: Return on own capital + management fees:

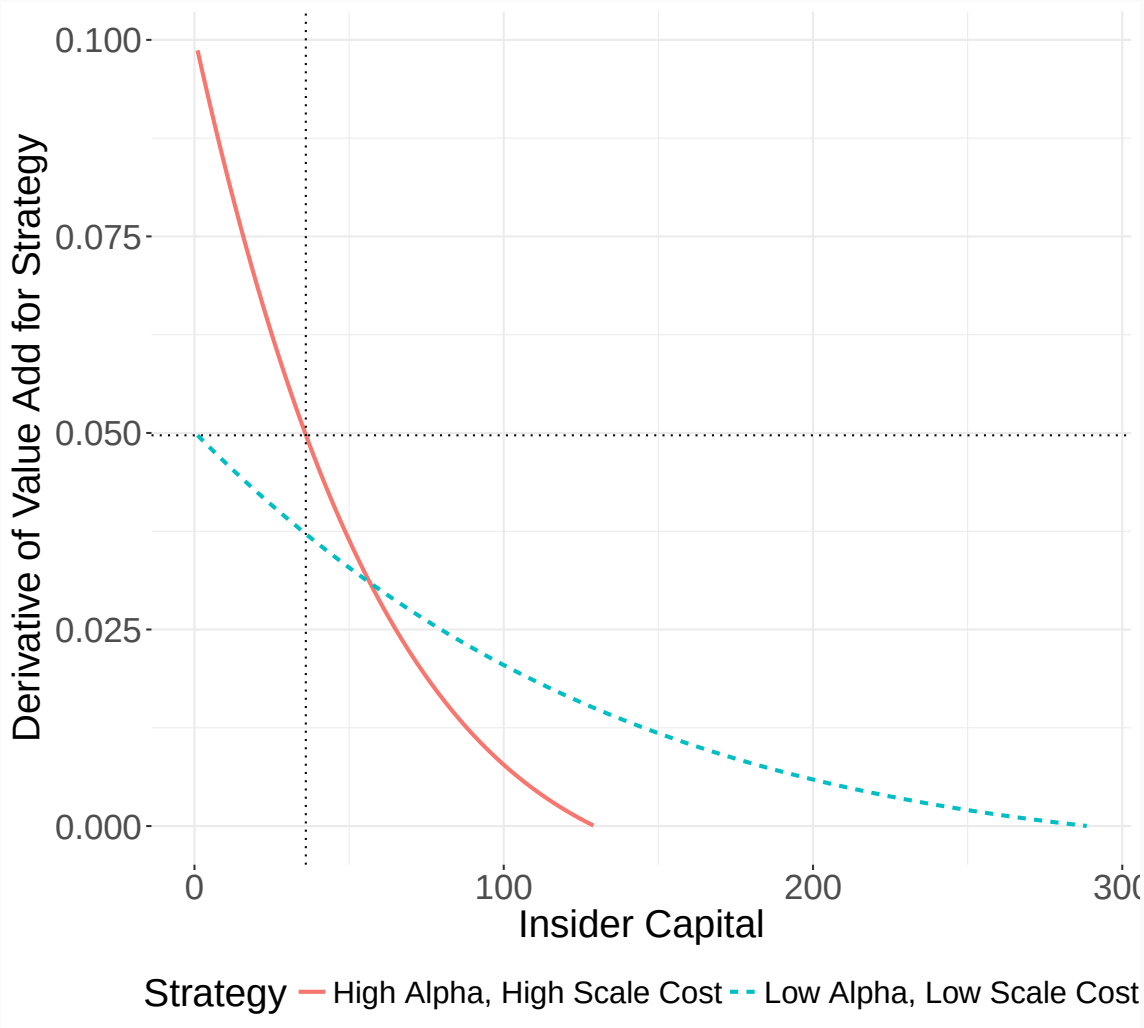
$$V^I = \underbrace{q^I\left(\alpha - C\left(q^T\right)\right)}_{\text{Insider Return on Capital}} + \underbrace{q^O f}_{\text{Mgmt fee}}$$

Outsider's value add: Return on invested capital - management fees (taken as given):

$$V^O = q^O \underbrace{\left(\alpha - C\left(q^T\right) - f\right)}_{\text{Net Return}}$$

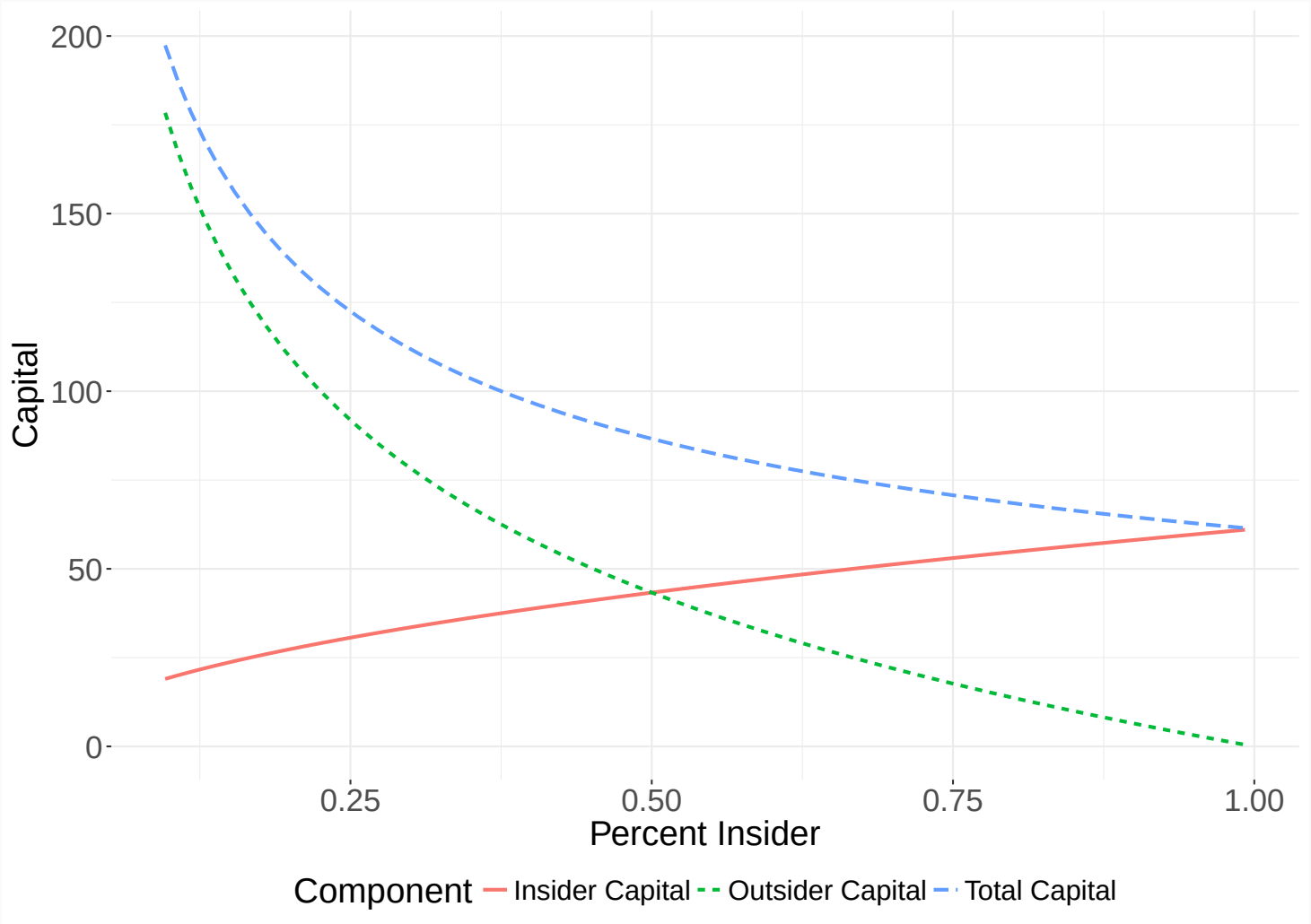
Insider's objective: maximize insider value add subject to the participation of the outsiders and scarce insider capital

Two Strategies, Intuition



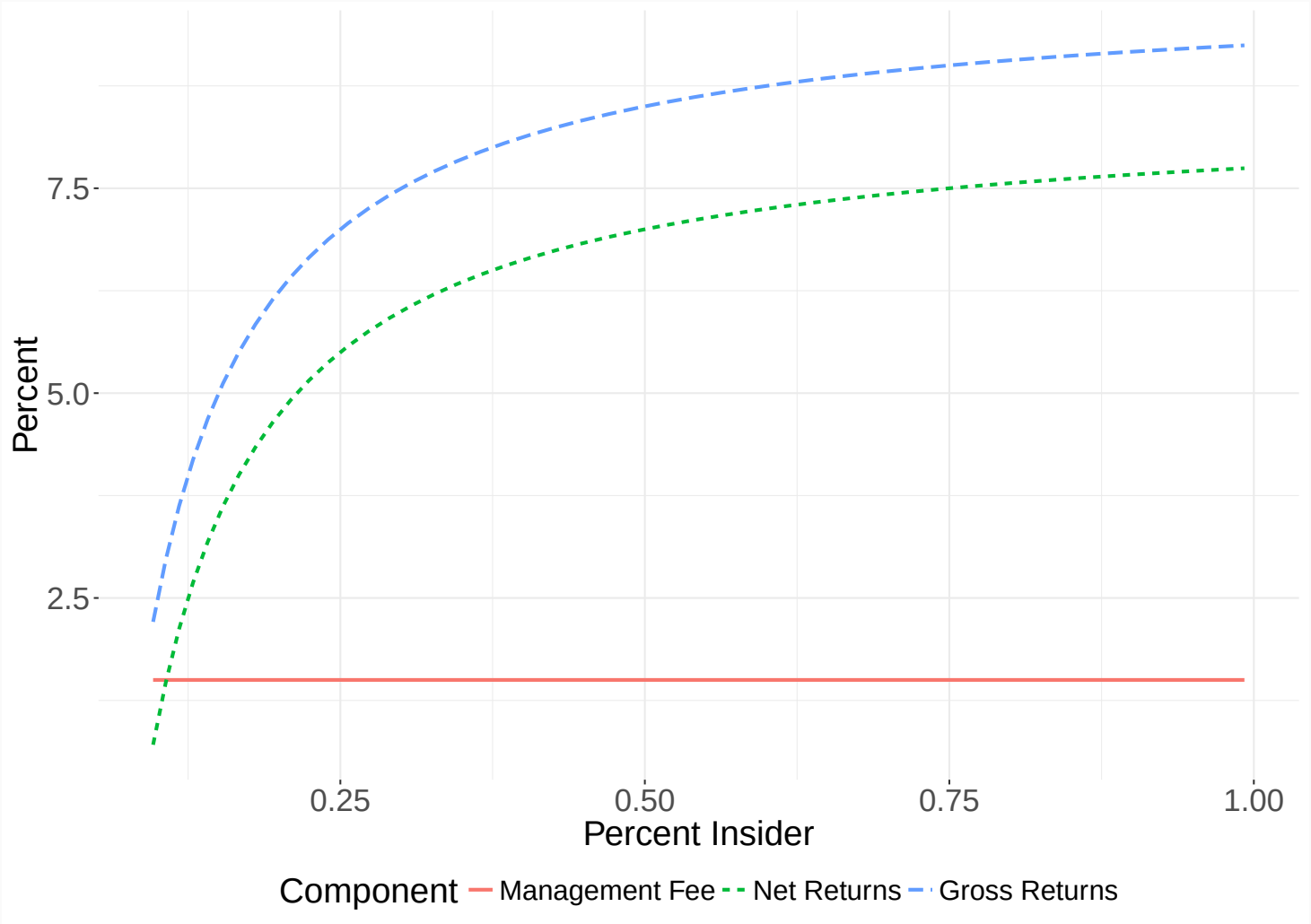
Decision of Where Insiders Allocate Capital

Insider Funds Tend to Be Smaller



Components of Capital Source

Insider Funds Outperform



Net and Gross Returns by Inside Investment

Berk + Green + inside capital = Predictions on Performance

- Predictions from model:
  1. Scale/size costs vary $\rightarrow$ inside capital not evenly allocated
  2. High skin funds are smaller
  3. High skin funds should outperform, ex-fees
- Where does it come from?
  - **Skill vs. Scale**: Tradeoff fees against return on own capital
  - Insider capital better aligns incentives with investors
  - Internalize dilutive impact of new capital raising on returns of existing investors
- Key friction: **limited commitment**. Insiders cannot credibly commit not to over-size fund

Single Strategy

3. Data

Form ADV enables novel analysis of inside investment in hedge funds

Novel Linkage of Regulatory Data and Hedge Fund Returns

- **Form ADV**
  - Required disclosure form for investment advisors ($>$ \$100m), 2001 — Present
  - Dodd-Frank — Hedge Funds required to disclose, report internal investments
  - Survival-bias free, comprehensive

- **Commercial Hedge Fund Return Databases**
  - eVestment, HFR, BarclayHedge, CISDM, Eureka Hedge
  - Linkage based on SEC Identifier or name, hand-checked

Merge Bias

Sample ADVs – RenTech Firm Level

FORM ADV

UNIFORM APPLICATION FOR INVESTMENT ADVISER REGISTRATION AND REPORT BY EXEMPT REPORTING ADVISERS

Primary Business Name: RENAISSANCE TECHNOLOGIES LLC	**CRD Number: 106661**
Annual Amendment - All Sections	**Rev. 10/2012**
3/30/2016 6:03:03 PM	

WARNING: Complete this form truthfully. False statements or omissions may result in denial of your application, revocation of your registration, or criminal prosecution. You must keep this form updated by filing periodic amendments. See Form ADV General Instruction 4.

Item 1 Identifying Information

Responses to this Item tell us who you are, where you are doing business, and how we can contact you.

A. Your full legal name (if you are a sole proprietor, your last, first, and middle names):
RENAISSANCE TECHNOLOGIES LLC

B. Name under which you primarily conduct your advisory business, if different from Item 1.A.:
RENAISSANCE TECHNOLOGIES LLC

Sample ADVs – Medallion LP, High Skin

A. PRIVATE FUND

Information About the *Private Fund*

1. (a) Name of the *private fund*:
   MEDALLION FUND L.P.
   (b) *Private fund* identification number:
   (include the "805-" prefix also)
   805-5297474322

2. Under the laws of what state or country is the *private fund* organized:

State:	Country:
Delaware	United States

3. Name(s) of General Partner, Manager, Trustee, or Directors (or persons serving in a similar capacity):

Name of General Partner, Manager, Trustee, or Director
RENAISSANCE TECHNOLOGIES LLC

Sample ADVs – Medallion LP, High Skin

11. Current gross asset value of the *private fund*:
    $ 6,043,321,751

Ownership

12. Minimum investment commitment required of an investor in the *private fund*:
    $ 10,000
    NOTE: Report the amount routinely required of investors who are not your *related persons* (even if different from the amount set forth in the organizational documents of the fund).

13. Approximate number of the *private fund*'s beneficial owners:
    342

14. What is the approximate percentage of the *private fund* beneficially owned by you and your *related persons*:
    67%

15. What is the approximate percentage of the *private fund* beneficially owned (in the aggregate) by funds of funds:
    0%

16. What is the approximate percentage of the *private fund* beneficially owned by non-*United States persons*:
    0%

Sample ADVs – Medallion LP, High Skin

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    0%

Sample ADVs – RIEF LLC, Low Skin

Information About the *Private Fund*

1. (a) Name of the *private fund*:

   RIEF TRADING LLC

   (b) *Private fund* identification number:
   (include the "805-" prefix also)

   805-1242904711

2. Under the laws of what state or country is the *private fund* organized:

   State: Delaware

   Country: United States

3. Name(s) of General Partner, Manager, Trustee, or Directors (or persons serving in a similar capacity):

Name of General Partner, Manager, Trustee, or Director
RENAISSANCE TECHNOLOGIES LLC

Sample ADVs – RIEF LLC, Low Skin

11. Current gross asset value of the *private fund*:
    $ 15,636,418,583

Ownership

12. Minimum investment commitment required of an investor in the *private fund*:
    $ 1,000
    NOTE: Report the amount routinely required of investors who are not your *related persons* (even if different from the amount set forth in the organizational documents of the fund).

13. Approximate number of the *private fund*'s beneficial owners:
    497

14. What is the approximate percentage of the *private fund* beneficially owned by you and your *related persons*:
    12%

15. What is the approximate percentage of the *private fund* beneficially owned (in the aggregate) by funds of funds:
    0%

16. What is the approximate percentage of the *private fund* beneficially owned by non-*United States persons*:
    24%

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    12%

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    0%

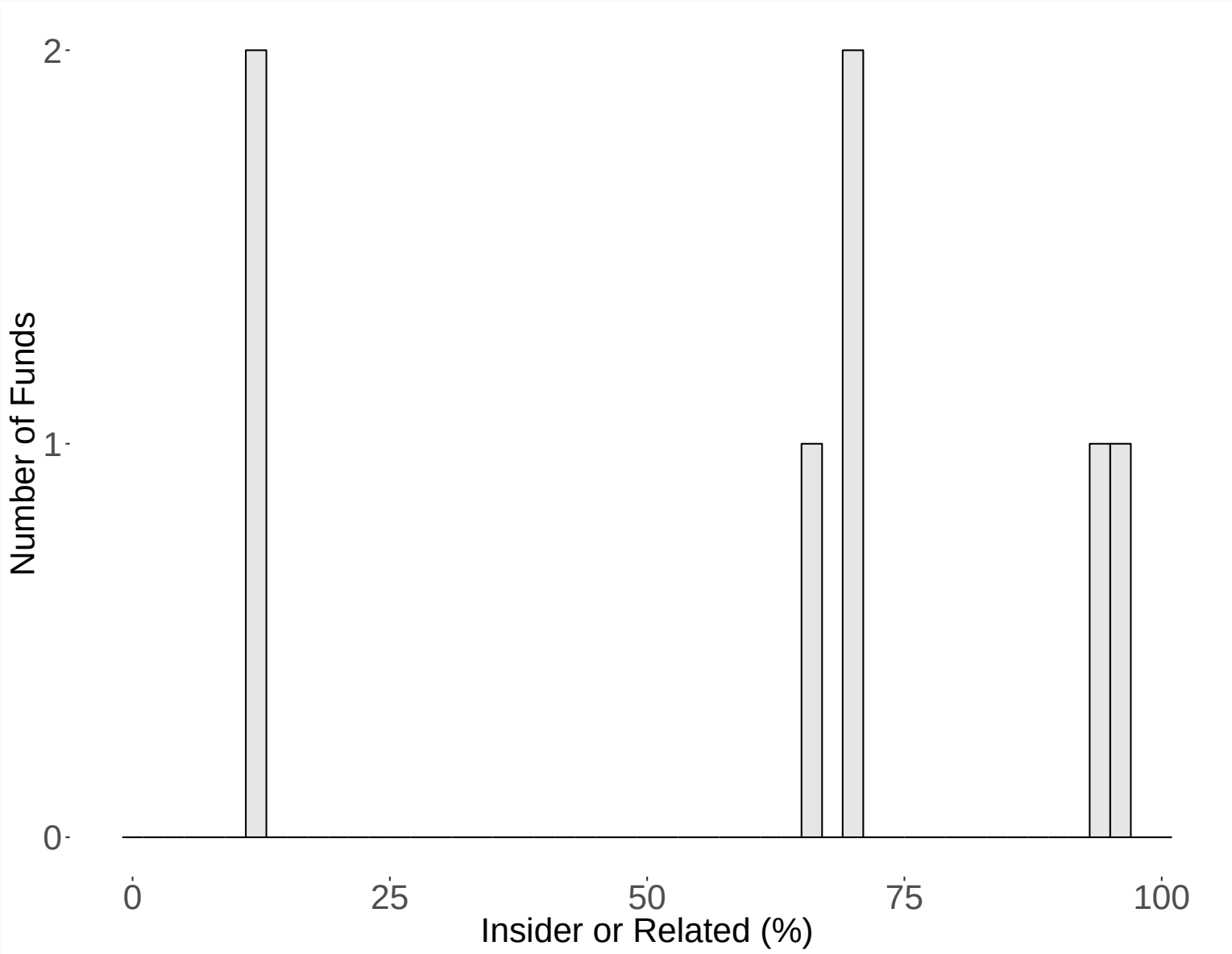
16. What is the approximate percentage of the *private fund* beneficially owned by non-*United States persons*:
    24%

Related Parties are Typically Vehicles for Ownership by GPs

Statistic	Mean	SD
Sponsor of GP	0.741	0.438
Other Investment Advisor	0.501	0.500
Commodity Pool	0.401	0.490
Broker/Dealer	0.160	0.367
Insurance	0.065	0.246
Sponsor of LP	0.046	0.210
Bank or Thrift	0.045	0.207
Trust	0.042	0.201
Pension	0.027	0.161
Accountant	0.025	0.156
Real Estate	0.024	0.153
Lawyer	0.019	0.138
Municipal Advisor	0.013	0.113
Futures Merchant	0.009	0.094
Swap Dealer	0.007	0.081
Swap Participant	0.001	0.026
Share Supervised Persons	74%	
Share Office	59%	

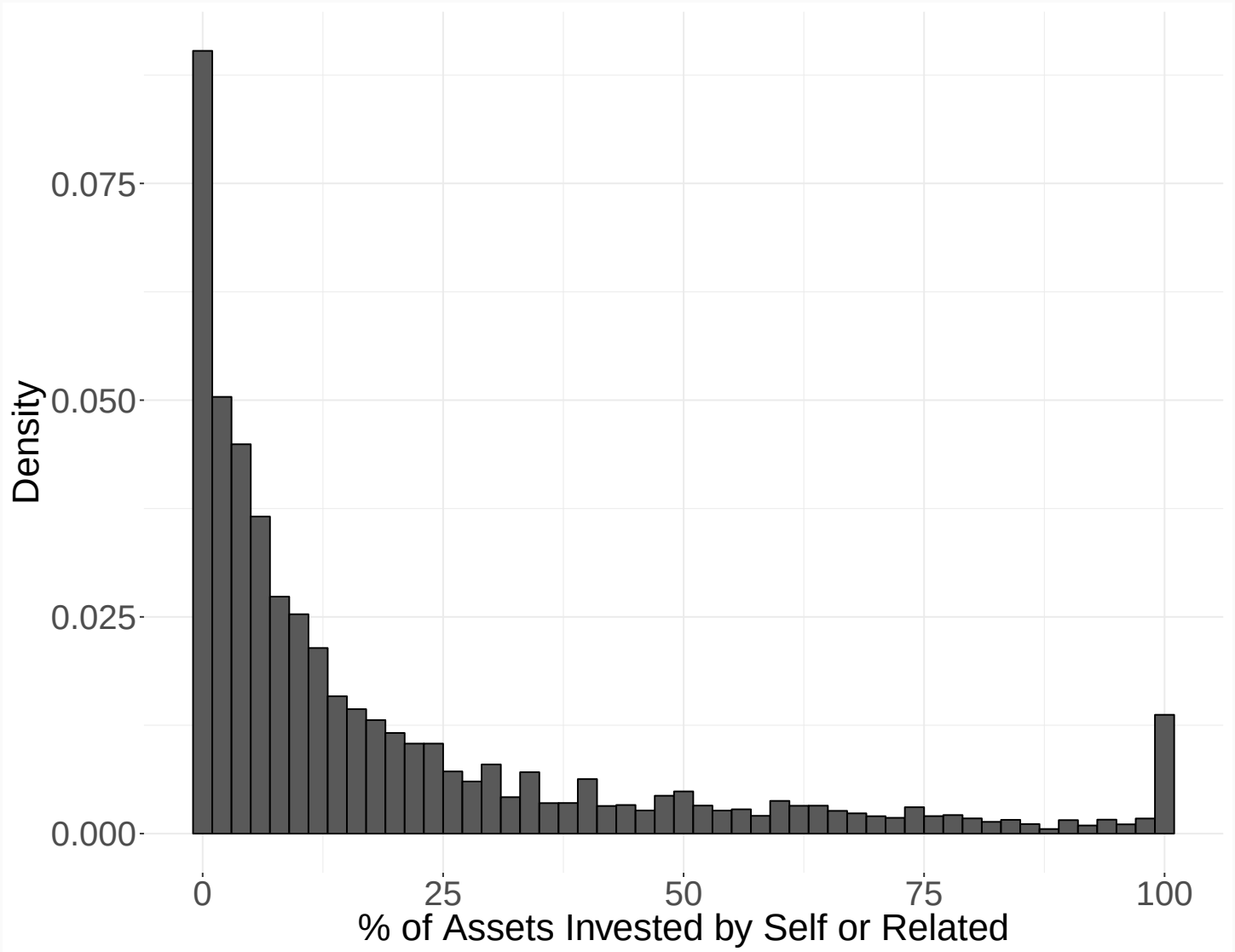
Note: Measures whether related party is present; does not add to 100%

Revealing RenTech's Dark Matter



Data Enable Novel Analysis of Insider Investment

Gross Investment



4. Results

Inside Investment $\rightarrow$ Performance, and Mechanisms

Ownership-Performance Relationship

	FH Excess Returns		FFC Excess Returns	
Skin (Percent)	0.0024***	0.0048***	0.0024***	0.0048***
	(0.0009)	(0.0015)	(0.0009)	(0.0013)
Year FE	No	Yes	No	Yes
Firm FE	No	Yes	No	Yes
Fund Controls	No	Yes	No	Yes
Log(Fund Size)	Yes	Yes	Yes	Yes
Observations	41,097	41,097	41,097	41,097
R^2	0.0003	0.0368	0.0009	0.0404

First Stage : time-series factor correction (i.e., for (3)-(4)):

$$R_{it} - R_{ft} = \beta_1(R_{Mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{it}$$

Shown in table: second stage panel

Ownership-Performance Relationship

	FH Excess Returns		FFC Excess Returns	
	All	Controls	All	Controls
Skin (Percent)	0.0024***	0.0048***	0.0024***	0.0048***
	(0.0009)	(0.0015)	(0.0009)	(0.0013)
Year FE	No	Yes	No	Yes
Firm FE	No	Yes	No	Yes
Fund Controls	No	Yes	No	Yes
Log(Fund Size)	Yes	Yes	Yes	Yes
Observations	41,097	41,097	41,097	41,097
R^2	0.0003	0.0368	0.0009	0.0404

Additional percent of insider investment adds 0.48 bps of α, monthly; or a 1 SD shift within firm adds 1.24% yearly α.

Groucho Mark Theory of Investment

Don't Want to Invest in a Fund that will have you as a LP

	Open for Investors	α^{FH}	α^{FFC}
Inside Investment (%)	−0.0021***		
	(0.0003)		
Open for Investors		−0.2186***	−0.3141***
		(0.0746)	(0.0706)
Fixed Effects	Yes	Yes	Yes
Log(Fund Size)	Yes	Yes	Yes
Sample:	Yearly	Monthly	Monthly
Observations	1,977	12,065	12,065
R^2	0.1385	0.0168	0.0130
Note:		*p<0.1; **p<0.05; ***p<0.01	

Funds closed to new investment outperform by 2-4% yearly

Disproportionately managing **inside** capital

Capacity Constraints

High Inside Investment Funds are Smaller

	AUM from Merged Dataset ($m)		Gross Value from ADV ($m)	
Skin (Percent)	−3.82***	−7.86***	−6.34***	−10.14***
	(0.24)	(1.20)	(0.89)	(1.12)
Year FE	No	Yes	No	Yes
Firm FE	No	Yes	No	Yes
Fund Controls	No	Yes	No	Yes
Observations	2,633	2,633	57,295	57,295
R^2	0.01	0.88	0.002	0.57
Note:				*p<0.1; **p<0.05; ***p<0.01

Interpretation: One additional percent of inside investment associated with a $7-10m smaller fund

Capacity Constraints

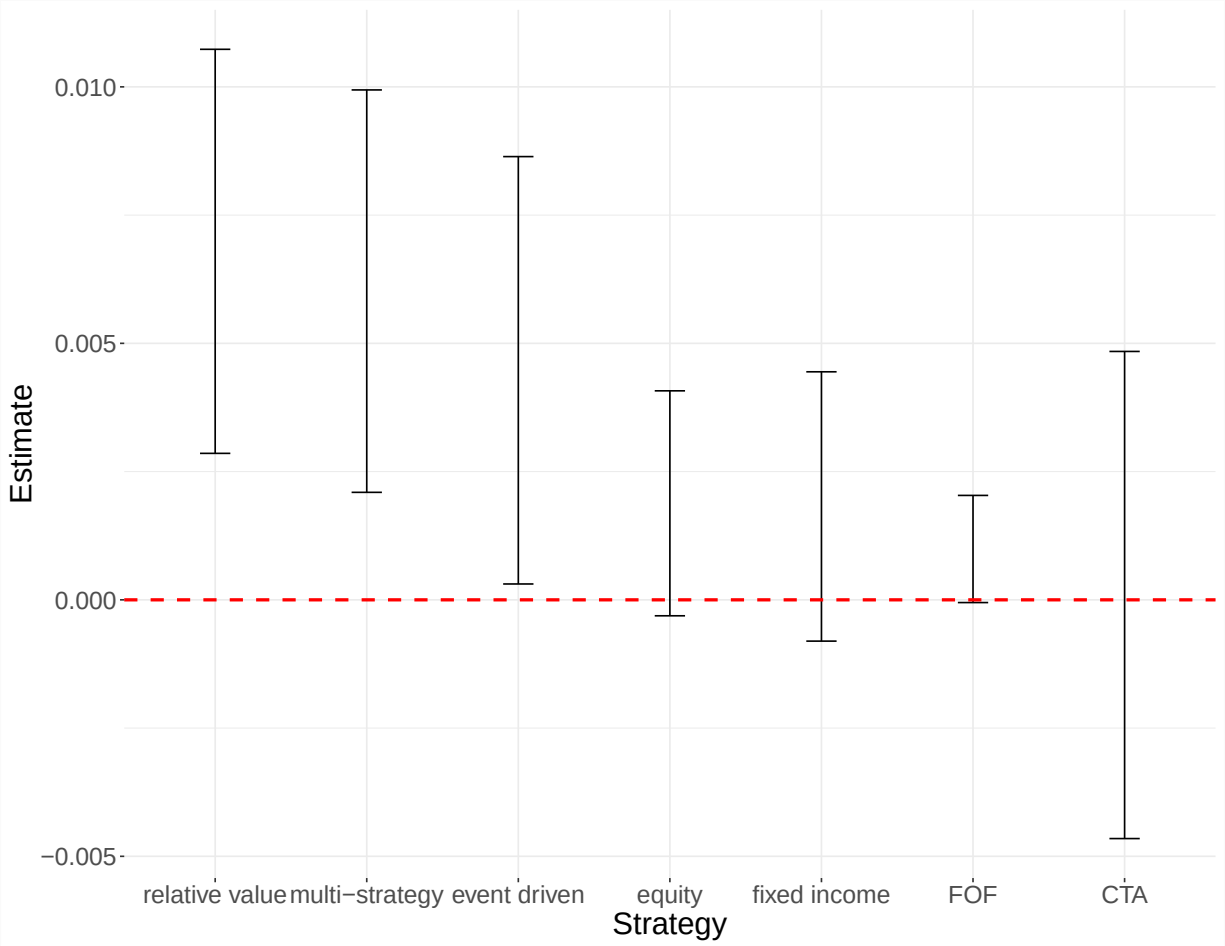
Inside Funds Better Manage Capacity Constraints

	Percent Flow	Percent Flow >0	Excess Return$_t$	Excess Return$_t$ >0
	(1)	(2)	(3)	(4)
Excess Return$_{t-1}$ $\times$ Insider	-0.1126^{**}	-0.3747^{***}	0.0437	0.3321
	(0.0548)	(0.1309)	(0.0369)	(0.2230)
Excess Return$_{t-2}$ $\times$ Insider	-0.0227	-0.0618	0.0116	0.1605
	(0.0817)	(0.2162)	(0.0381)	(0.2633)
Excess Return$_{t-3}$ $\times$ Insider	0.0213	-0.0850	-0.0288	-0.1880
	(0.0684)	(0.2178)	(0.0353)	(0.2522)
Fixed Effects:	Yes	Yes	Yes	Yes
Controls:	Yes	Yes	Yes	Yes
Observations	7,255	7,255	7,255	7,255
R^2	0.2479	0.2465	0.1677	0.1490
Note:				*p$<$0.1; **p$<$0.05; ***p$<$0.01

Insider funds: higher than average inside skin level (20%)

Capacity Constraints

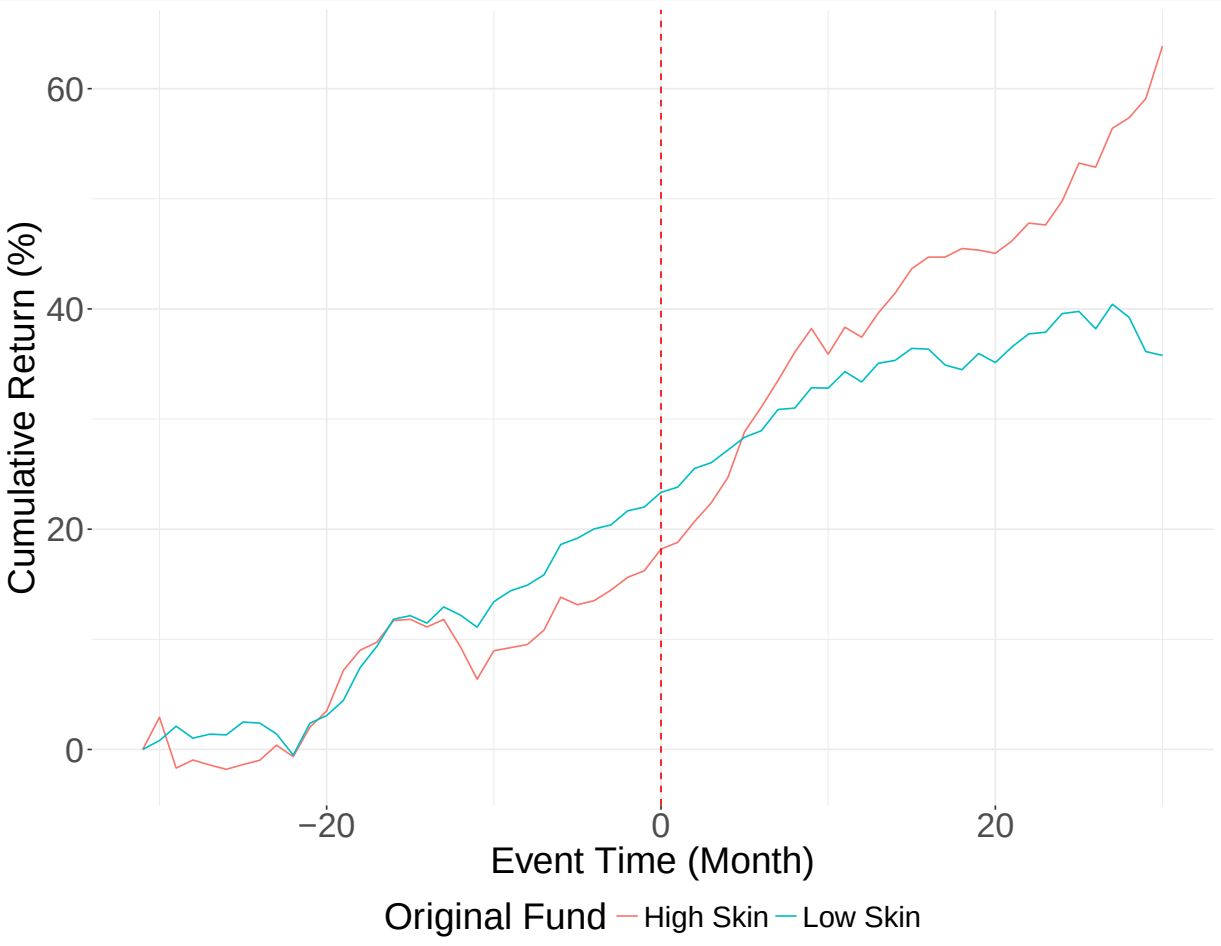
Effects driven by specialist, arb, funds



Coefficient on main regression ($\alpha_{it} = \beta \text{Ownership}_{it-1}$) by type of fund

Agency Conflict

"Skimming" Event Study: Returns Follow Skin



Tracks excess return of *original* fund after *new* fund is created with outsider or insider money Regression

Our Contribution Relates to Several Literatures:

- **Inside Investment and Mutual Fund Performance:**
  Khorana et al. (2007), Evans (2008), Chen et al. (2008), Cremers et al. (2009)
  Hedge funds: Qiu et al. (2016), Brown et al. (2008)

- **Assessing Managerial α:**
  Kosowski et al. (2006), Fama and French (2010), Kacperczyk, Nieuwerburgh, and Veldkamp (2014),Berk and van Binsbergen (2015), Khorana, Servaes and Wedge (2007), Evans (2008), Chen, Goldstein and Jiang (2008), Koijen (2014)

- **Fund Families:**
  Massa (2003), Berk et al. (2017)

- **Financial Compensation and Incentives:**
  Das et al. (2002), Ibert et al. (2017), Ma et al. (2016)
  Hedge funds: Agarwal et al. (2009), Burasachi et al. (2014)
  Model: Berk and Green (2004), Berk and van Binsbergen (2015)
  Inequality: Kaplan and Rauh (2013), Philippon and Reshef (2012), Alvaredo et al. (2013)
- **Ownership and Firm Performance:**
  Berle and Means (1932), Jensen and Meckling (1976), Fama and Jensen (1983), Holmstrom (1985), Randall, Shleifer and Vishny (1988)

Robustness

- What about superior managerial information?
- What about firm-level equity ownership?
- What about fees?
- What about fraud?
- Where in Insider Investment Distribution does this Matter?
- Where in Size Distribution does this Matter?
- Value Weighted?
- What about Merge Bias?
- Including 0, 100% Skin Funds?

Where are the Investors' Yachts?

- We're ignoring a major component of hedge fund compensation: **insider returns**
  - Managers now tradeoff high capacity-management fee funds with low capacity-inside money funds
  - Predictions confirmed by novel data from hedge funds
- Investors: find funds that eat their own cooking
- Suggests why hedge fund manager profits so persistent despite seeming competition and low performance

Summary Statistics: Merged Dataset, Firm Level

Back

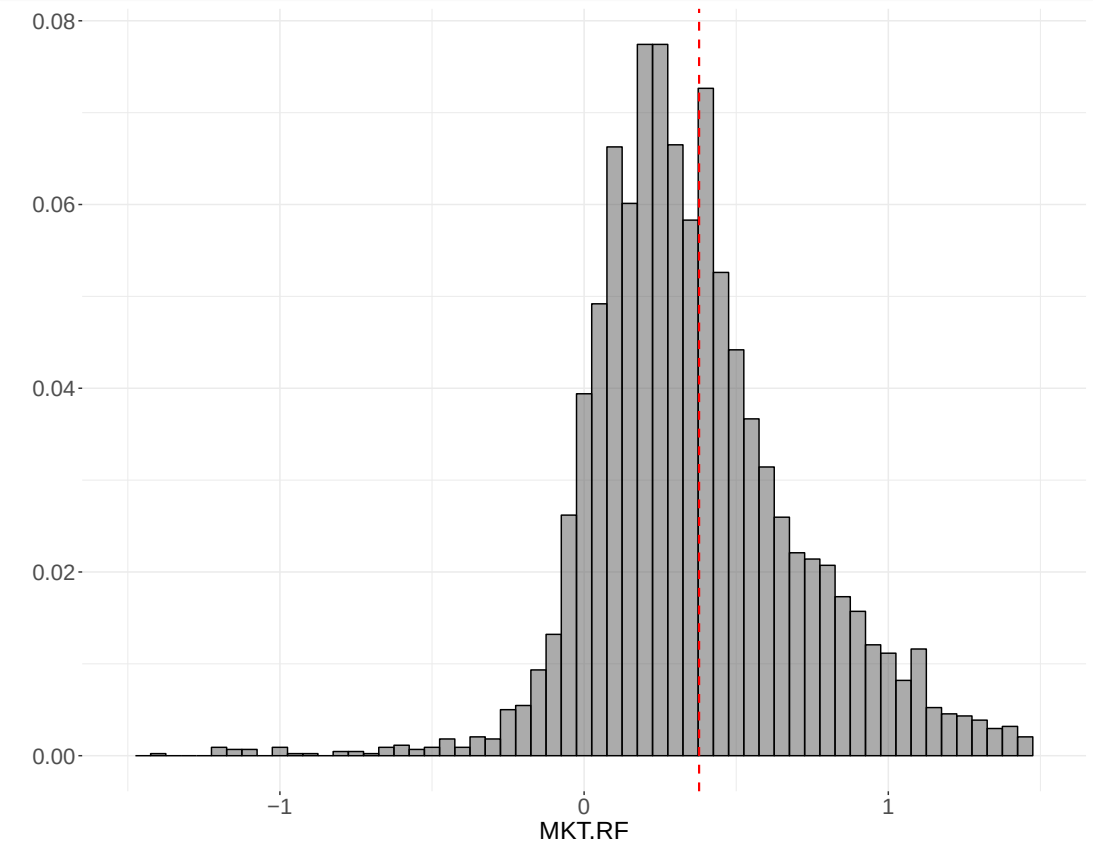
Names	Total	Median	Mean	Std.Dev
Custodial AUM ($m)	8,525,754.0	775.5	6,458.9	28,332.9
Regulatory AUM ($m)	18,084,715	1,166.7	13,700.5	72,114.3
Discretionary AUM ($m)	17,518,589	1,030.8	13,271.7	71,040.1
Non-Discretionary AUM ($m)	566,126	0	428.9	2,585.1
Number of Employees	139,264	13	57.2	199.0
— Support Staff	81,033	5	33.3	132.9
— Advisors	58,231	7	23.9	75.6
Number of Firms	2,433			

Summary Statistics: Merged Dataset, Fund Level

Names	Total	Median	Mean	Std.Dev
Number of Hedge Funds	9, 763			
Gross Asset Value ($m)	6, 177, 174.0	127.8	632.7	3, 060.7
Gross Assets, Inside Investment ($m)	772, 663	3.8	79.1	553.2
Gross Assets, Fund of Funds ($m)	1, 160, 354.0	0	118.9	873
Gross Assets, Non-US Investors ($m)	2, 492, 344.0	4.7	255.3	1, 698.6
Number of Owners		19	66.8	544.3
Minimum Investment ($m)		1	7.5	70.3
Inside Investment (%)		3	16.7	28.6
Investment by Fund of Funds (%)		0	15.9	29.5
Non-US Investors (%)		4	30.7	39.0
Number of Fund of Funds	2, 322			

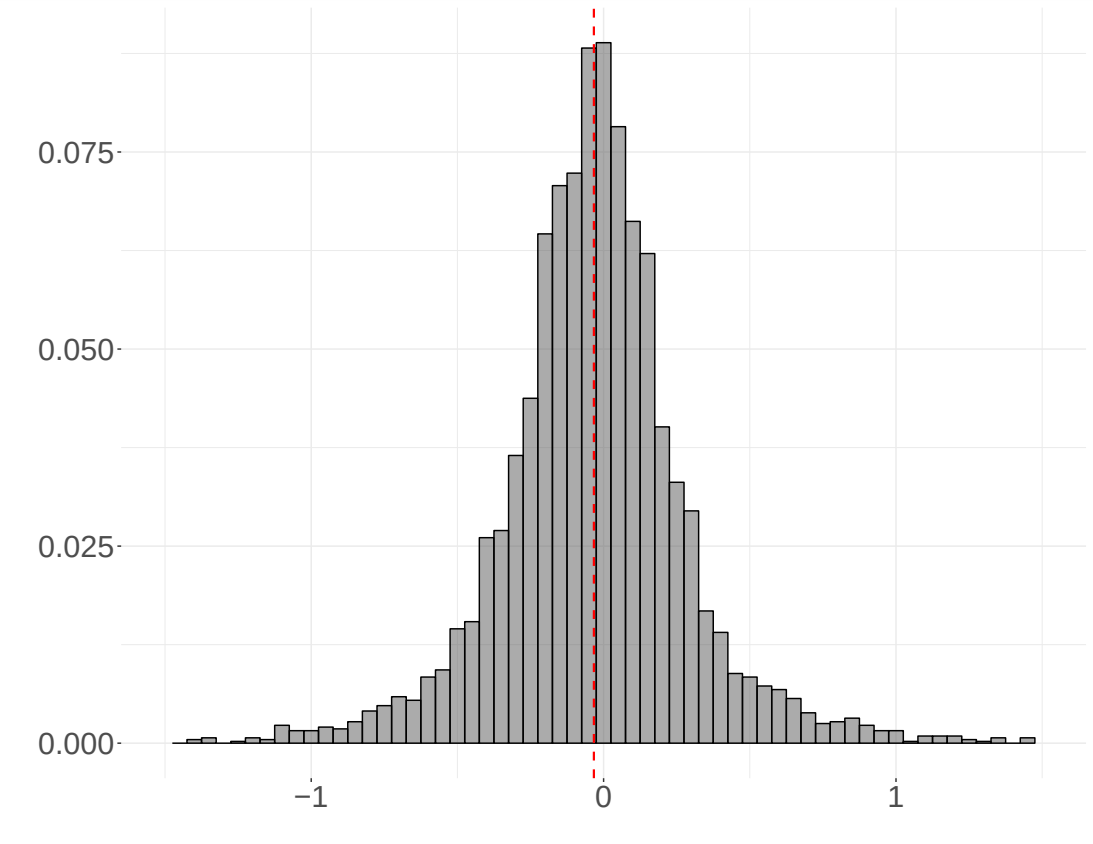
First Stage

Back



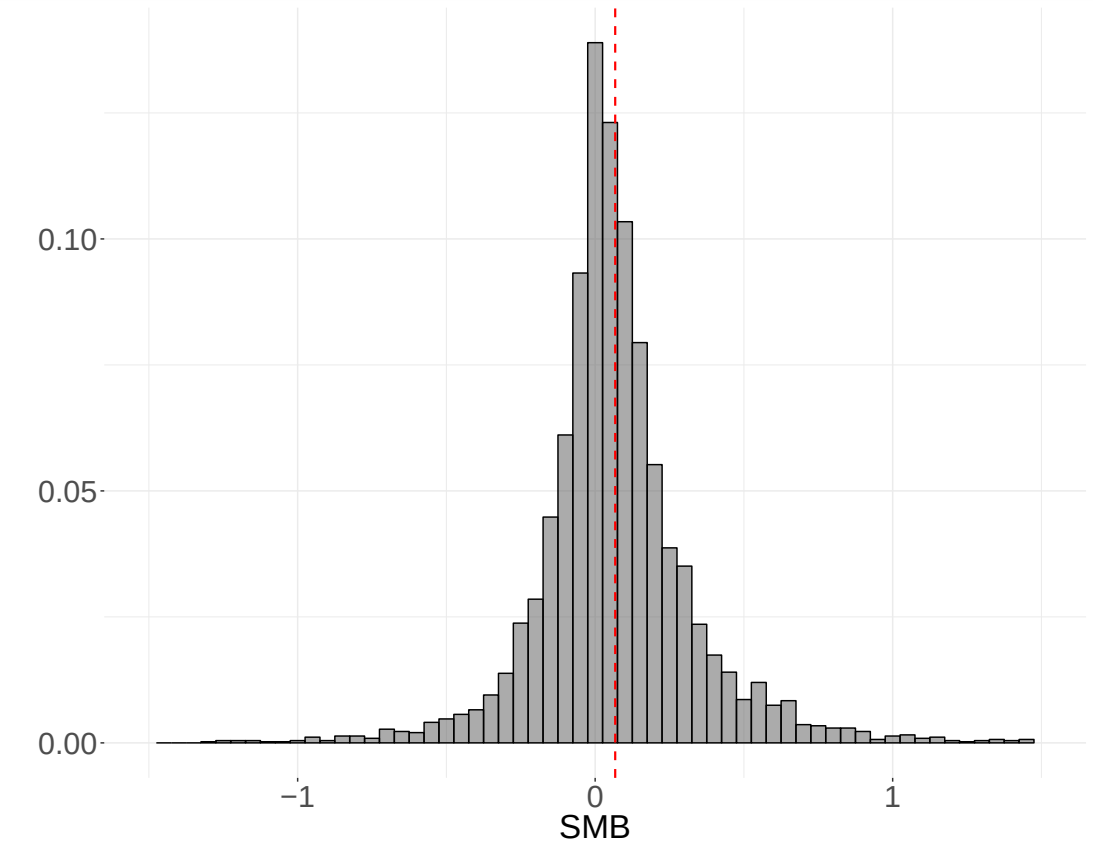
(a) Market Factor

First Stage



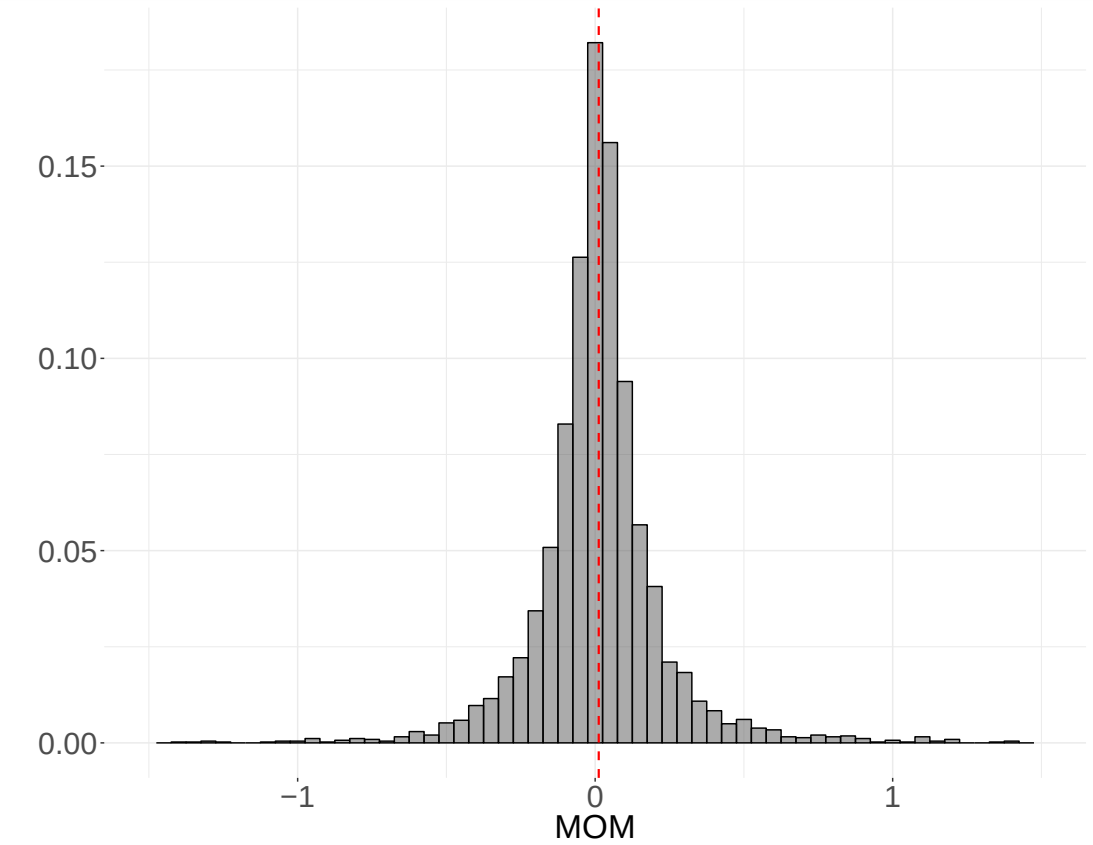
(b) Value Factor

First Stage



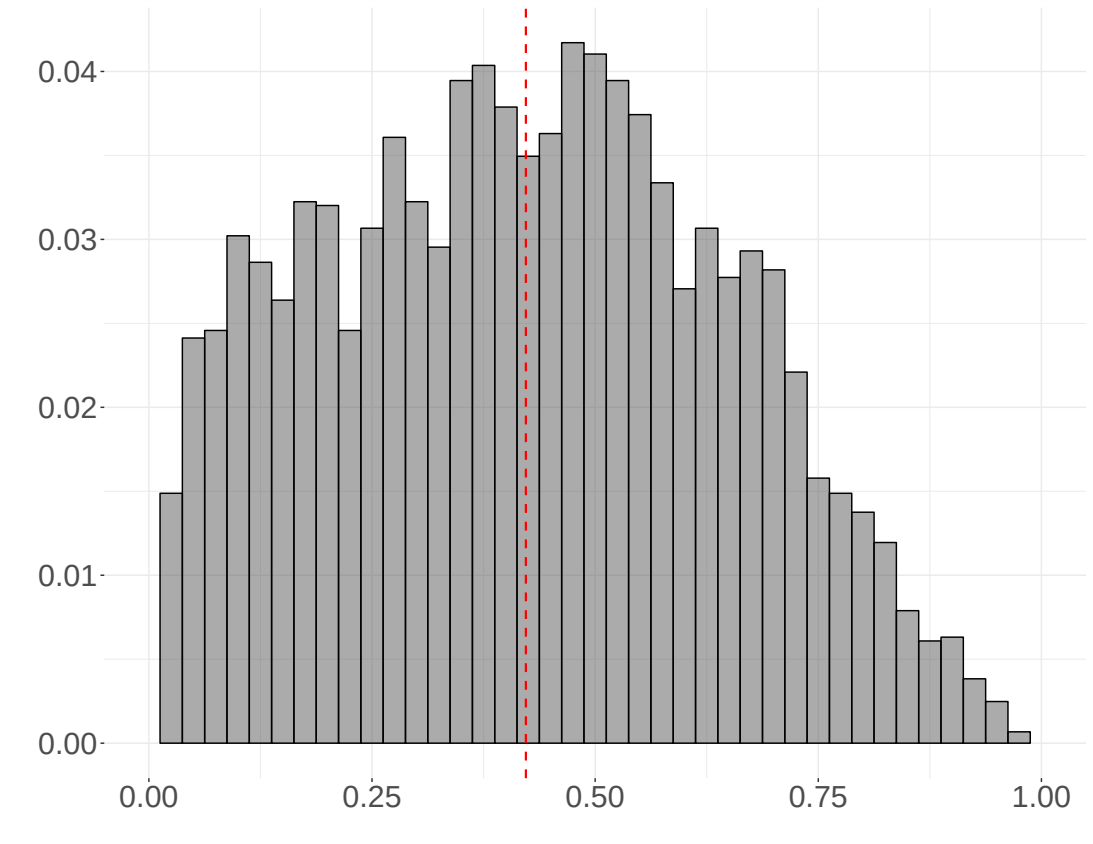
(c) Small Factor

First Stage



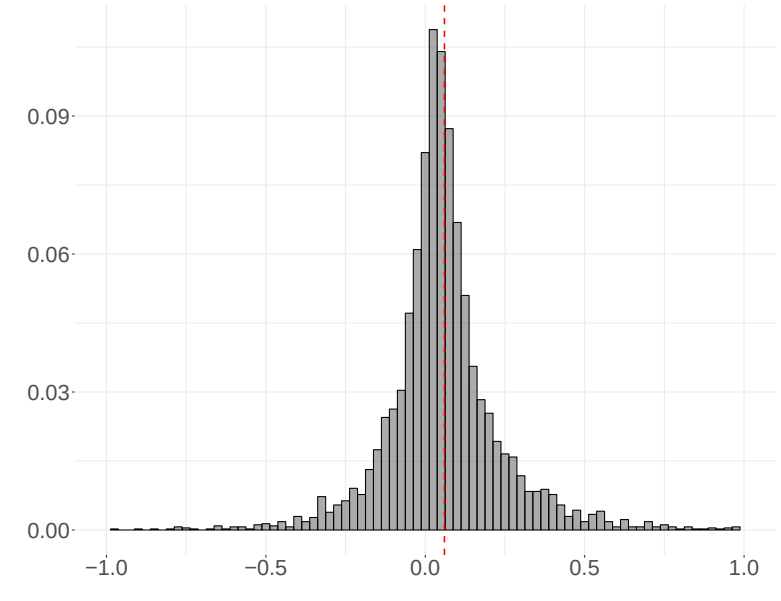
(d) Momentum Factor

First Stage



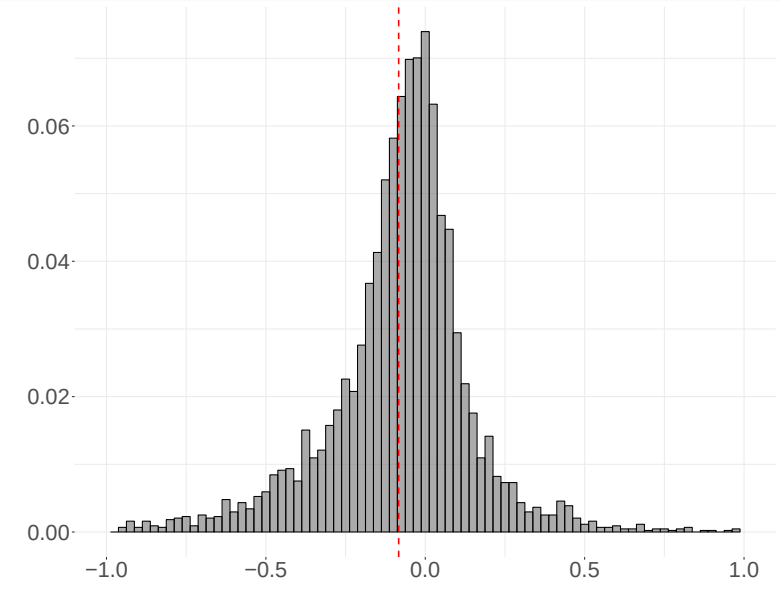
(e) R^2

First Stage—FH



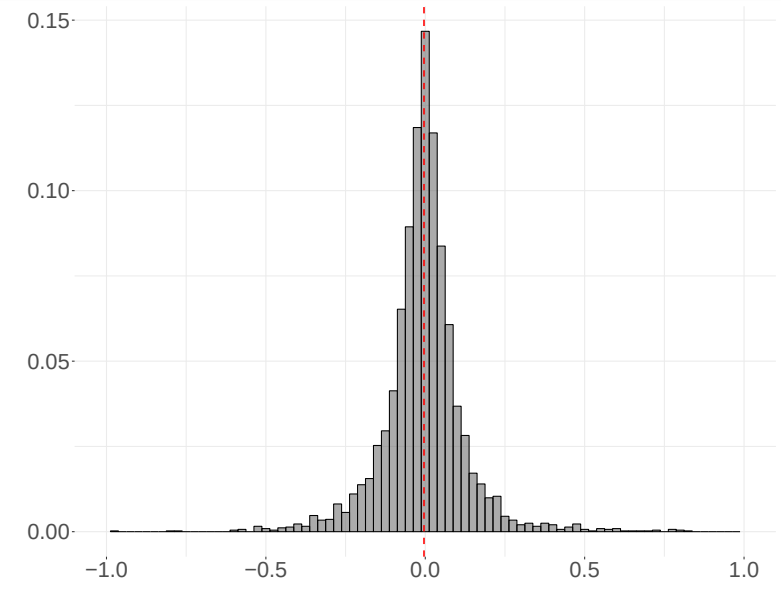
(f) Equity Market Factor

First Stage—FH



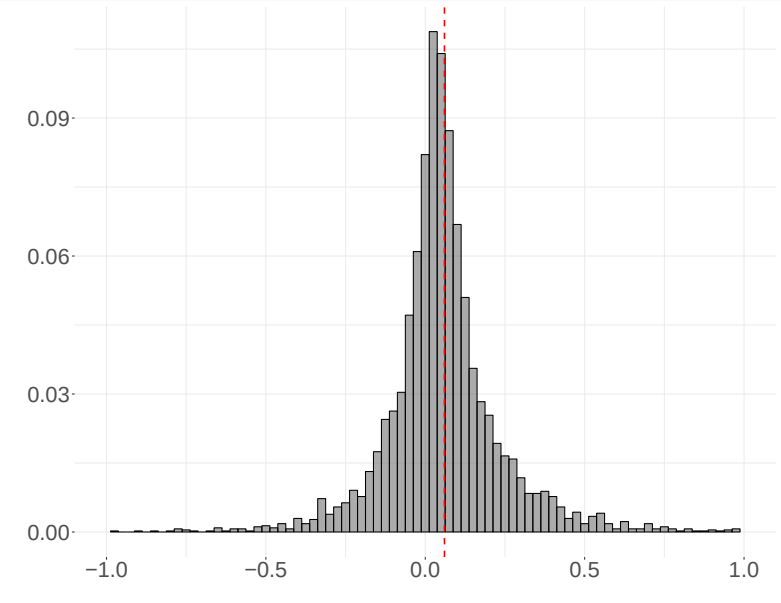
(g) Size-Spread Factor

First Stage—FH



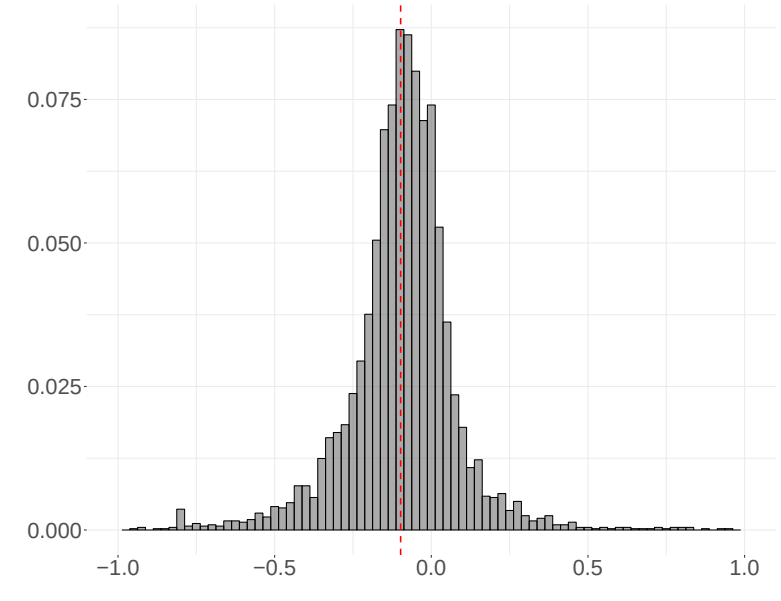
(h) Bond Market Factor

First Stage—FH



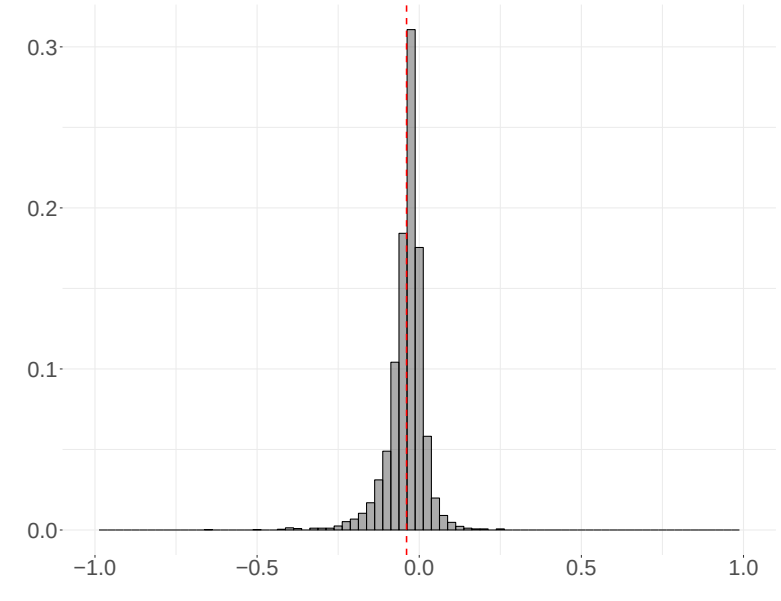
(i) Equity Market Factor

First Stage—FH



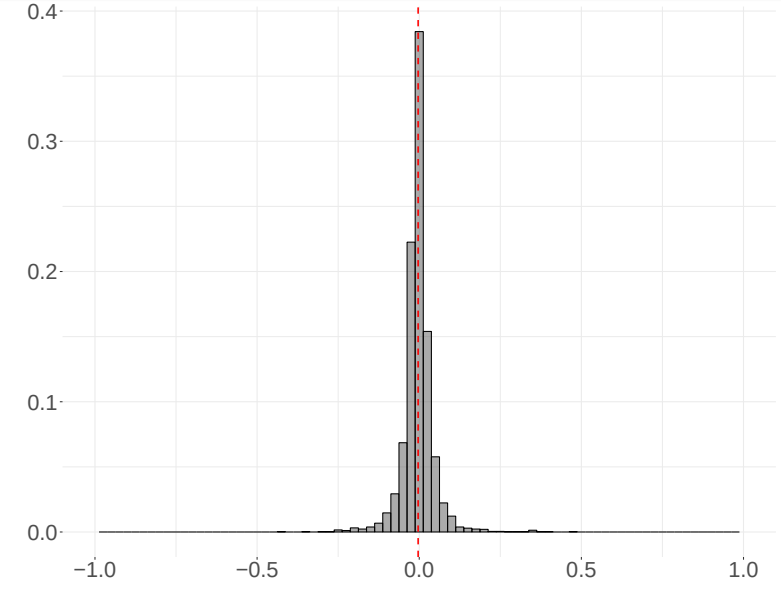
(j) Credit Spread Factor

First Stage—FH



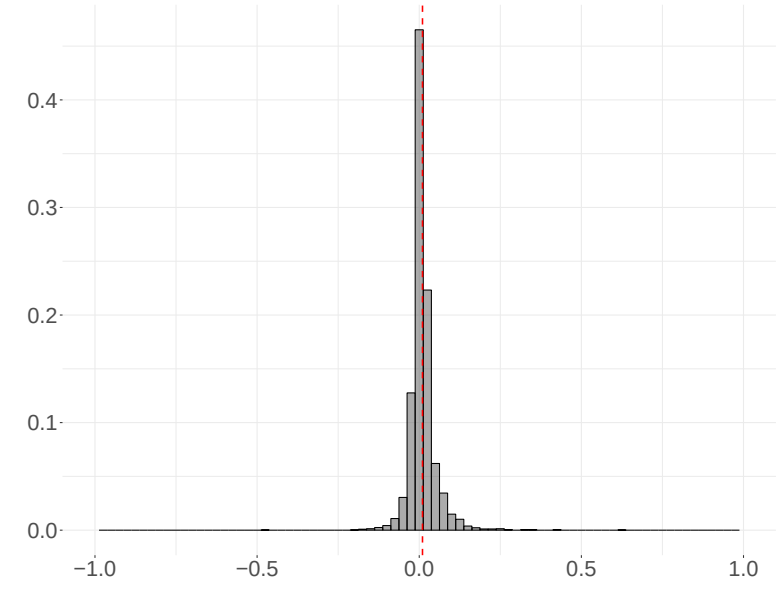
(k) Bond Trend Following Factor

First Stage—FH



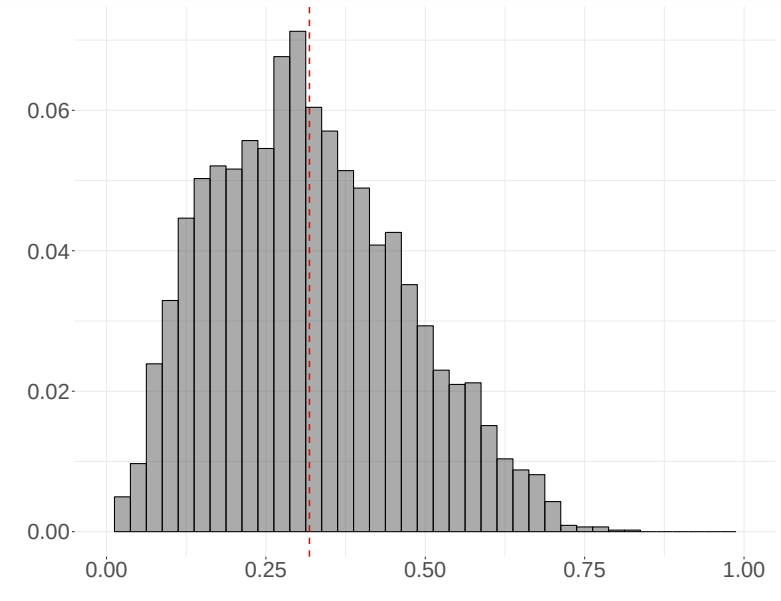
(l) Currency Trend Following Factor

First Stage—FH



(m) Commodity Trend Following Factor

First Stage—FH



(n) R^2

Size Distribution

Back

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
	(1)	(2)	(3)	(4)
Skin (Percent)	0.0009	0.0021	0.0037***	0.0054***
	(0.0015)	(0.0013)	(0.0014)	(0.0017)
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Fund Controls	Yes	Yes	Yes	Yes
Log(Fund Size)	Yes	Yes	Yes	Yes
Observations	10,280	10,281	10,267	10,269
R^2	0.0133	0.0127	0.0141	0.0189
Note:				*p<0.1; **p<0.05; ***p<0.01

Value-Weighted Regression

Back

	FH Excess Returns		FFC Excess Returns	
	(1)	(2)	(3)	(4)
Skin (Percent)	0.0060***	0.0048**	0.0047***	0.0073***
	(0.0014)	(0.0022)	(0.0013)	(0.0024)
Log(Fund Size)	Yes	Yes	Yes	Yes
Fixed Effects	No	Yes	No	Yes
Observations	41,097	41,097	41,097	41,097
R^2	0.0015	0.0389	0.0006	0.0352
Adjusted R^2	0.0015	0.0216	0.0006	0.0178
Note:				*p<0.1; **p<0.05; ***p<0.01

0 and 100 Skin Funds

Back

	FH Excess Returns		FFC Excess Returns	
	(1)	(2)	(3)	(4)
Skin (Percent)	0.0017**	0.0035***	0.0026***	0.0044***
	(0.0007)	(0.0012)	(0.0007)	(0.0011)
Log(Fund Size)	Yes	Yes	Yes	Yes
Fixed Effects	No	Yes	No	Yes
Observations	47,589	47,589	47,589	47,589
R^2	0.0002	0.0348	0.0010	0.0393
Adjusted R^2	0.0001	0.0188	0.0010	0.0234

Skin Doesn't Predict Fees

Back

	Management Fee	Performance Fee	Management Fee
	(1)	(2)	(3)
Skin (Percent)	−0.0030*	0.0040	−0.0014
	(0.0016)	(0.0153)	(0.0014)
Log(Fund Size)	No	No	Yes
Year FE	No	No	Yes
Inception Year FE	No	No	Yes
Strategy FE	No	No	Yes
Observations	5,925	5,848	5,925
R^2	0.0137	0.0002	0.3216
Note:			*p<0.1; **

Information

Changes in inside investment don't matter, only levels

Back

Insider Flow (%)	−0.00034	−0.00025	−0.00029
	(0.00023)	(0.00023)	(0.00039)
Outsider Flow (%)	0.00002	0.00003	0.00003*
	(0.00002)	(0.00002)	(0.00002)
Size	Yes	Yes	Yes
Year FE	No	Yes	Yes
Firm FE	No	No	Yes
Observations	228	228	228
R^2	0.00372	0.05192	0.11300
Note:			*p<0.1; **p<0.05; ***p<0.01

$$R_{i,t-1\to t} = \beta InsiderInflow_{i,t-1} + \gamma OutsiderInflow_{i,t-1} + \varepsilon_{it}$$

Nefarious Actions

Fraud weakly linked to to other characteristics

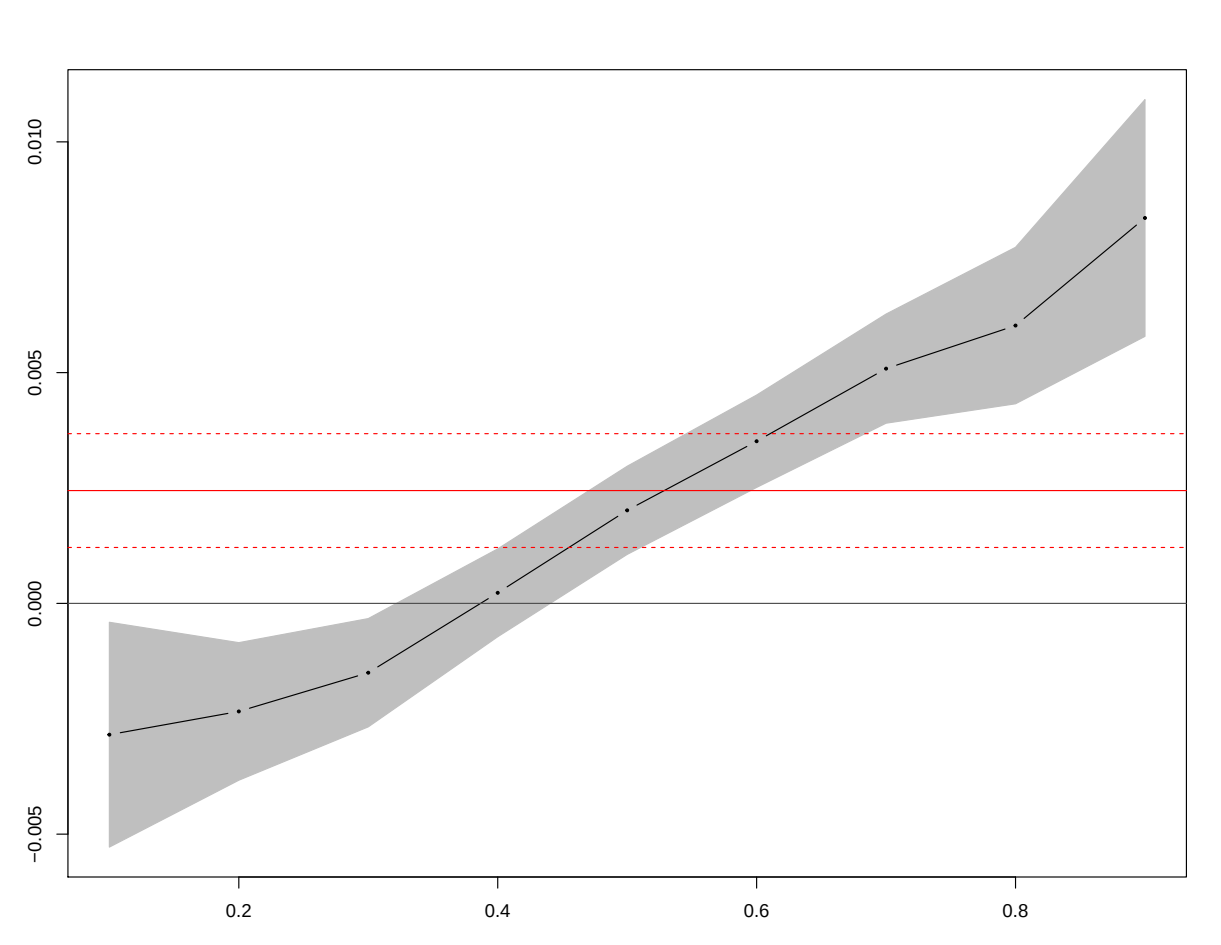
Back Corporate Governance of Hedge Funds

Dep. Var:	Excess Return		Inside Investment	
Ever Civil Judgement	−0.08		−2.01	
	(0.05)		(1.27)	
Ever Criminal Judgement		−0.23**		−0.28
		(0.10)		(2.52)
Observations	63,978	63,978	5,062	5,062
R^2	0.0000	0.0001	0.0005	0.0000

** p<0.05; *** p<0.01

Effects Strongest for High-Skin Funds

Back



Quantile Regression of Inside Investment on Excess Returns

[

noframenumbering] Back

5. Broader Implications

Role of inside investment in hedge fund compensation

Ownership of Partnership

Direct Owners and Executive Officers	DE/FE/I	Status	Date Status	Ownership
Name, First Name, Middle Name)			Acquired MM/YYYY	Code
ASNESS, CLIFF, SCOTT	I	PRESIDENT, FOUNDING AND MANAGING PRINCIPAL	01/1998	NA
KABILLER, DAVID, GARY	I	FOUNDING PRINCIPAL	01/1998	NA
LIEW, JOHN, MIHN SOO	I	FOUNDING PRINCIPAL	01/1998	NA
ASNESS, BRADLEY, DAVID	I	CHIEF LEGAL OFFICER	12/2004	NA
HURST, BRIAN, KEITH	I	PRINCIPAL	01/2004	NA
FRIEDMAN, JACQUES, ALAIN	I	PRINCIPAL	01/2005	NA
KURBANOV, OKTAY	I	PRINCIPAL	01/2005	NA
AQR CAPITAL MANAGEMENT HOLDINGS, LLC	DE	MEMBER	11/2004	E

Direct Equity Ownership of AQR

NA - less than 5%	B - 10% but less than 25%	D - 50% but less than 75%
A - 5% but less than 10%	C - 25% but less than 50%	E - 75% or more

Shell Companies

Direct Owners and Executive Officers	DE/FE/I	Status	Date Status	Ownership
Name, First Name, Middle Name)			Acquired MM/YYYY	Code
ASNESS, CLIFF, SCOTT	I	PRESIDENT, FOUNDING AND MANAGING PRINCIPAL	01/1998	NA
KABILLER, DAVID, GARY	I	FOUNDING PRINCIPAL	01/1998	NA
LIEW, JOHN, MIHN SOO	I	FOUNDING PRINCIPAL	01/1998	NA
ASNESS, BRADLEY, DAVID	I	CHIEF LEGAL OFFICER	12/2004	NA
HURST, BRIAN, KEITH	I	PRINCIPAL	01/2004	NA
FRIEDMAN, JACQUES, ALAIN	I	PRINCIPAL	01/2005	NA
KURBANOV, OKTAY	I	PRINCIPAL	01/2005	NA
AQR CAPITAL MANAGEMENT HOLDINGS, LLC	DE	MEMBER	11/2004	E

Direct Equity Ownership of AQR

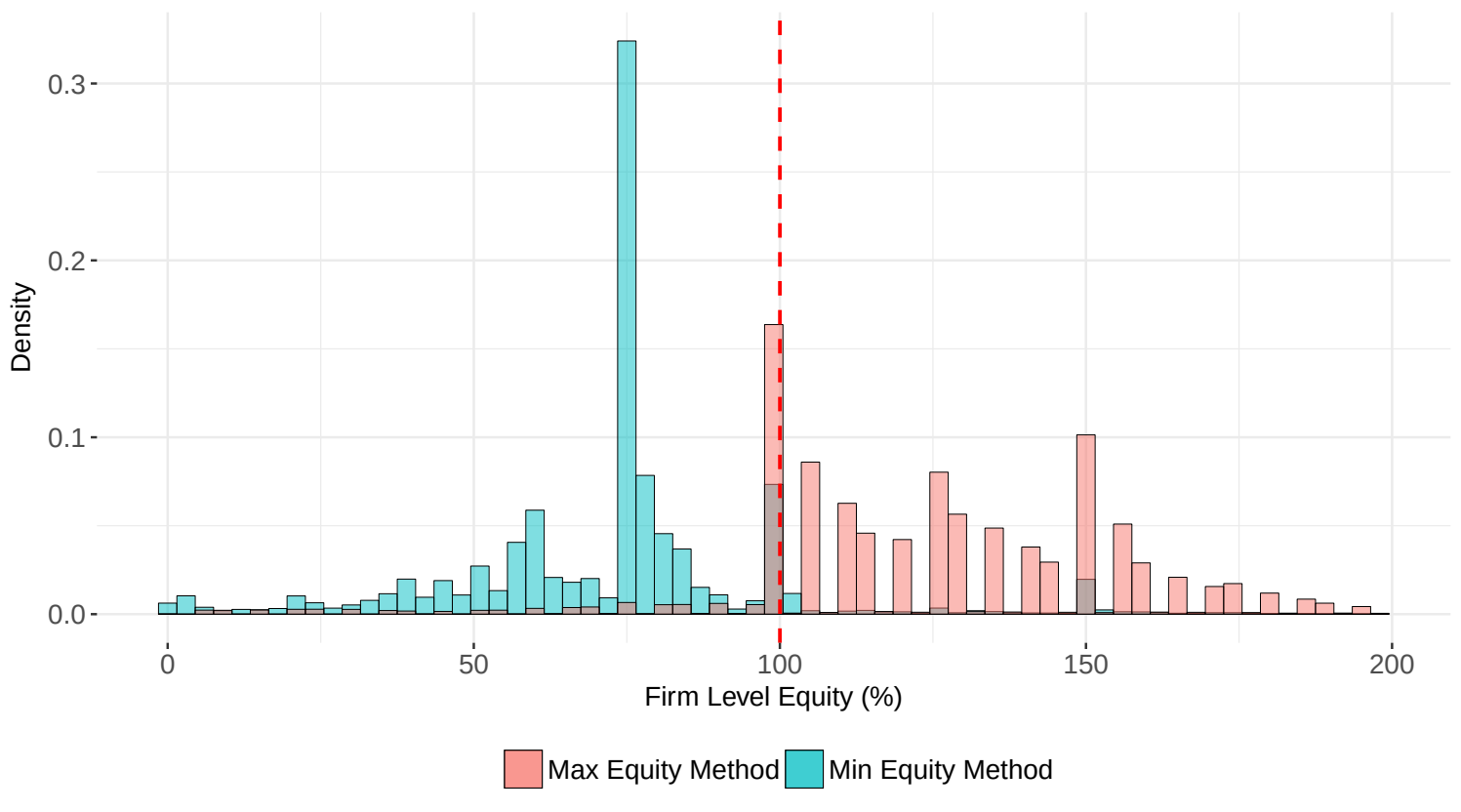
NA - less than 5%	B - 10% but less than 25%	D - 50% but less than 75%
A - 5% but less than 10%	C - 25% but less than 50%	E - 75% or more

Really Cliff Just Owns This

Indirect Owners	E (Individuals: Last Name, First Name, Middle Name)	DE/FE/I	Entity in Which Interest is Owned	Status	Date Status Acquired MM/YYYY	Ownership Code	Contr Perso
	ASNESS, CLIFFORD, SCOTT	I	AQR CAPITAL MANAGEMENT GROUP, L.P.	MANAGING MEMBER	01/2004	C	Y
	AQR CAPITAL MANAGEMENT GROUP, L.P.	DE	AQR CAPITAL MANAGEMENT HOLDINGS, LLC	MEMBER	09/2012	E	Y
	AFFILIATED MANAGERS GROUP, INC.	DE	TOPSPIN ACQUISITION, LLC	MEMBER	11/2004	E	Y
	TOPSPIN ACQUISITION, LLC	DE	AQR CAPITAL MANAGEMENT HOLDINGS, LLC	MEMBER	12/2014	C	N

Indirect Equity Ownership of AQR

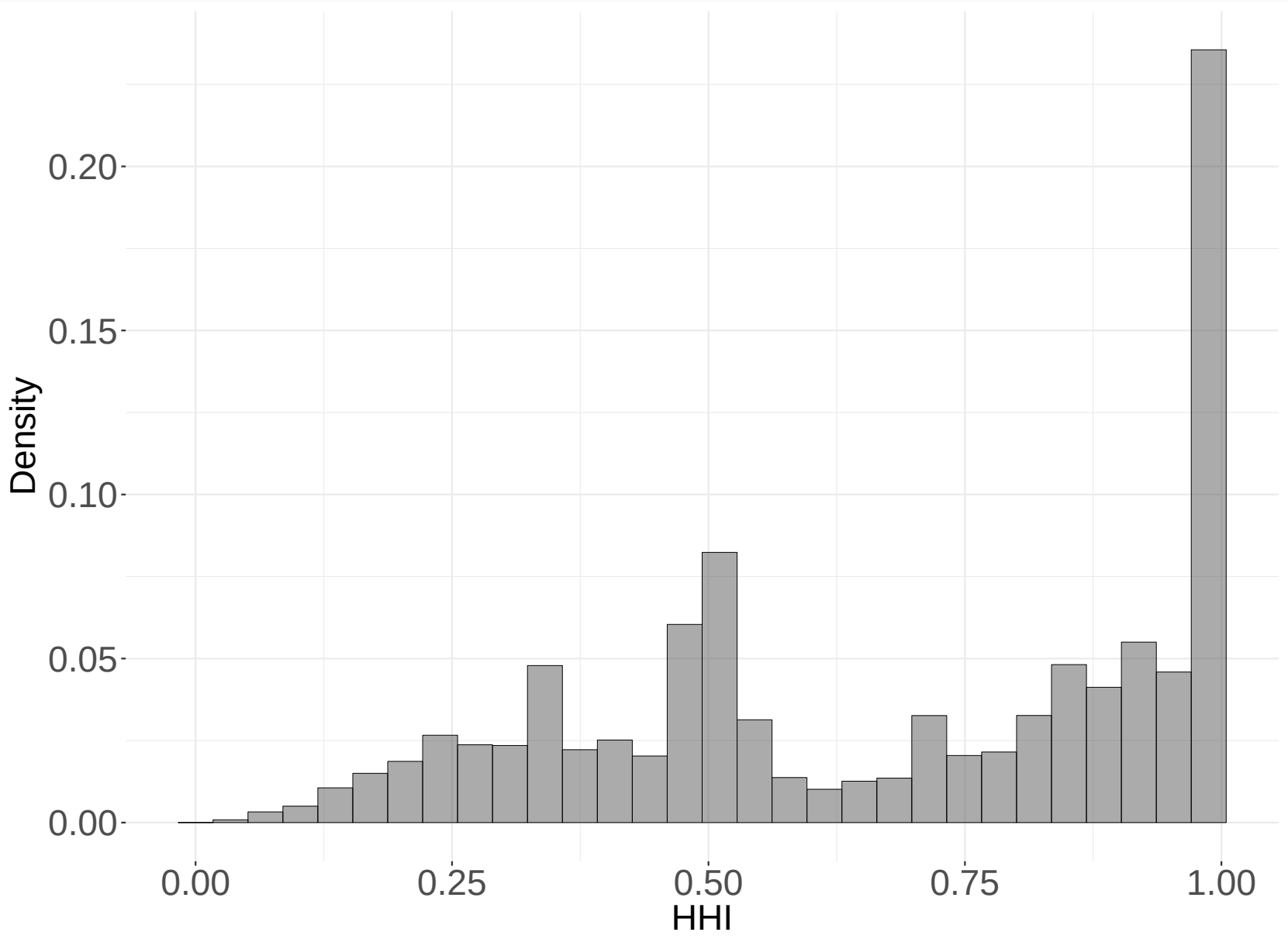
Placing Bounds on Firm-level Ownership



Distribution of min and max estimates of Firm Ownership

Expect min estimate to be < 100 and max estimate ≥ 100

Dispersion of Equity Ownership (HHI)



Equity Ownership Dispersion and Performance

	Monthly Excess Return (FF)		
Skin (Percent)	0.0025***	0.0021***	0.0025***
	(0.0004)	(0.0004)	(0.0004)
# of Equity Holders	−0.0165***		−0.0170***
	(0.0028)		(0.0032)
HHI of Firm Equity		0.0840**	−0.0142
		(0.0355)	(0.0399)
Year	Yes	Yes	Yes
Log(Size)	Yes	Yes	Yes
Observations	63,978	63,978	63,978
R^2	0.0142	0.0132	0.0143
Note:		*p<0.1; **p<0.05; ***p<0.01	

One Strategy, Unconstrained Insider Capital

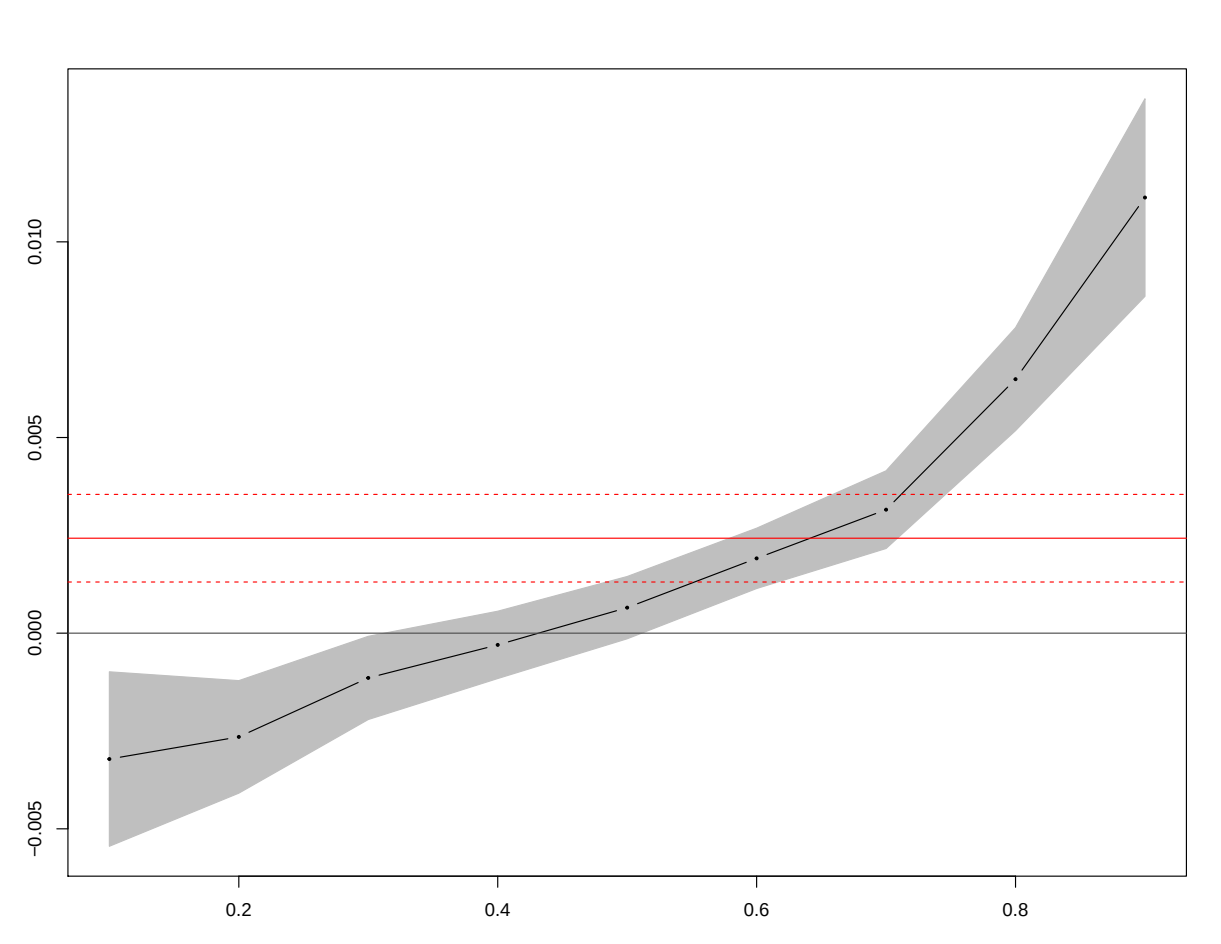
Back First consider a **capital unconstrained** insider. Their is no benefit to collecting fees. The insider's problem reduces to:

$$\underset{q^I, q^O}{\arg\max} \quad V^I_{t+1} = q^I_t \left(\alpha - C\left(q^T_t\right)\right) + f q^O$$

Can set $q^T = q^I$, $q^O = 0$, optimal level of capital for an insider that is unconstrained:

$$\bar{q}^{I*}_t = \sqrt{\frac{2\alpha}{3a}}$$

Effects Strongest for High-Skin Funds



Quantile Regression of Inside Investment on Excess Returns

Back

One Strategy, Constrained Insider Capital

Now consider a **capital constrained** insider, $q_t^I \in \left(0, \bar{q}_t^{I*}\right)$:

$$\underset{q^I, q^O}{\arg\max} \quad V_{t+1}^I = q_t^I \left(\alpha - C\left(q_t^T\right)\right) + f q^O$$

q^I is constrained, and the only choice variable is q^O. The outsiders capital that maximizes value add is:

$$q_t^O = \frac{f}{a q^I} - q_t^I$$

While fees are such that must have a non-negative value add:

$$0 \leq q^O \left(\alpha - C\left(q^T\right)\right) - f q^O$$

One Strategy, Constrained Insider Capital (Cont.)

Fees are set to ensure non-negative value-add:

$$f^* = -a\left(q^I\right)^2 + a\left(q^I\right)^2\sqrt{1+\frac{2\alpha}{a\left(q^I\right)^2}}$$

Total optimal investment reduces to:

$$q^{T*} = -q^I + \sqrt{\left(q^I\right)^2 + \frac{2\alpha}{a}}$$

- Key Intuition:
  - Total fund size is decreasing in insider capital
  - Total funds size is increasing in α, decreasing scale cost a

Event Study Suggestive of "Skimming"

	DiD
	Monthly Return
Post	0.285*
	(0.164)
High	−0.252
	(0.169)
Post x High	0.969***
	(0.214)
Constant	0.336***
	(0.126)
Observations	2,719
R^2	0.037
F Statistic	34.289*** (df = 3; 2715)
Note:	*p<0.1; **p<0.05; ***p<0.01

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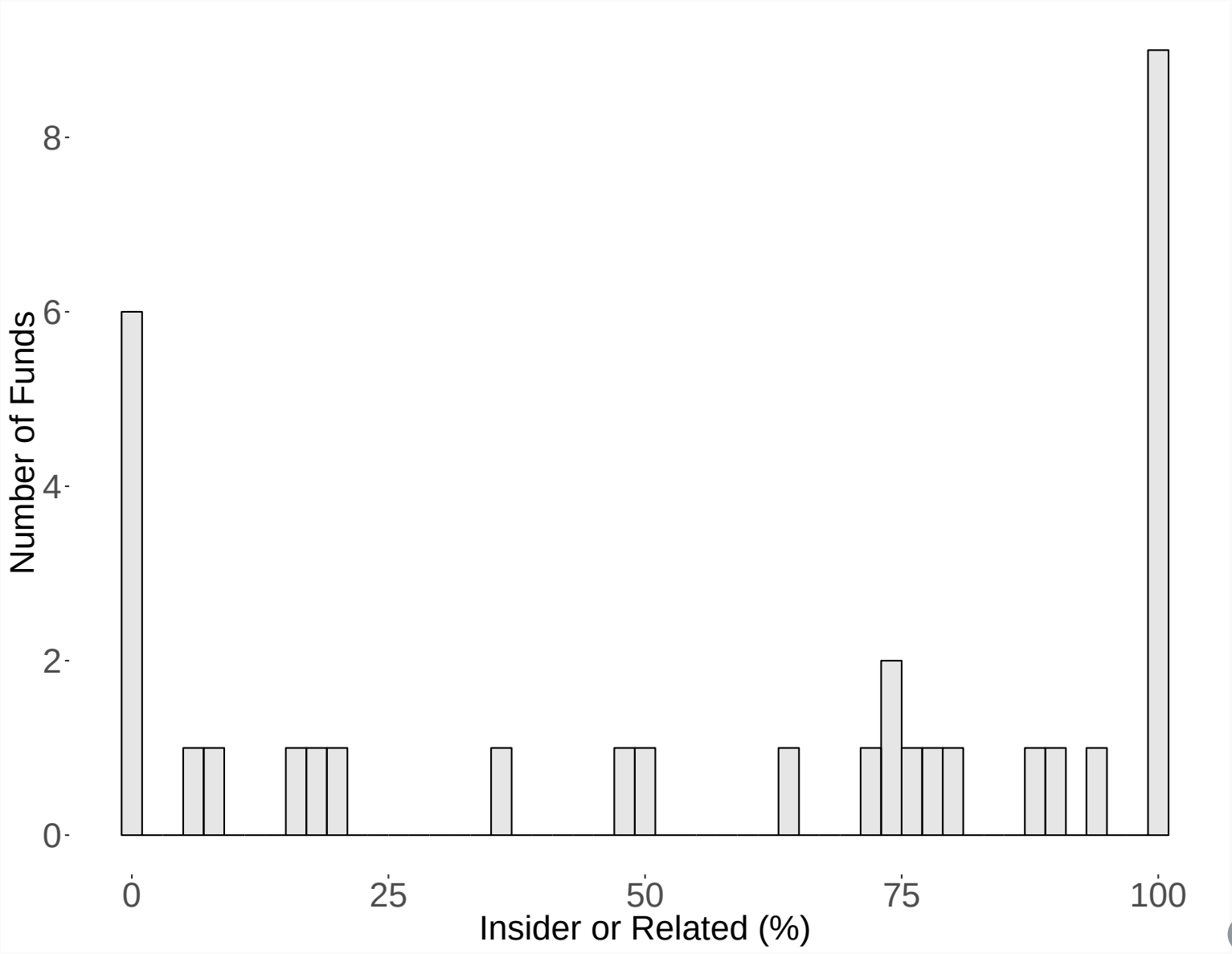
Blue Crest



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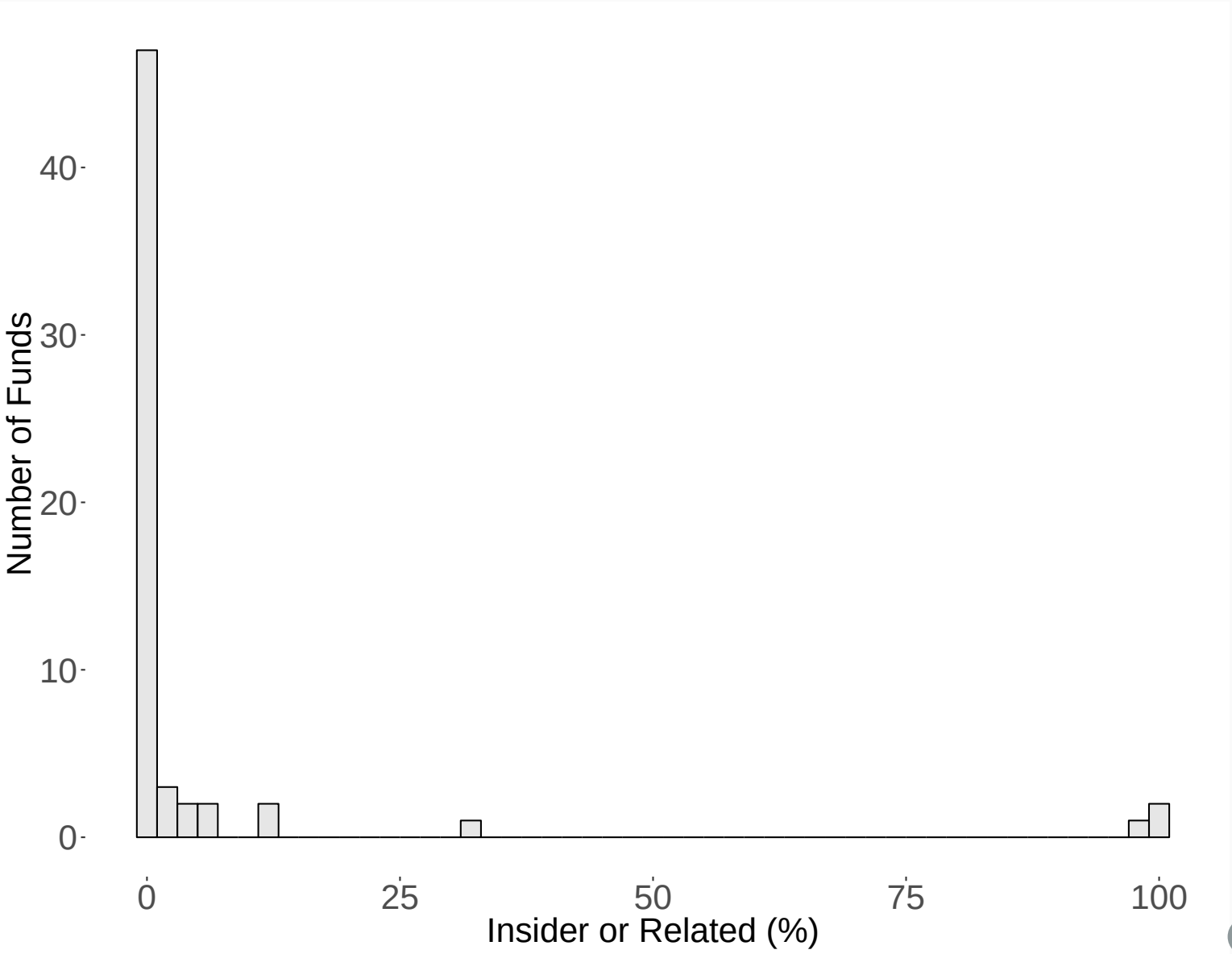

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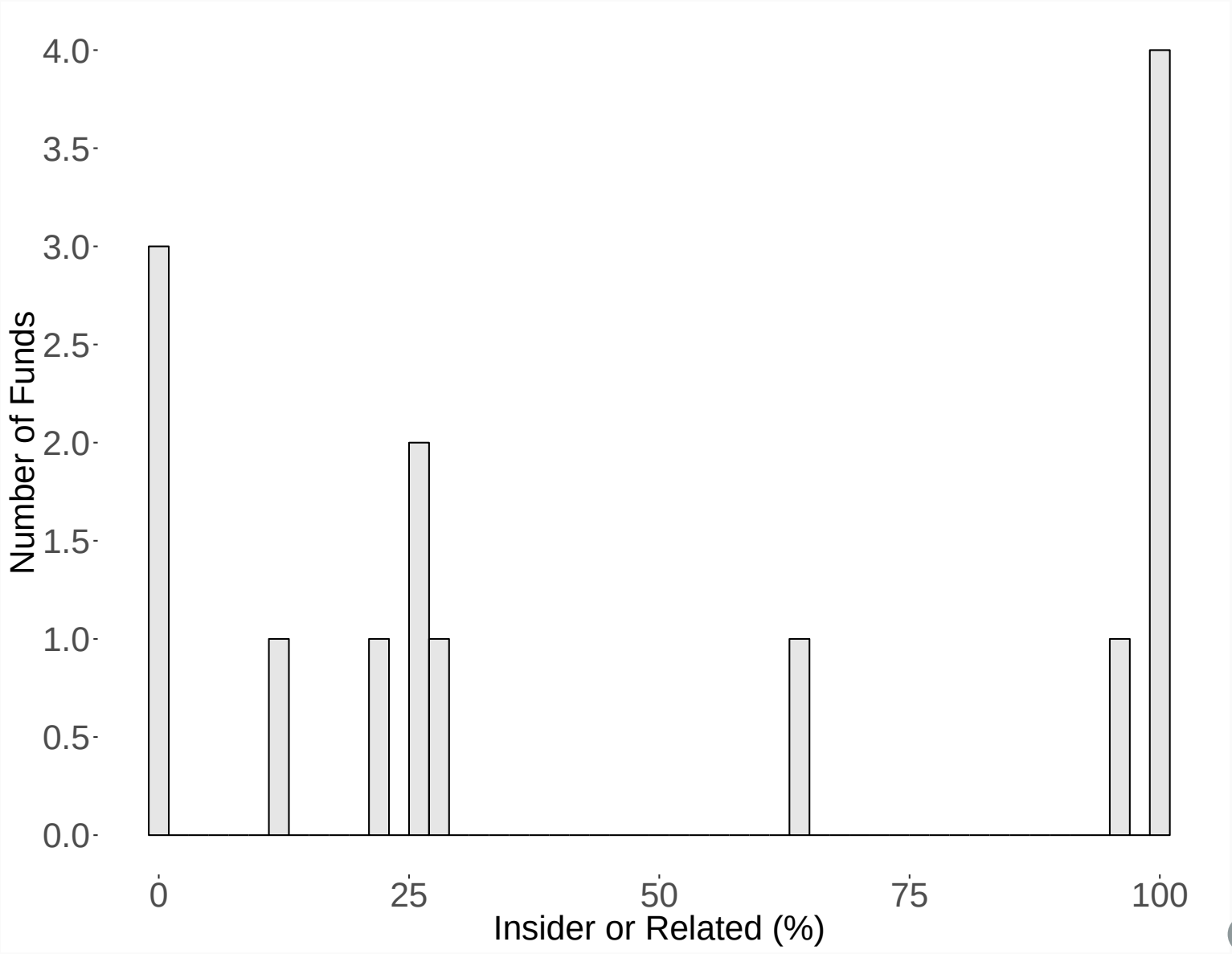
Two Sigma



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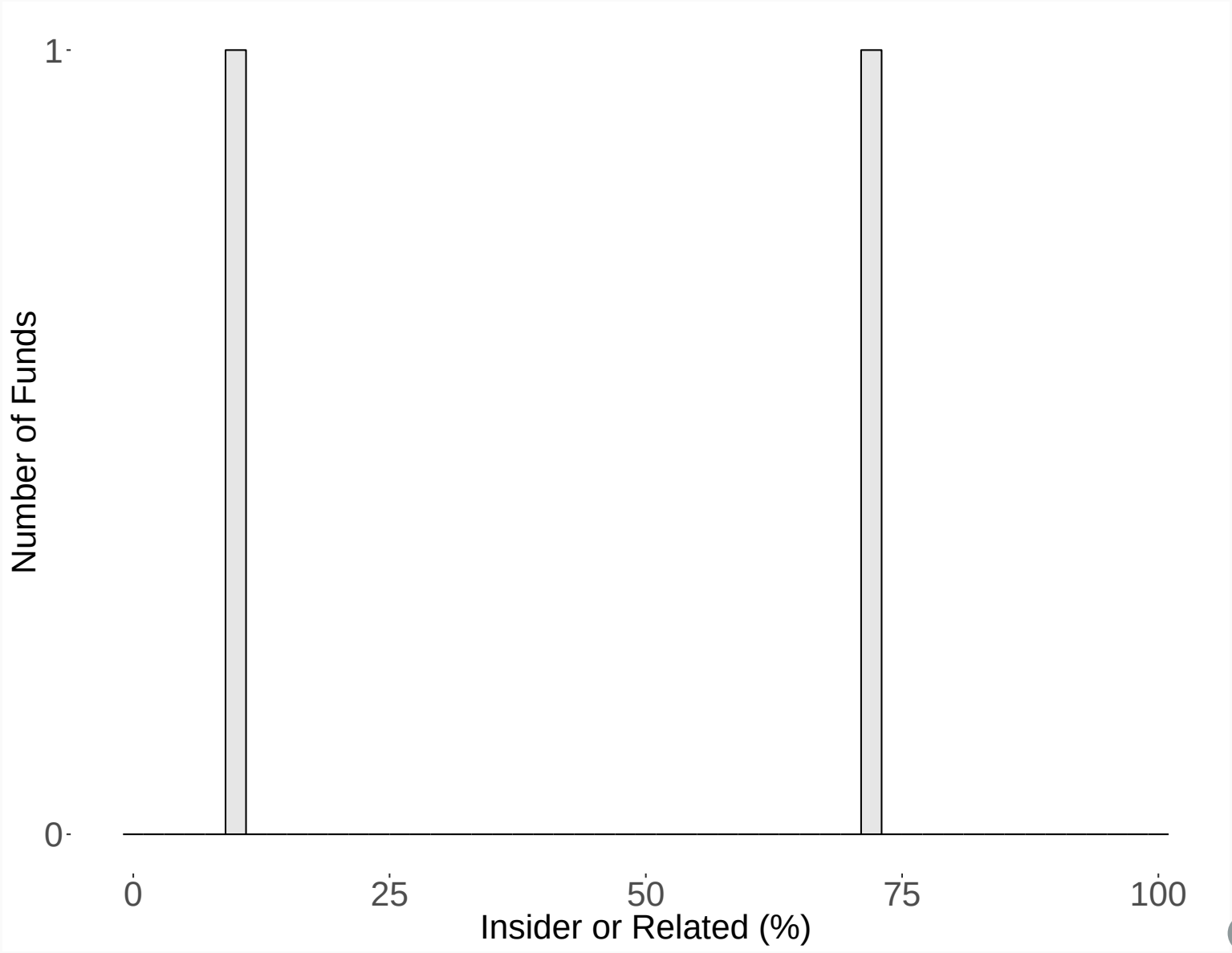
Appaloosa



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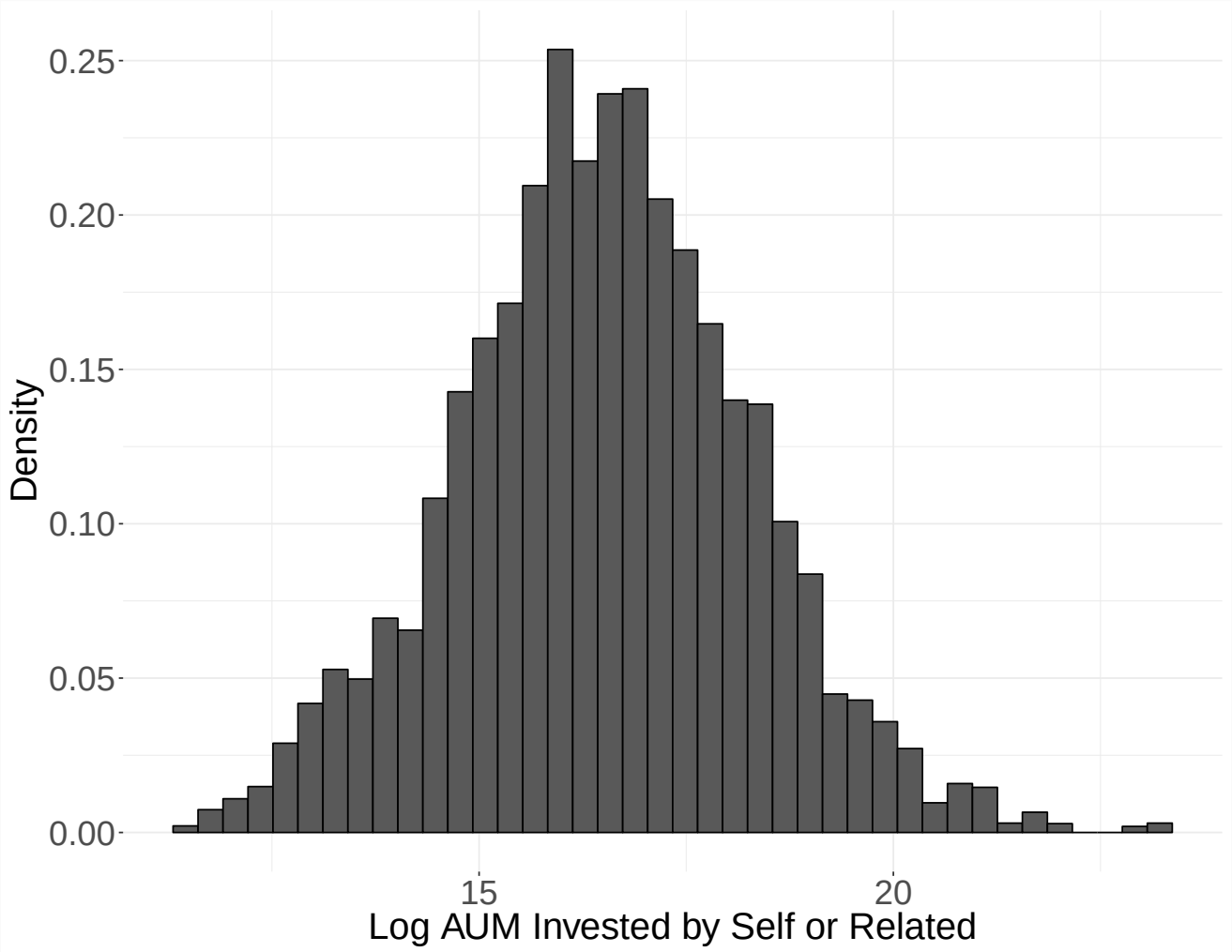
Data Enable Novel Analysis of Insider Investment



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Merge Bias is Constant Except at 0% and 100% of Ownership

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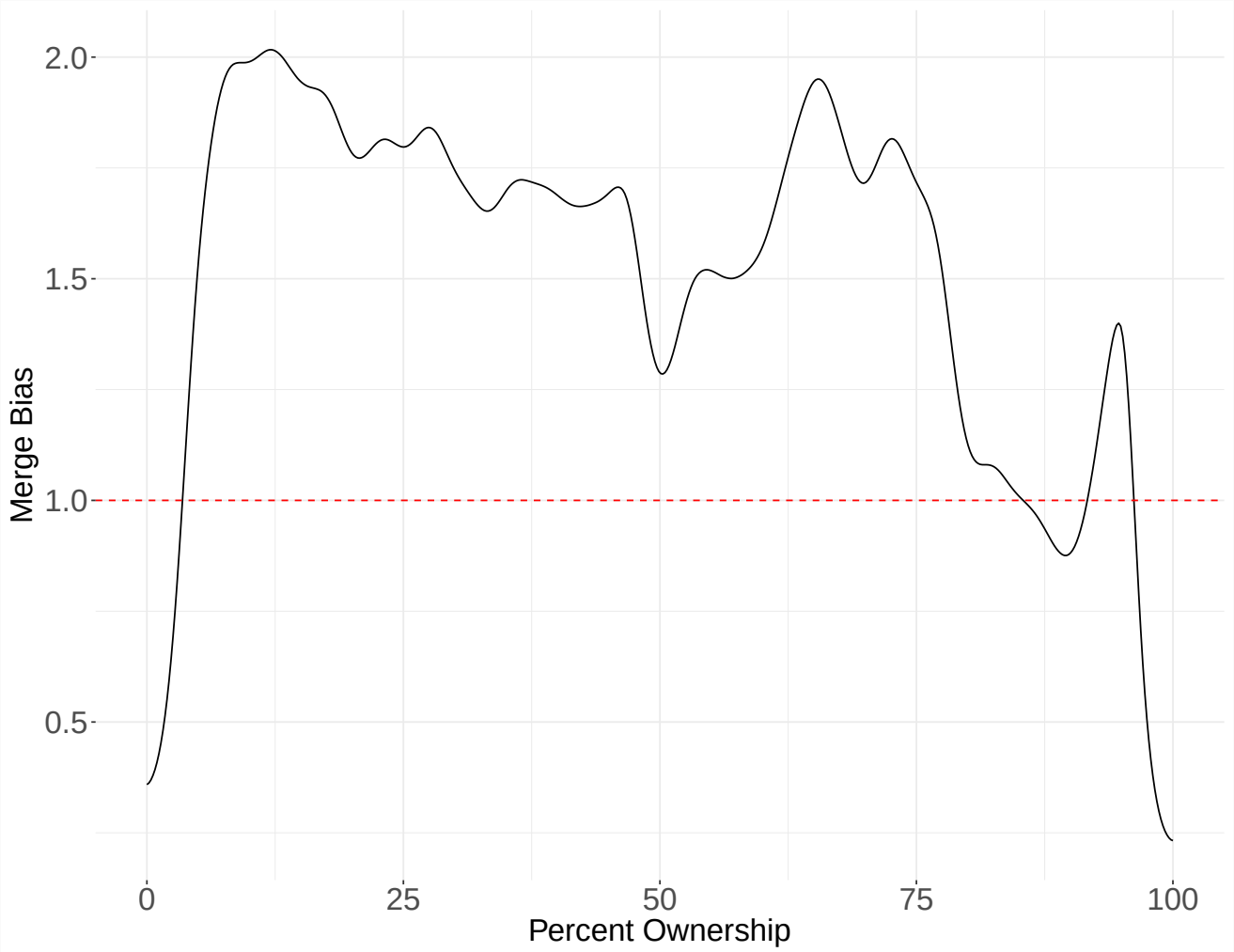

Merge Bias by Ownership Percentage

Corporate Governance Obligations of Hedge Funds

As noted in Nowak (2009) and quoted in Morley (2014), the manager:

> *is required to devote to the [fund] only that amount of time and attention that the [manager] in its sole discretion deems reasonably necessary to achieve the [fund's] objectives.*

Back