Individual Stock-picking Skills in Active Mutual Funds

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Outline

Objectives

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    - $r_{i,t}$: Investor's return.
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  - Application: Select stock-picking mutual funds with large out-of-sample α (Annualized $\alpha = 3.5\%$ before fees ($\alpha = 2.3\%$ after fees)).

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- Comparison in Distribution: $Distr(r_{i,t})$ VS $Distr(\hat{r}_{i,t})$
  - Skilled stock-picking: $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$.

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- Mathematical Difference:
  - $\alpha > 0 \Longleftrightarrow \mathbb{E}\left(r_{i,t}\right) > \mathbb{E}\left(r_{i,t}^{b}\right)$: Compares the mean.
  - $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$: Compares the entire return distribution.

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- In Population:
  - $\alpha > 0 \Longleftrightarrow \mathbb{E}\left(r_{i,t}\right) > \mathbb{E}\left(r_{i,t}^{b}\right)$: Not necessary due to information advantage. Alternative source of α – uncontrolled risk factors.
  - $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$: Alleviate the "missing factors" problem. Attribute outperformance to stock-picking.

Intuition

FSD Implementation

$\alpha > 0$:

$$\left.\begin{array}{l} r_{i,1},\ r^b_{i,t} \\ r_{i,2},\ r^b_{i,2} \\ \vdots \\ \vdots \\ r_{i,T},\ r^b_{i,T} \end{array}\right\} \longrightarrow \hat{\alpha}_i = \frac{1}{T}\sum_t \left(r_{i,t} - r^b_{i,t}\right)$$

$r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$:

$$\left.\begin{array}{l} r_{i,1},\ \langle \hat{r}_{i,1} \rangle \\ r_{i,2},\ \langle \hat{r}_{i,2} \rangle \\ \vdots \\ \vdots \\ r_{i,T},\ \langle \hat{r}_{i,T} \rangle \end{array}\right\} \longrightarrow Pct\left(r_{i,t}, \langle \hat{r}_{i,t} \rangle\right) \overset{fsd}{\succ} Unif\,(0,1)$$

$\langle \hat{r}_{i,t} \rangle$: Counterfactual return distribution, constructed using holdings.

Application: Active Mutual Fund Industry

- Important in size.
  - Roughly $30\% \times \frac{2}{3} = 20\%$ of US equity is managed by active mutual funds.
- Good Observability:
  - Both returns and holdings are observable.
- Weak Skill Manifestation:
  - Average before-fees performance is similar to the market index. Average after-fees performance is significantly lower than the passive index.
  - **Skilled managers are difficult to find in the cross section: In-sample alpha is a weak signal.**

Failure of Alpha as a Predictor

- Out-of-sample performances of funds sorted by in-sample alpha, sample 01/1991-12/2015, before fees:

Quintile	α **(in %)**	mkt	smb	hml	umd
1	$-\mathbf{0.83}$	1.02	0.28	0.06	0.00
	[−1.22]	[61.56]	[11.00]	[2.51]	[0.17]
2	$-\mathbf{0.02}$	0.98	0.15	0.06	−0.01
	[−0.03]	[71.07]	[7.02]	[2.86]	[−0.40]
3	$-\mathbf{0.13}$	0.99	0.13	0.06	0.00
	[−0.26]	[79.50]	[5.76]	[2.75]	[0.27]
4	**0.33**	1.00	0.18	0.03	0.01
	[0.63]	[72.70]	[7.92]	[1.26]	[0.84]
5	**1.13***	1.02	0.31	−0.08	0.03
	[1.74]	[59.76]	[11.89]	[−2.85]	[1.54]

Failure of Alpha as a Predictor Cont.

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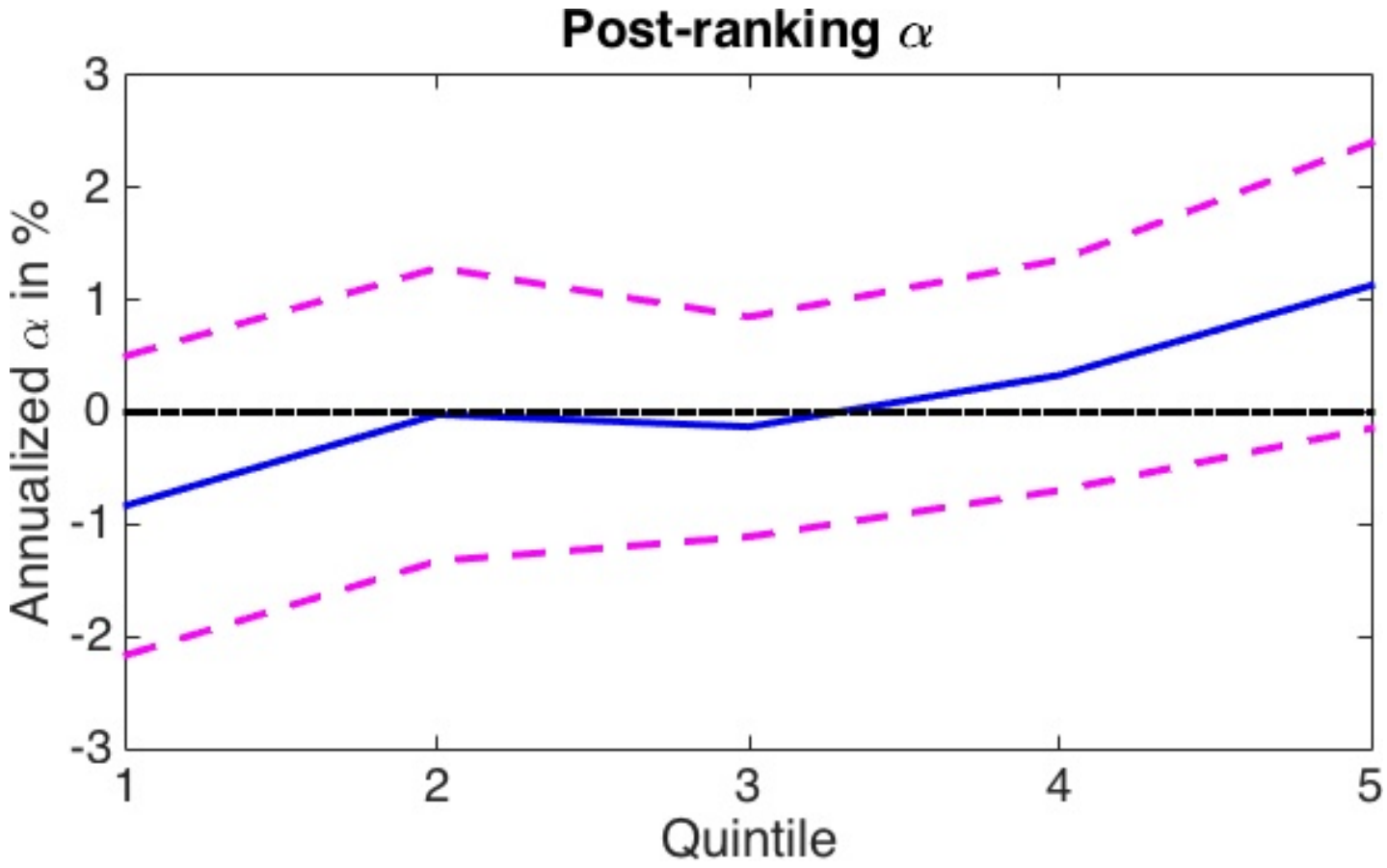
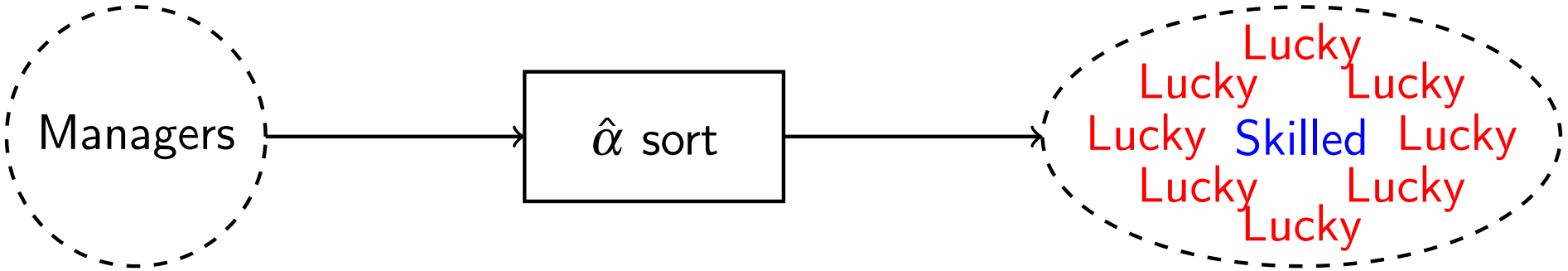


Search for Stock-picking Funds

Search by α:



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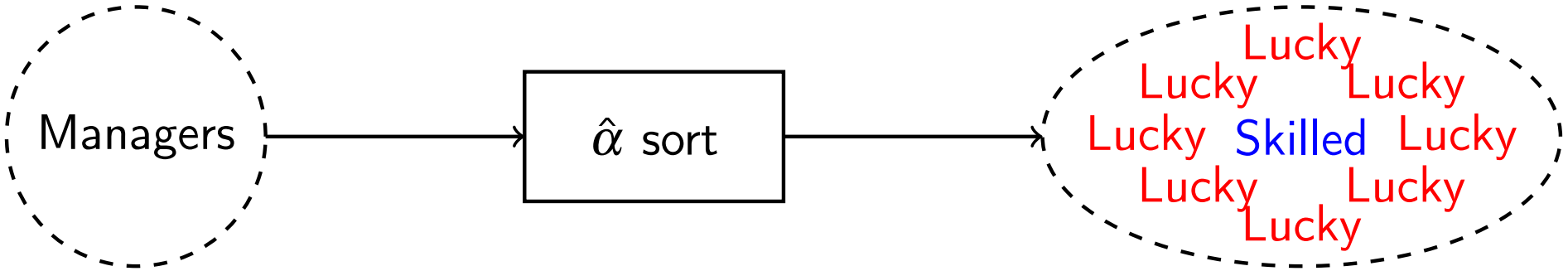
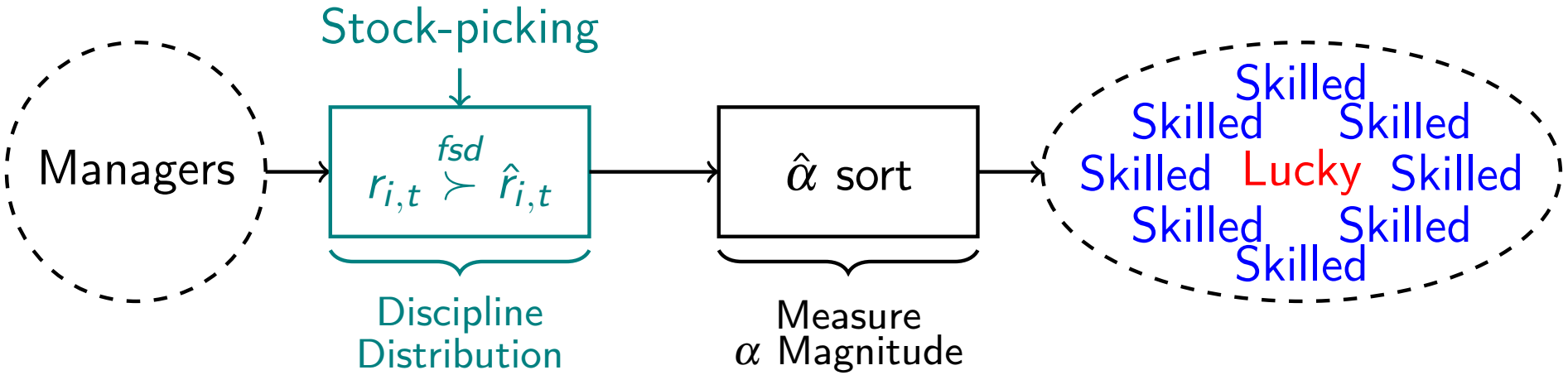


Search for Informed Stock-pickers:



Results Preview

With ($\hat{\alpha}$ sort) only, out-of-sample, before fees:

Quintile	α **(in %)**	mkt	smb	hml	umd
1	$-$**0.83**	1.02	0.28	0.06	0.00
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	[$-$**0.26]**	[79.50]	[5.76]	[2.75]	[0.27]
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	[0.63]	[72.70]	[7.92]	[1.26]	[0.84]
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Results Preview Cont.

With $(r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t})$ + ($\hat{\alpha}$ sort), out-of-sample, before fees:

Quintile	α **(in %)**	mkt	smb	hml	umd
1	**0.50**	1.03	0.29	0.03	0.04
	[0.53]	[46.26]	[8.82]	[0.87]	[2.08]
2	**1.54***	1.01	0.20	0.06	0.03
	[1.88]	[59.22]	[5.89]	[2.07]	[1.58]
3	**2.10****	1.00	0.23	0.10	0.05
	[2.28]	[43.55]	[7.12]	[2.35]	[2.48]
4	**2.53*****	1.03	0.26	0.01	0.07
	[2.60]	[47.04]	[6.80]	[0.21]	[2.53]
5	**3.55*****	1.07	0.45	−0.10	0.08
	[3.24]	[38.85]	[13.47]	[−2.87]	[3.26]

Results Preview Cont., Unmatched Sample Size

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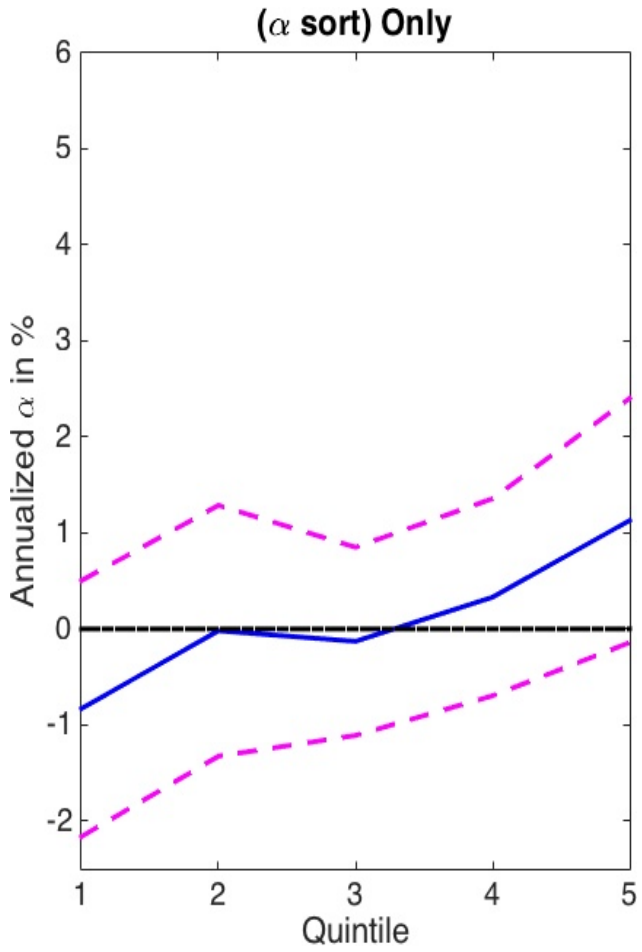
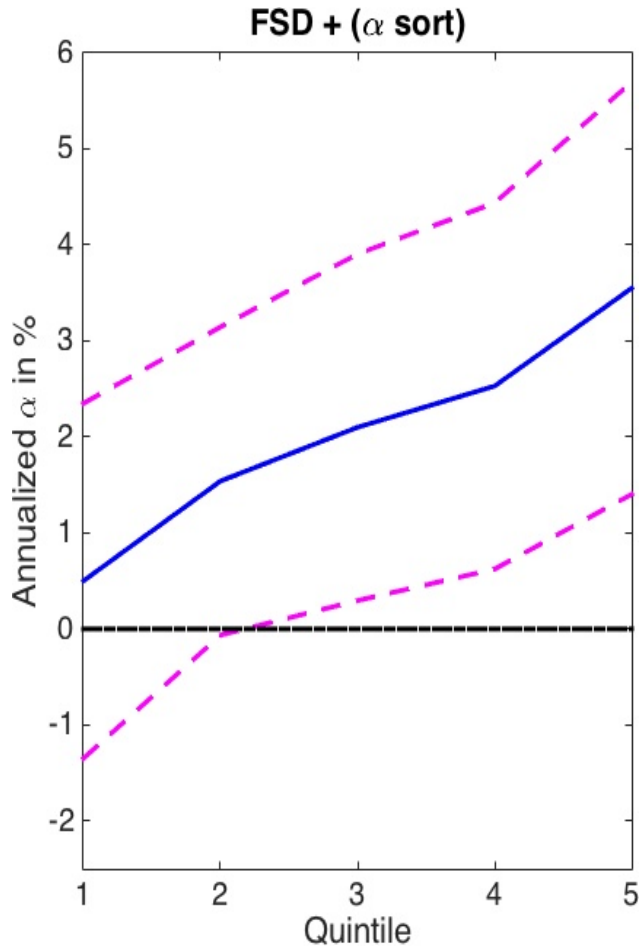
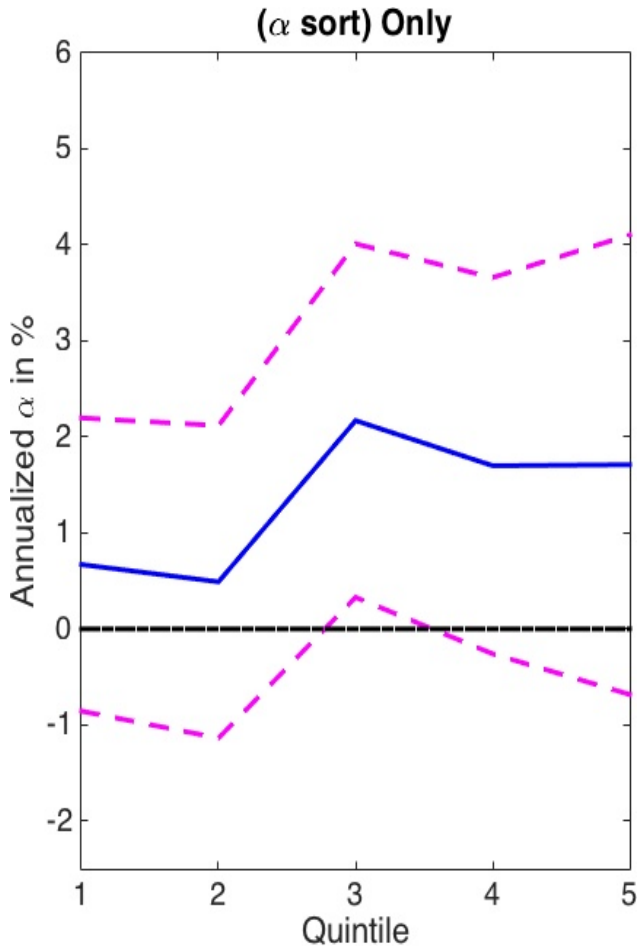
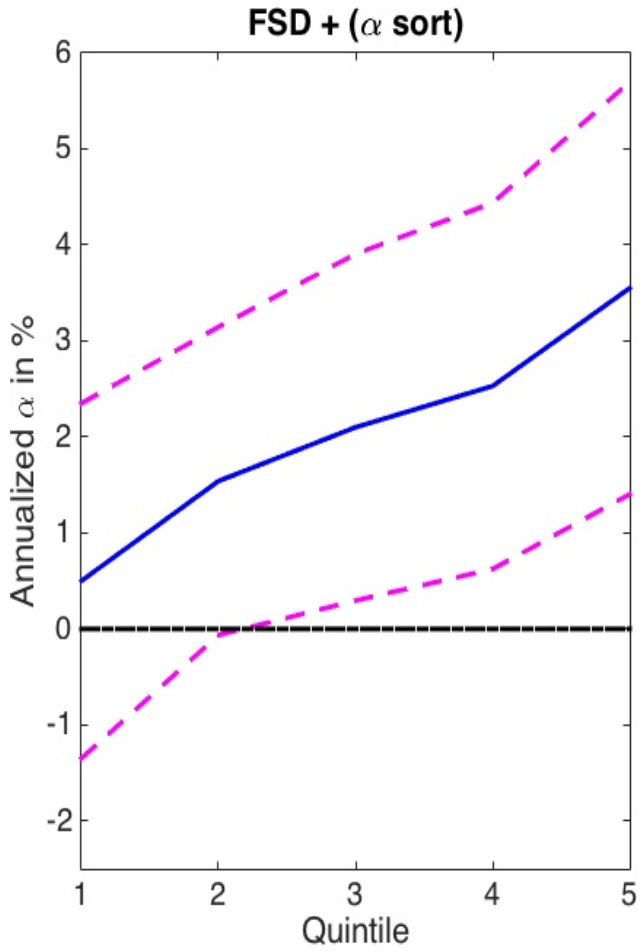




Results Preview Cont., Matched Sample Size

- Out-of-sample, before fees:





Fund Characteristics

- Outperforming Funds:
  - Average size, but higher fees;
  - More concentrated with fewer stocks;
  - Large within-quarter trading profits;
  - More fund flows controlling for in-sample $\hat{\alpha}$.

Related Literature

- Holdings $\overset{\text{predict}}{\longrightarrow}$ Fund Performance: Grinblatt and Titman (1989), Grinblatt, Titman, and Wermers (1995), Chen, Jegadeesh, and Wermers (2000), Iskoz and Wang (2003), Cohen, Coval, and Pástor (2005), Kacperczyk, Sialm, and Zheng (2005, 2008), Alexander, Cici, and Gibson (2006), Jiang, Yao, and Yu (2007), Kacperczyk and Seru (2007), Cremers and Petajisto (2009), Baker et al. (2010), Da, Gao, and Jagannathan (2010), Huang, Sialm, and Zhang (2011), Kacperczyk, van Nieuwerburgh, and Veldkamp (2014), Agarwal et al. (2015), etc.
- Simulation $\longrightarrow$ Fund Return Distribution: Kosowski et al. (2006), Fama and French (2010), Barras, Scaillet, and Wermers (2010).

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- Extend Benchmark: $\left\{ r_{i,t}^{b} \right\}_{t=1}^{T} \longrightarrow \{\langle \hat{r}_{i,t} \rangle\}_{t=1}^{T}$

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  - $\left\{r_{i,t}^{b}\right\}_{t=1}^{T}$: Account for factor loadings.
  - $\left\{\langle \hat{r}_{i,t} \rangle\right\}_{t=1}^{T}$: Account for both factor loadings and degree of diversification.
    - Additional statistical information.

The One-period World

- There is only one period in the economy.
- An Example:
  - Warren Buffett made 10% last month.
  - Benchmark (e.g. Market) returned 8%. No other factor exposure.
  - Buffett out-performed $10\% - 8\% = 2\%$.
- Problem:
  - Only a point estimate, no statistical significance.

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- A bootstrap procedure with 4 steps:
  1. Retrieve fund holdings.
  2. Random replacement.
  3. Repeated sampling.
  4. Compare $r_{i,t}$ to $\left\langle \hat{r}_{i,t} \right\rangle$.

Step 1: Retrieve Fund Holdings

Longleaf Partners 2012/12

Stock Ticker	Bucket No.	Weight(%)
ABT	597	5.24
BEN	552	4.68
BK	576	6.73
BRK	561	4.65
CHK	603	8.07
CNX	428	7.16
DELL	529	5.55
DIS	598	5.70
DTV	502	8.19
FDX	534	8.00
L	581	10.00
LVLT	405	6.15
MDLZ	592	5.39
PHG	356	1.26
TRV	568	6.65
VMC	489	6.58

Bucket Definition

- Extension of DGTW (Daniel et al. (1997)):
  - Divide stocks into 5 buckets for size, book-to-market, momentum, volatility, respectively;
  - $5 \times 5 \times 5 \times 5 = 625$ buckets altogether.

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  - Divide stocks into 5 buckets for size, book-to-market, momentum, volatility, respectively;
  - $5 \times 5 \times 5 \times 5 = 625$ buckets altogether.
- Crude summary of fund's mandate:
  - Capture factor exposure;
  - Can be improved by tailoring the buckets on a fund by fund basis.

Step 2: Random Replacement

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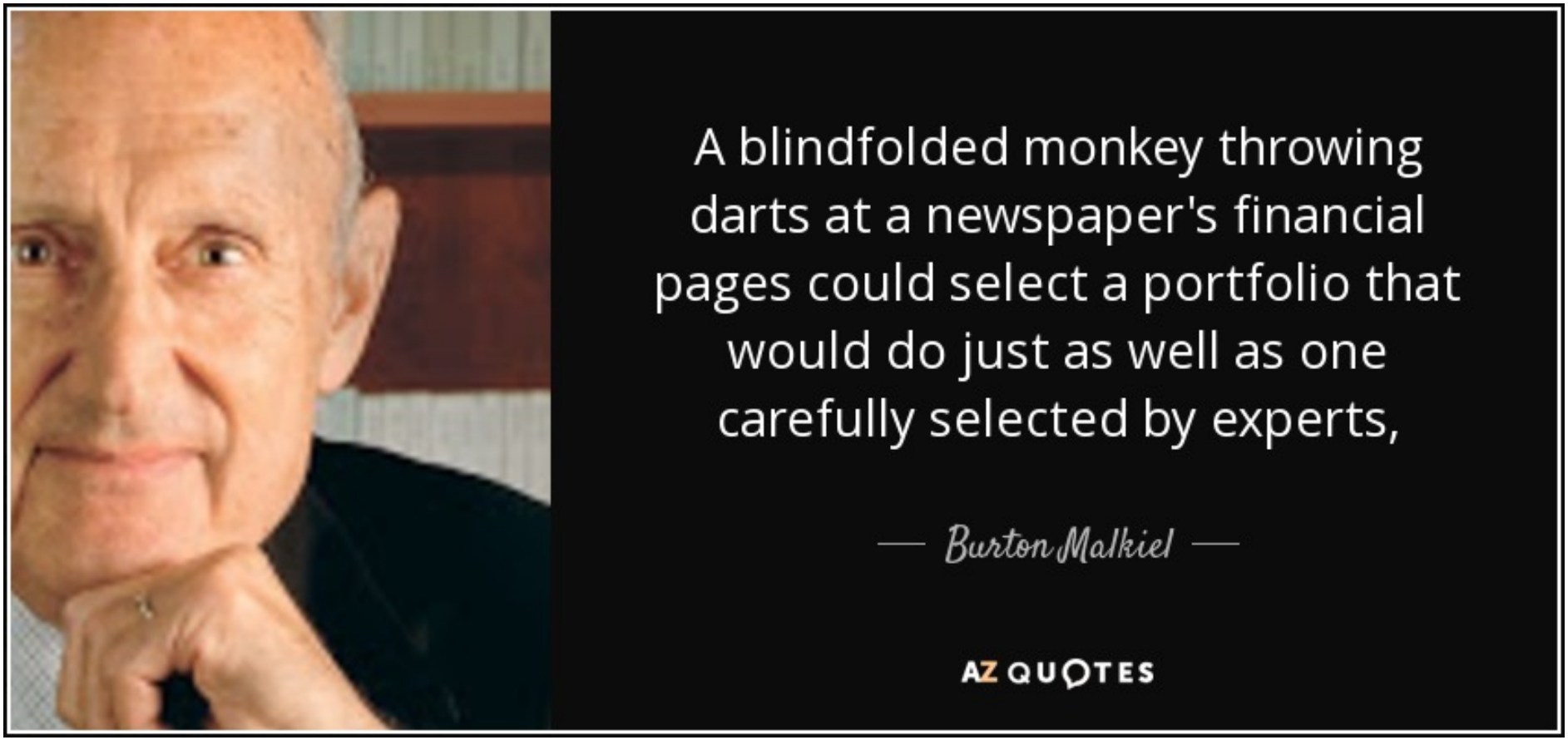
- Hypothetical Return: $\hat{r}_{i,t} = \sum_j w_{i,j,t-1} \tilde{r}_{\hat{j},t}$.

Malkiel's Quote



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Step 3&4

- Step 3: Repeat Step 2 to create the counterfactual return distribution $\langle \hat{r}_{i,t} \rangle$.
- Step 4: Compare the actual return $r_{i,t}$ to the counterfactual return distribution $\langle \hat{r}_{i,t} \rangle$.

Clarifications

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- Controlling for style $\rightarrow$ Stock-picking skills. Skill is reflected in the matching between weights and stock picks.
- Test Interpretation:
  - $r_{i,t}$ is the realized fund performance.
  - $\left\langle \hat{r}_{i,t} \right\rangle$ is the return distribution under the null of no stock-picking skill.
  - The comparison between the two is a statistical test.
    - $Pct\left(r_{i,t}, \left\langle \hat{r}_{i,t} \right\rangle\right) = 1 - p_{i,t}$, $p_{i,t}$ is the p-value of this test.

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- FSD identifies investors:
  1. specialize in stock-picking;
  2. sufficiently diversified;
  3. have no bias towards uncontrolled factors.

The Economy

- An Economy with Factors:
  - J observable (to the econometrician) factors: $\left\{F_{j,t}\right\}_{j=1}^{J}$.
  - L unobservable factors: $\left\{f_{l,t}\right\}_{l=1}^{L}$.
- K stocks:

$$\tilde{r}_{k,t} = r_f + \sum_j \beta_{k,j} F_{j,t} + \sum_l \gamma_{k,l} f_{l,t} + \varepsilon_{k,t}$$

- $\left\{F_{j,t}\right\}_{j=1}^{J}$, $\left\{f_{l,t}\right\}_{l=1}^{L}$ and $\left\{\varepsilon_{k,t}\right\}_{k=1}^{K}$ are mutually independent.

Stock-picking and FSD

The Real Fund: $r_{i,t} = r_f + \sum_j \beta_{i,j,t} F_{j,t} + \sum_l \gamma_{i,l,t} f_{l,t} + \sum_k w_{i,k,t-1} \varepsilon_{k,t}$

The Replica Fund: $\hat{r}_{i,t} = r_f + \sum_j \beta_{i,j,t} F_{j,t} + \sum_l \hat{\gamma}_{i,l,t} f_{l,t} + \sum_k w_{i,k,t-1} \varepsilon_{\hat{k},t}$

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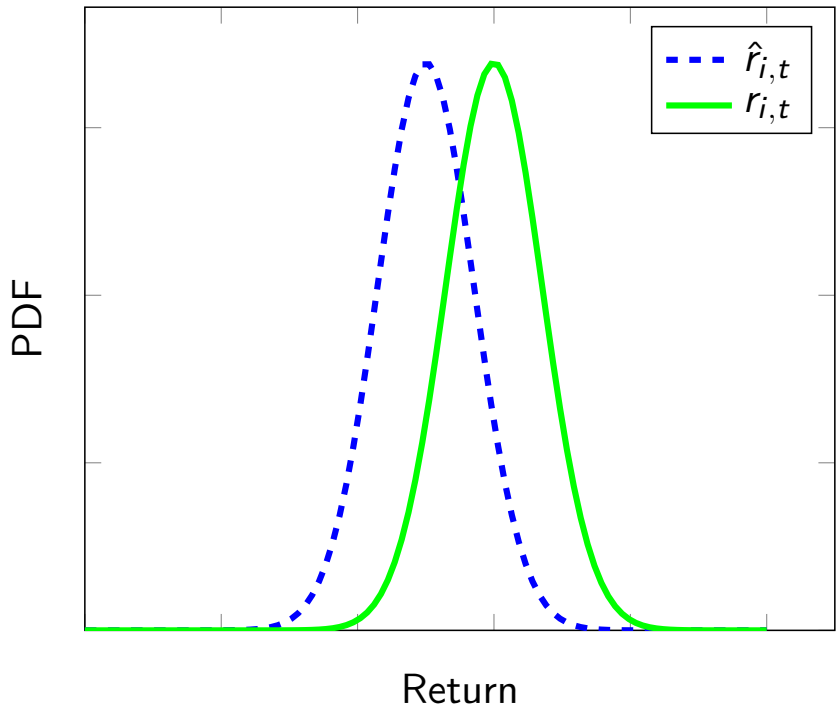
- Sufficient Conditions Leading to FSD:
  1. Skilled stock-picking:
     $\mathbb{E}_{t-1}\left(\sum_k w_{i,k,t-1}\varepsilon_{k,t}\right) \equiv \alpha_{i,t} > \mathbb{E}_{t-1}\left(\sum_k w_{i,k,t-1}\varepsilon_{\hat{k},t}\right) = 0.$
  2. Sufficient diversification: $\sum_k w_{i,k,t-1}\varepsilon_{k,t}$ and $\sum_k w_{i,k,t-1}\varepsilon_{\hat{k},t}$ are approximately normal.
  3. Unbiased towards unobservable factors: $\gamma_{i,l,t} = \hat{\gamma}_{i,l,t},\ \forall l.$

"Proof" by Graph

The Real Fund: $r_{i,t} = r_f + \sum_j \beta_{i,j,t} F_{j,t} + \sum_l \gamma_{i,l,t} f_{l,t} + \sum_k w_{i,k,t-1} \varepsilon_{k,t}$

The Replica Fund: $\hat{r}_{i,t} = r_f + \sum_j \beta_{i,j,t} F_{j,t} + \sum_l \hat{\gamma}_{i,l,t} f_{l,t} + \sum_k w_{i,k,t-1} \varepsilon_{\hat{k},t}$



- Stock-picking $\rightarrow$ FSD

"Proof" by Graph Cont.

The Real Fund: $r_{i,t} = r_f + \sum_j \beta_{i,j,t} F_{j,t} + \sum_l \gamma_{i,l,t} f_{l,t} + \sum_k w_{i,k,t-1} \varepsilon_{k,t}$

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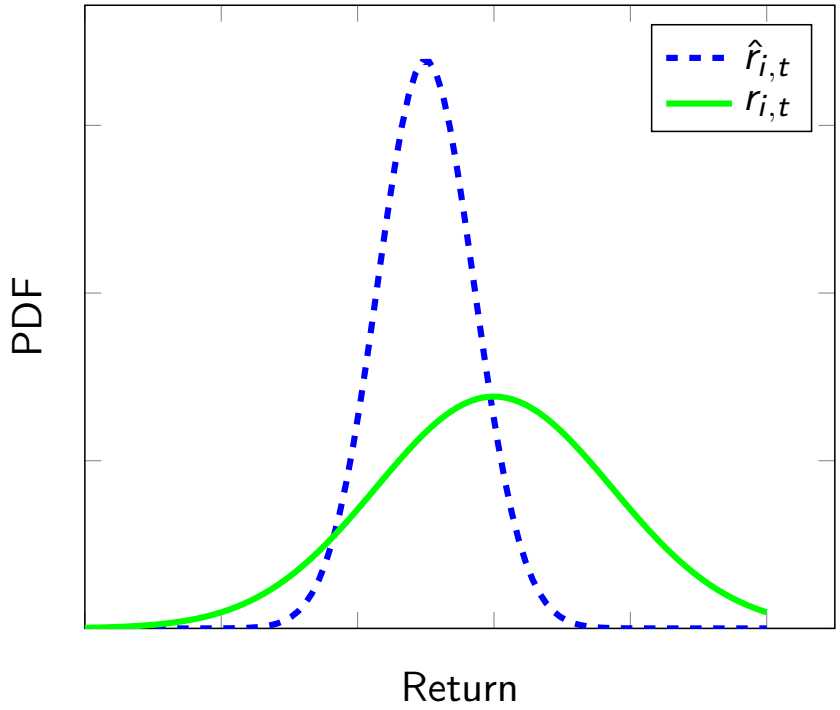

- Additional Factors $\not\rightarrow$ FSD

Outline

Objectives

- Implement $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$ with $\langle \hat{r}_{i,t} \rangle$.
- Construct test statistic for $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$.
- Simulate finite-sample distribution of the test statistic.

Ranking FSD

Proposition

$$r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t} \iff Pct\left(r_{i,t}, \left\langle \hat{r}_{i,t} \right\rangle\right) \overset{fsd}{\succ} Pct\left(\hat{r}_{i,t}, \left\langle \hat{r}_{i,t} \right\rangle\right) \sim Unif\,(0,1)$$

Ranking FSD

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Proposition

$r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t} \iff F_{t-1}^{Pct(r_{i,t},\langle \hat{r}_{i,t} \rangle)}(x) < F_{t-1}^{Pct(\hat{r}_{i,t},\langle \hat{r}_{i,t} \rangle)}(x) = x$, *where* F_{t-1} *denotes the conditional CDF.*

Ranking FSD

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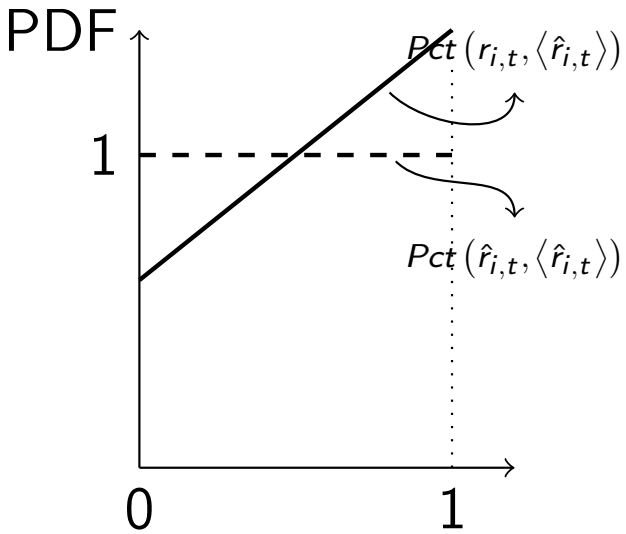
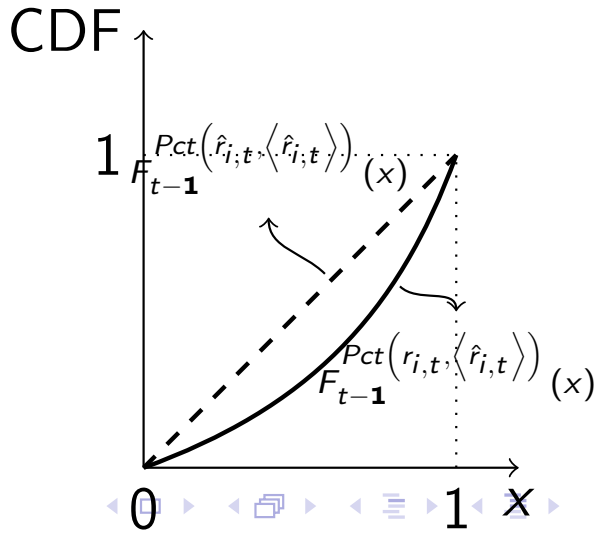
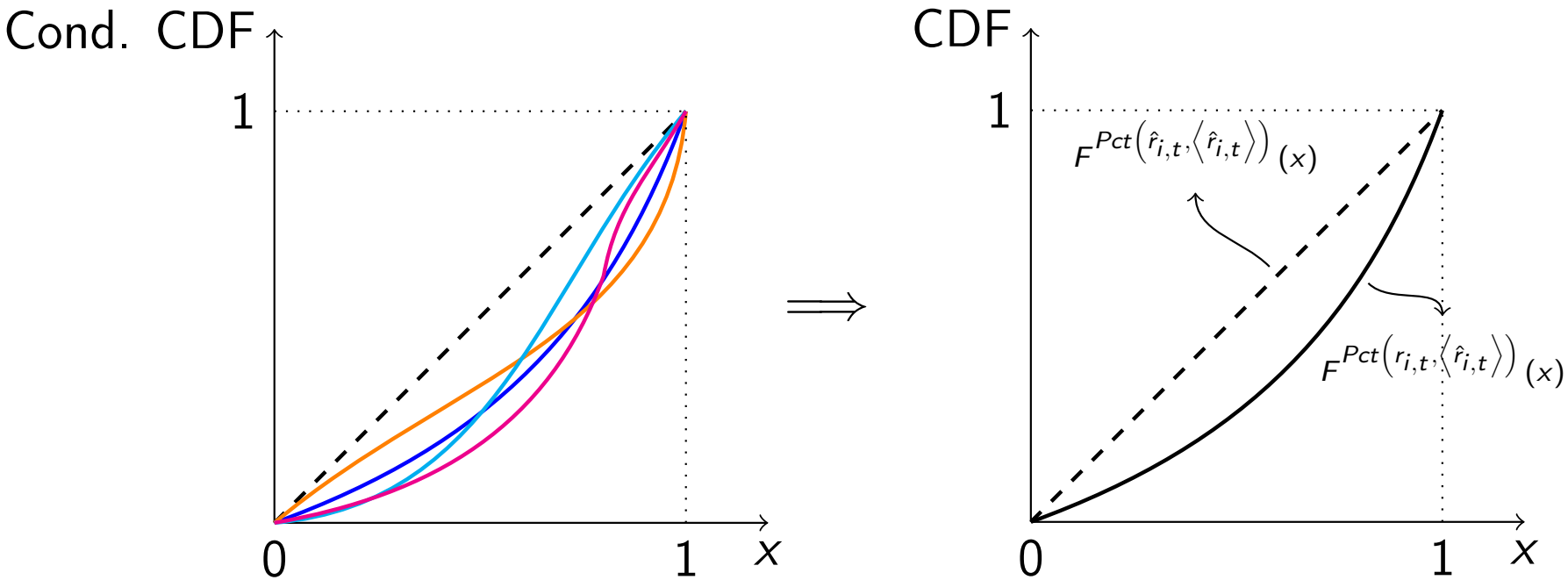




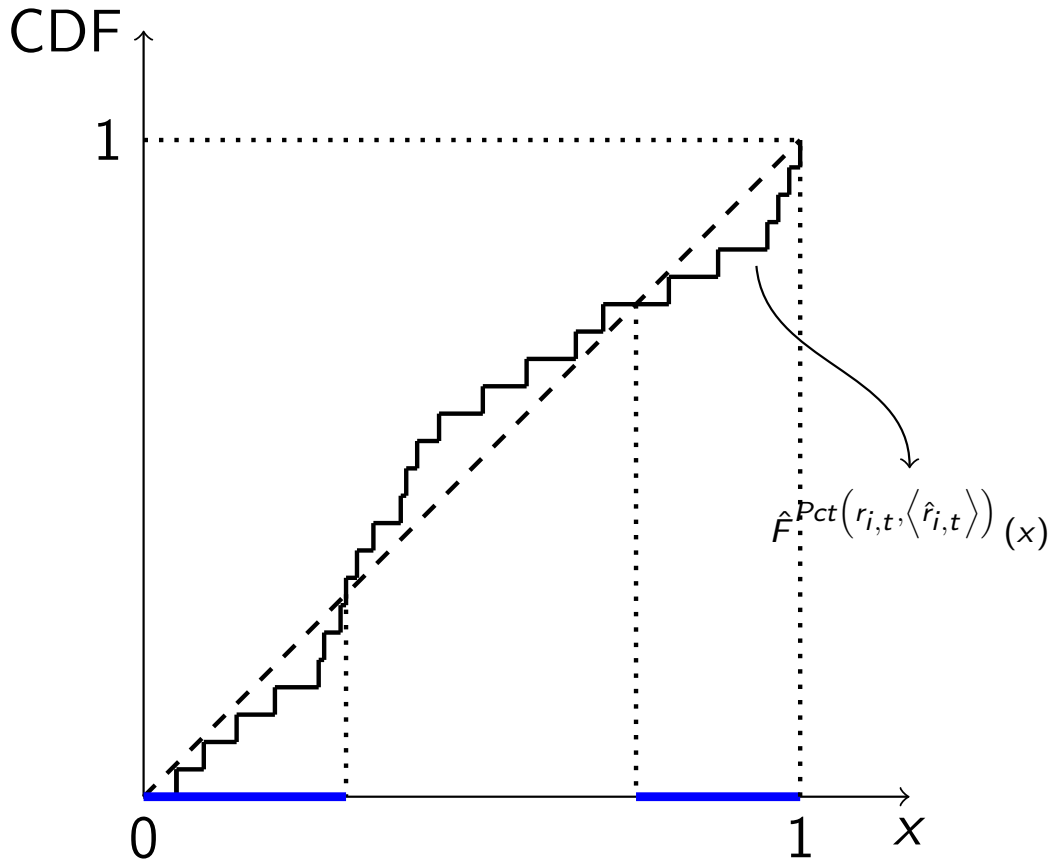
Unconditional FSD

Proposition

$r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t},\ \forall t \Rightarrow F^{Pct\left(r_{i,t},\left\langle \hat{r}_{i,t} \right\rangle\right)}(x) < F^{Pct\left(\hat{r}_{i,t},\left\langle \hat{r}_{i,t} \right\rangle\right)}(x) = x$, *where* F *denotes the unconditional CDF.*



FSD Test Statistic

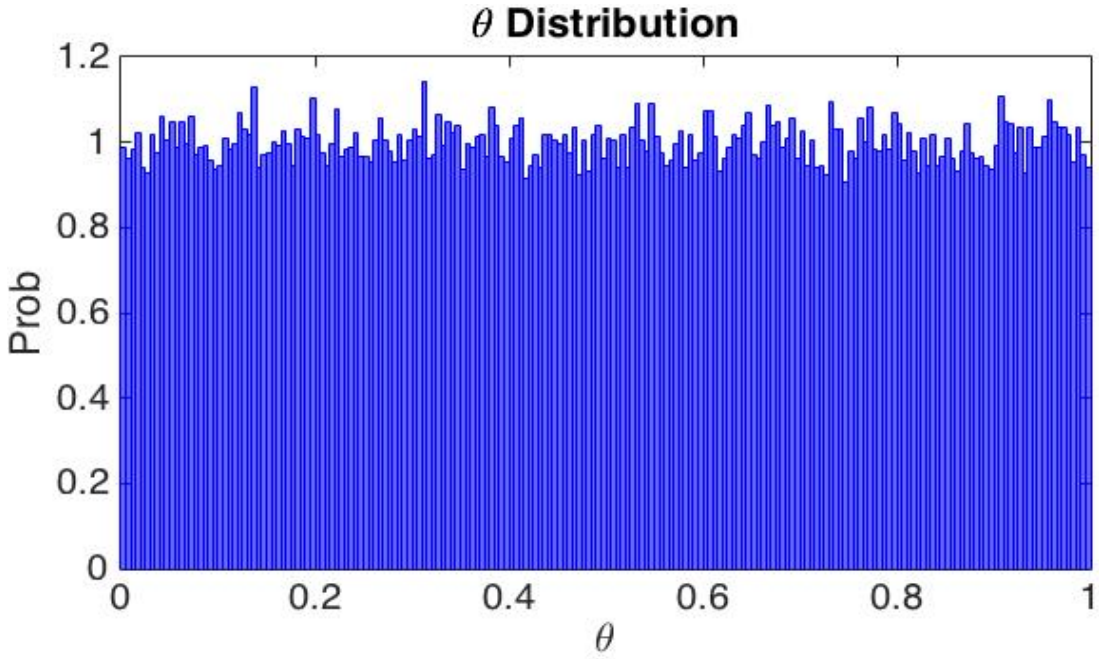


- Test Statistic: $\hat{\theta}$ = length of —.

Alternative Test Statistics

Test Statistic Distribution

Sample Size = 24:



- Test Size: 10%: 0.90; 5%: 0.95.
- The in-sample $\hat{\alpha}$ is still useful:
  - Rankings: Discipline return distribution.
  - In-sample $\hat{\alpha}$: Measures outperformance magnitude.

Outline

Objectives

- Fund Return Process:

$$r_{i,t} - r_f = \alpha_i + \sum_j \beta_{i,j} F_{j,t} \left(+ \sum_l \gamma_{i,l} f_{l,t} \right) + \sigma_t e_{i,t}$$

  - Features:
    - σ_t: Time-varying idiosyncratic volatility.
    - $\{f_{l,t}\}_{l=1}^{L}$: Unobservable factors.

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  - Features:
    - σ_t: Time-varying idiosyncratic volatility.
    - $\{f_{l,t}\}_{l=1}^{L}$: Unobservable factors.

- $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$ VS $\alpha > 0$, robustness to:
  - Heteroscedasticity;
  - Benchmark Mis-specification.

Robustness to Heteroscedasticity (Minor)

- Fund Rankings $Pct\left(r_{i,t}, \langle \hat{r}_{i,t} \rangle\right)$:
  - Adjust for σ_t period by period;
  - Bounded between $[0, 1]$, no outlier.

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- Fund Rankings $Pct\left(r_{i,t}, \langle \hat{r}_{i,t} \rangle\right)$:
  - Adjust for σ_t period by period;
  - Bounded between $[0, 1]$, no outlier.
- Advantage: Parametric-free.

Robustness to Benchmark Mis-specification (Major)

- Benchmark Mis-specification:
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Robustness to Benchmark Mis-specification (Major)

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  - $\alpha > 0$: Defenseless.
  - $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$: Robust when the missing factor takes normal distribution.

Benchmark Mis-specification Environment

- Simulate 1000 funds, 20 are skilled.
- Observable Factor: $r_{m,t} \sim N\left(0, 0.06^2\right)$.
- Fund Returns:
  - $r_{i,t}^{skilled} = 0.0025 + r_{m,t} + e_{i,t}, \quad e_{i,t} \sim N\left(0, 0.01^2\right)$, 20 funds
  - $r_{i,t}^{unskilled} = r_{m,t} + e_{i,t}, \quad e_{i,t} \sim N\left(0, 0.01^2\right)$, 880 funds
  - $r_{i,t}^{mis-spec} = r_{m,t} + f_{i,t} + e_{i,t}, \quad e_{i,t} \sim N\left(0, 0.01^2\right)$, 100 funds
- Replica Fund Returns:
  - $\hat{r}_{i,t} = r_{m,t} + \hat{e}_{i,t}, \quad \hat{e}_{i,t} \sim N\left(0, 0.01^2\right)$

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- The Missing Factor: $f_{i,t} \sim N\left(0, \sigma_f^2\right)$
  - Mild: $\sigma_f = 0.01$; Moderate: $\sigma_f = 0.03$; Severe $\sigma_f = 0.05$

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  - Mild: $\sigma_f = 0.01$; Moderate: $\sigma_f = 0.03$; Severe $\sigma_f = 0.05$
- Select 20 funds with each measure. See how many of them are skilled.

Prediction: $\alpha > 0$ Condition

- Susceptible. $\hat{\alpha}$ picks up large $\frac{1}{T}\sum_t f_{i,t}$ realizations.
  -

$$\begin{aligned}\hat{\alpha}_i &= \frac{1}{T}\sum_t \left(r_{i,t} - r_{m,t}\right) \\ &= \underbrace{\alpha_i}_{\text{Skill}} + \underbrace{\frac{1}{T}\sum_t f_{i,t}}_{\text{Noise}} + \underbrace{\frac{1}{T}\sum_t e_{i,t}}_{\text{Noise}}\end{aligned}$$

Prediction: $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$ Condition

- Robust because of a detection mechanism.

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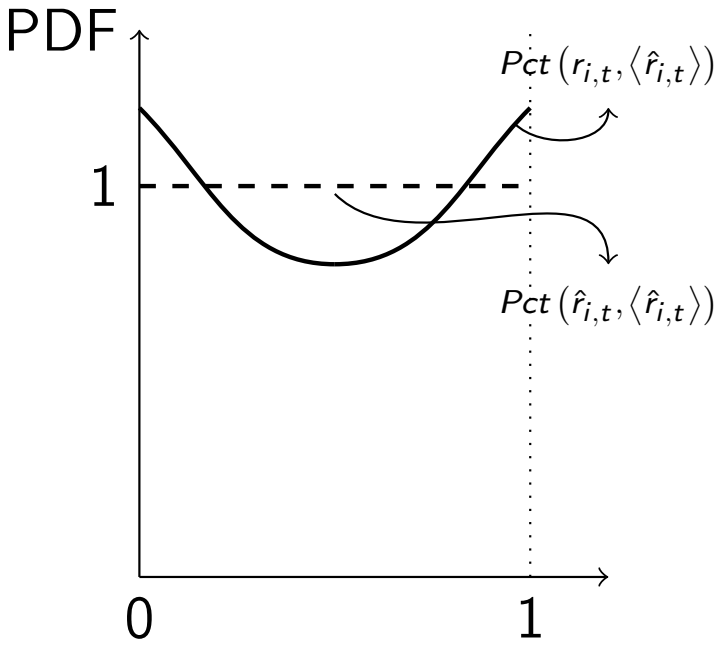
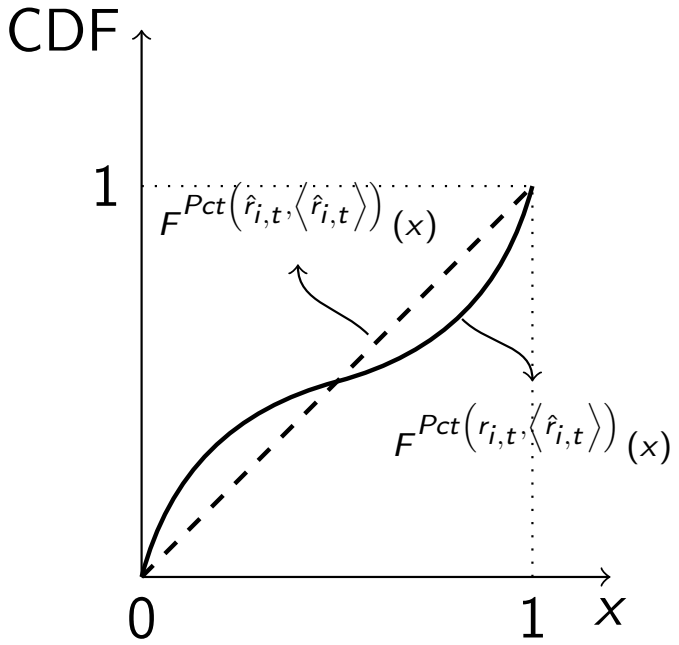
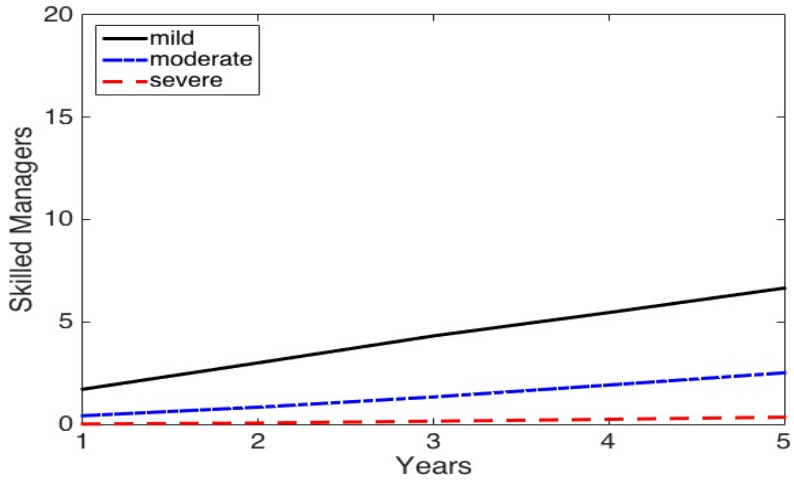
$$r_{i,t}^{mis-spec} = r_{m,t} + f_{i,t} + e_{i,t}$$
$$\hat{r}_{i,t} = r_{m,t} + \hat{e}_{i,t}$$



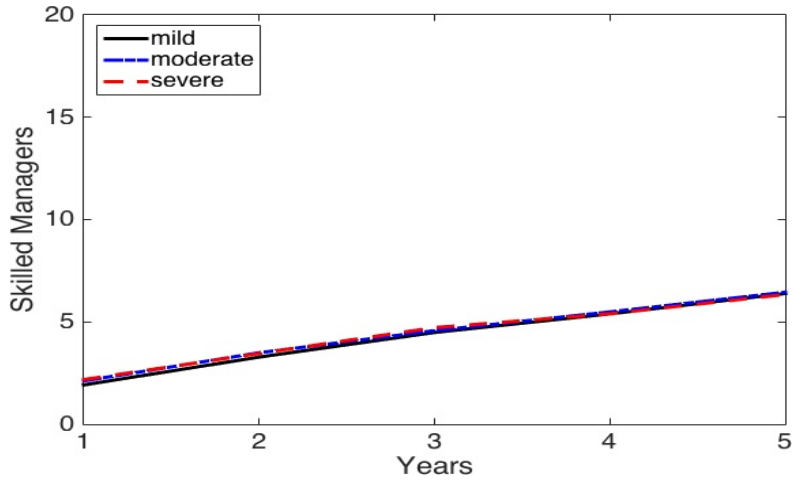


Accuracy Comparison

- Select 20 funds with each measure. See how many of them are skilled.
- Average accuracy from 500 simulations:



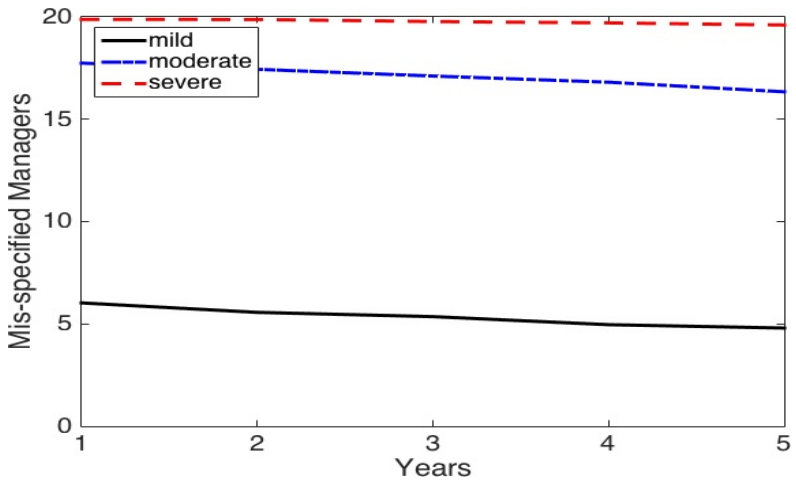
Search by $\alpha > 0$



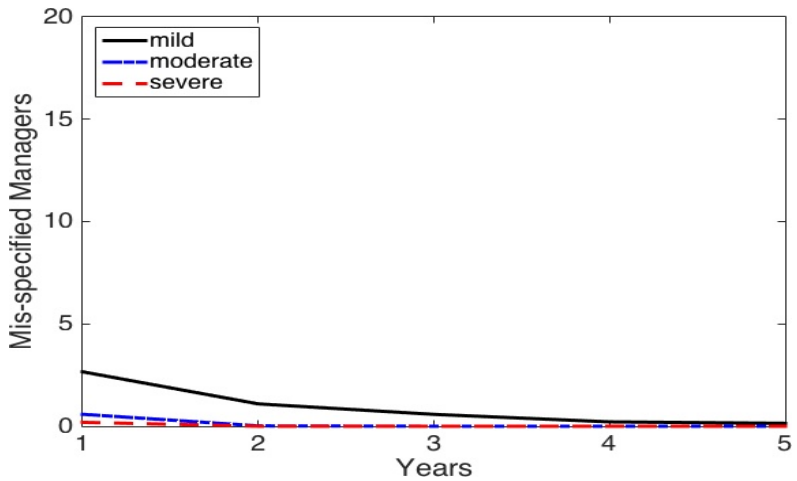
Search by $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$

Mistake Comparison

- Select 20 funds with each measure. See how many of them are mis-specified.
- Average mistake from 500 simulations:



Search by $\alpha > 0$



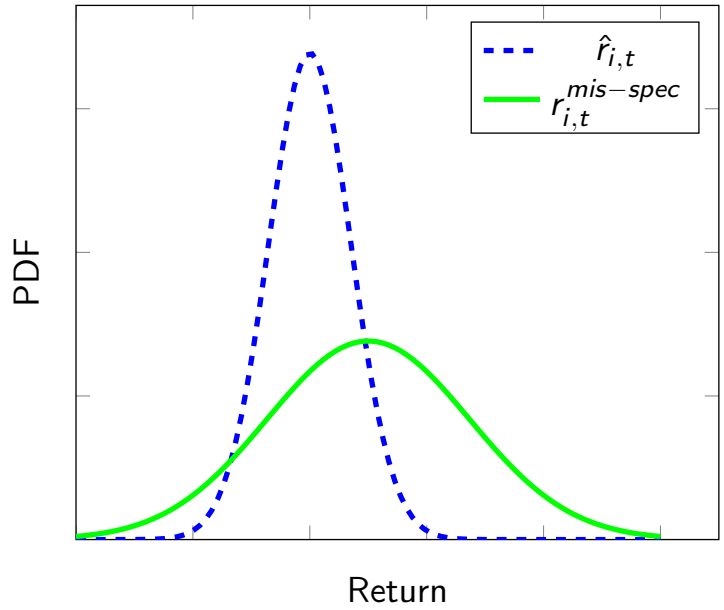
Search by $r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$

"General" Case

- Assumption: Missing factors have non-zero risk premium, but takes normal distribution.

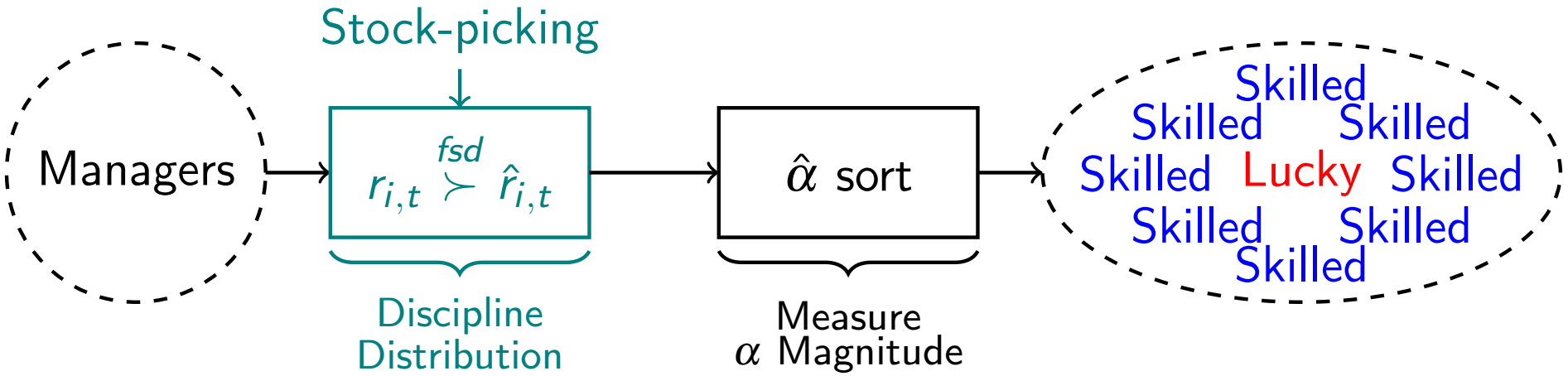
"General" Case

- Assumption: Missing factors have non-zero risk premium, but takes normal distribution.
- Conclusion:
  - $r_{i,t}^{mis-spec} \overset{fsd}{\succ} \hat{r}_{i,t}$ is always violated regardless of risk premium.
  - Missing factors $\rightarrow$ Larger left tail.



Outline

Empirical Strategy



Empirical Strategy Cont.

- Data:
  - Fund returns: CRSP
  - Fund holdings: Thomson Reuters
- Sample Period: 01/1991 - 12/2015
- Rebalance Frequency: Quarterly
- Search:
  - 1st stage: FSD test, size=10%, $\hat{\theta} \geq 0.90$
  - 2nd stage: In-sample $\hat{\alpha}$ sort

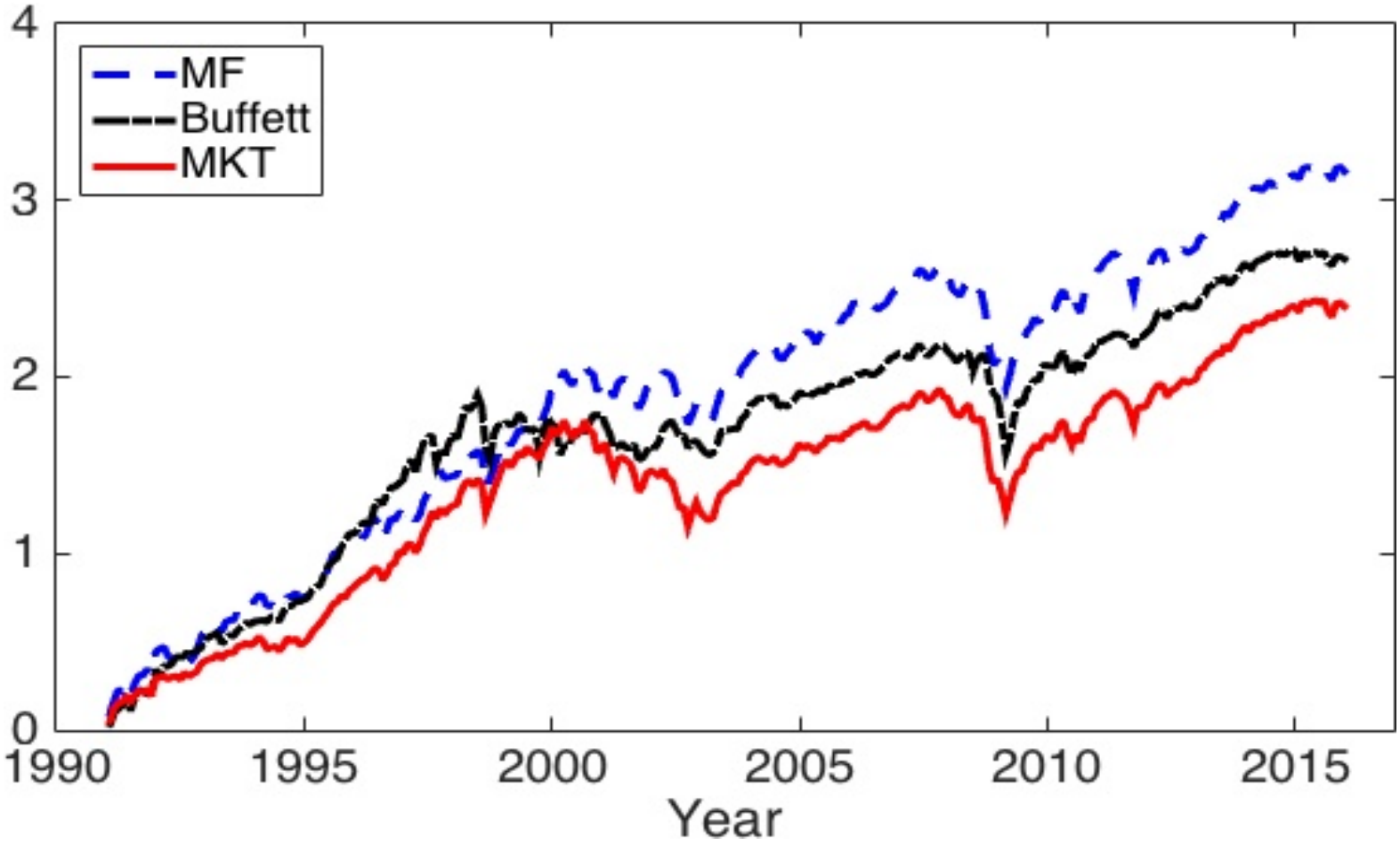
Out of Sample, Before Fees

2nd Stage	Sample	α (in %)	IR	mkt	smb	hml	umd
1	1.83%	**0.50**	**0.11**	1.03	0.29	0.03	0.04
		[0.53]		[46.26]	[8.82]	[0.87]	[2.08]
2	1.94%	**1.54***	**0.38**	1.01	0.20	0.06	0.03
		[1.88]		[59.22]	[5.89]	[2.07]	[1.58]
3	1.95%	**2.10****	**0.47**	1.00	0.23	0.10	0.05
		[2.28]		[43.55]	[7.12]	[2.35]	[2.48]
4	1.94%	**2.53*****	**0.52**	1.03	0.26	0.01	0.07
		[2.60]		[47.04]	[6.80]	[0.21]	[2.53]
5	1.88%	**3.55*****	**0.67**	1.07	0.45	−0.10	0.08
		[3.24]		[38.85]	[13.47]	[−2.87]	[3.26]
1st Stage	9.55%	**2.04*****	**0.57**	1.03	0.28	0.02	0.05
		[2.78]		[61.14]	[10.55]	[0.72]	[2.99]
All Funds	100%	**0.03**	**0.02**	1.00	0.21	0.02	0.01
		[0.07]		[81.56]	[10.74]	[1.19]	[0.94]

Out of Sample, After Fees

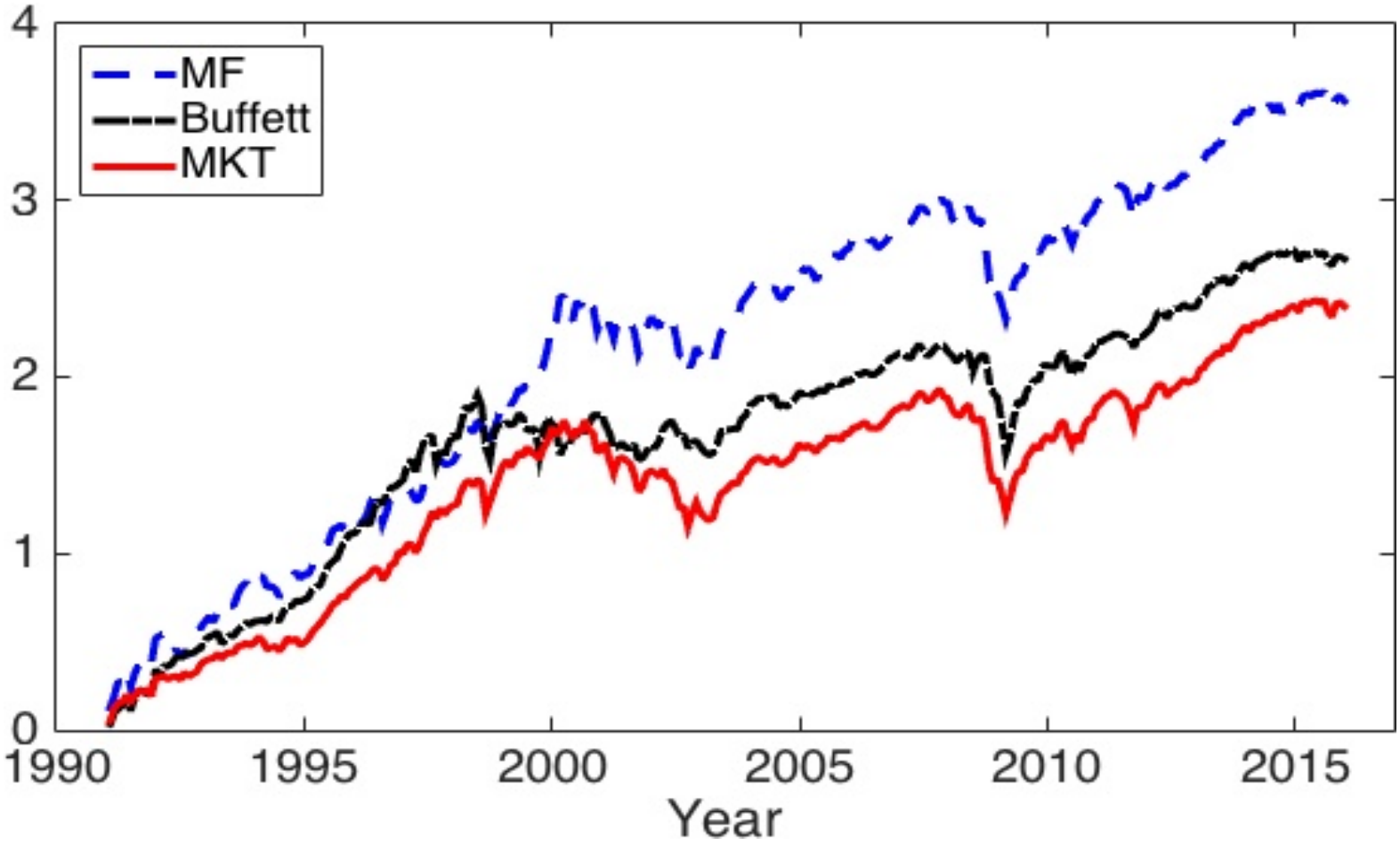
2nd Stage	Sample	α (in %)	IR	mkt	smb	hml	umd
1	1.83%	**−0.74**	**−0.16**	1.04	0.29	0.03	0.04
		[−0.79]		[46.34]	[8.78]	[0.87]	[2.10]
2	1.94%	**0.33**	**0.08**	1.01	0.20	0.06	0.03
		[0.40]		[59.59]	[5.89]	[2.05]	[1.55]
3	1.95%	**0.89**	**0.20**	1.00	0.23	0.10	0.05
		[0.95]		[43.51]	[7.09]	[2.32]	[2.50]
4	1.94%	**1.25**	**0.26**	1.03	0.26	0.01	0.07
		[1.29]		[47.08]	[6.80]	[0.22]	[2.54]
5	1.88%	**2.24****	**0.43**	1.07	0.45	−0.10	0.08
		[2.05]		[39.23]	[13.50]	[−2.90]	[3.28]
1st Stage	9.55%	**0.78**	**0.22**	1.03	0.28	0.02	0.05
		[1.07]		[61.27]	[10.52]	[0.68]	[2.99]
All Funds	100%	**−1.18**	**−0.53**	1.01	0.21	0.02	0.01
		[−2.39]		[81.97]	[10.70]	[1.20]	[0.99]

Performance, 1st Stage



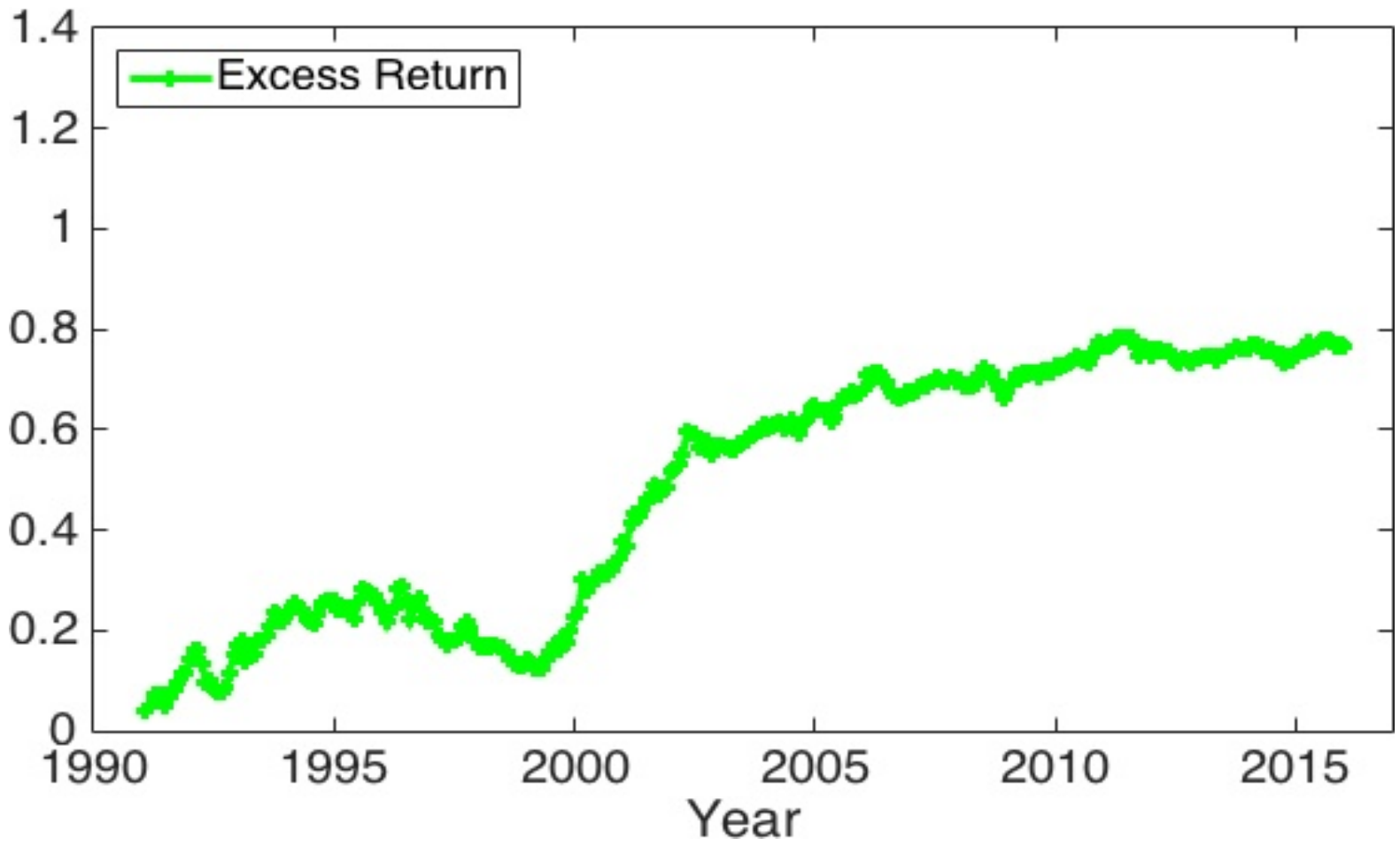
(a) 1st Stage

Performance, 2nd Stage



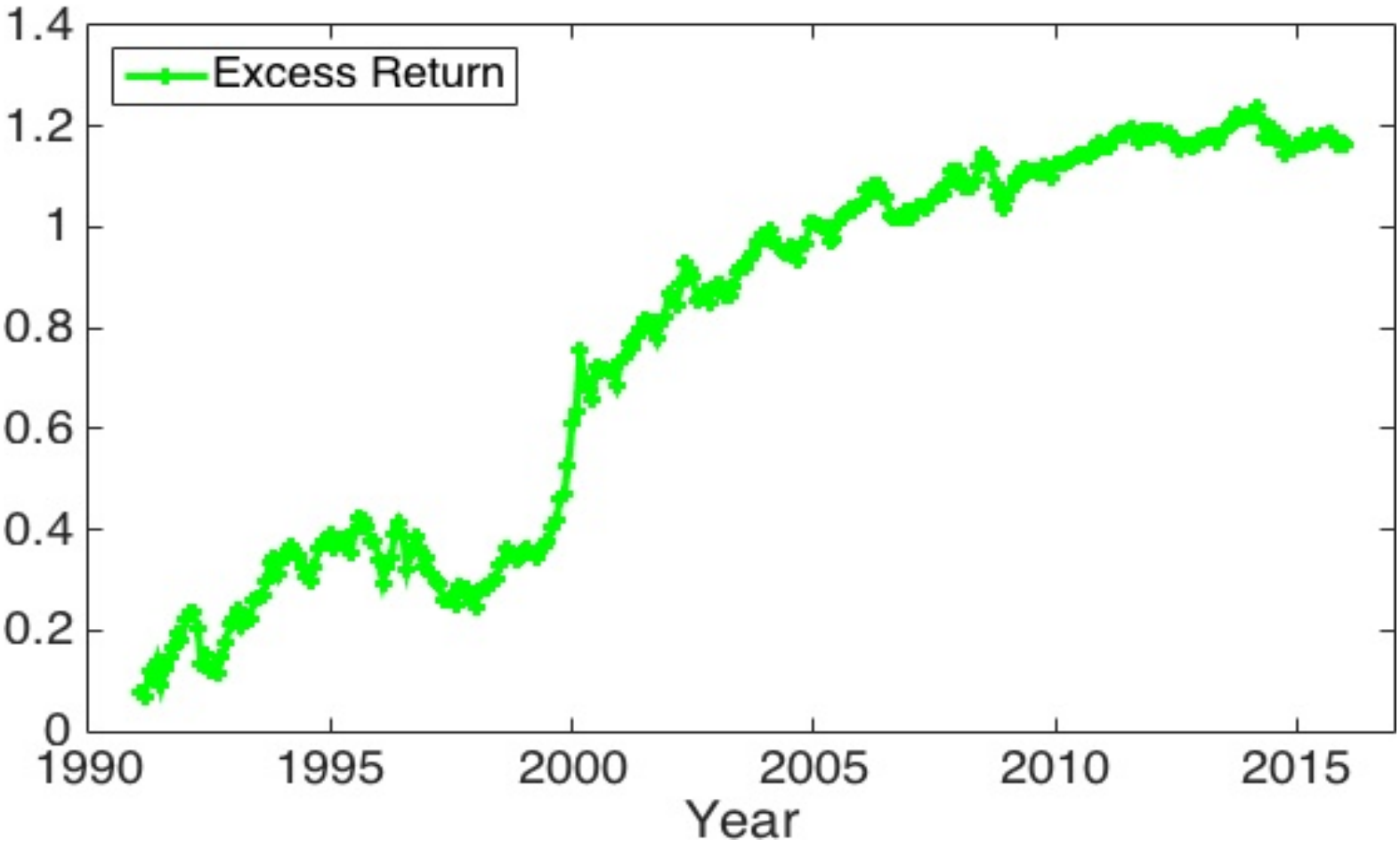
(b) Top Quintile by $\hat{\alpha}$, 2nd Stage

Outperformance, 1st Stage



(a) 1st Stage

Outperformance, 2nd Stage



(b) Top Quintile by $\hat{\alpha}$, 2nd Stage

Fund Characteristics

2nd Stage	Sample Share	Age	Age Norm.	TNA Norm.	Fees (in bps)	Fees Norm.	# of Stocks Norm.	Turnover Ratio	Turnover Norm.
1	1.83%	15.27	1.00	0.73	120.42	1.05	0.99	0.81	0.98
2	1.94%	16.41	1.08	1.11	117.23	1.02	1.10	0.69	0.84
3	1.95%	15.20	1.00	0.97	119.01	1.04	1.03	0.70	0.86
4	1.94%	15.92	1.05	1.06	125.43	1.09	0.97	0.73	0.88
5	1.88%	15.80	1.05	1.01	127.27	1.11	0.80	0.80	0.97
1st Stage	9.55%	15.73	1.04	0.98	121.94	1.06	0.99	0.75	0.92
All Funds	100%	15.18	1	1	114.78	1	1	0.82	1

Within-Quarter Trading Profits: The Return Gap

- Definition: $rgap_{i,t} \equiv r_{i,t} - \sum_j w_{i,j,\underline{t}} \tilde{r}_{j,t}$, Kacperczyk, Sialm, and Zheng (2008)

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- Definition: $rgap_{i,t} \equiv r_{i,t} - \sum_j w_{i,j,\underline{t}} \tilde{r}_{j,t}$, Kacperczyk, Sialm, and Zheng (2008)

2nd Stage	Sample	α^{rgap} **(in %)**	mkt	smb	hml	umd
1	1.83%	**0.74****	0.02	0.03	−0.01	0.02
		[2.31]	[2.31]	[1.73]	[−1.30]	[3.08]
2	1.94%	**0.77*****	0.02	0.02	−0.01	0.01
		[3.94]	[4.26]	[1.61]	[−0.91]	[2.83]
3	1.95%	**0.91*****	0.03	0.01	−0.00	0.01
		[3.64]	[4.76]	[0.67]	[−0.23]	[2.54]
4	1.94%	**0.85*****	0.02	0.01	−0.01	0.01
		[3.29]	[3.26]	[0.99]	[−0.50]	[2.01]
5	1.88%	**1.60*****	0.02	−0.02	−0.03	0.02
		[3.04]	[1.47]	[−0.63]	[−1.42]	[2.43]
1st Stage	9.55%	**0.97*****	0.02	0.01	-0.01	0.01
		[5.19]	[4.10]	[1.07]	[-1.11]	[3.49]
All Funds	100%	**0.21**	0.00	0.02	0.00	0.02
		[1.26]	[0.70]	[1.46]	[0.14]	[3.60]

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    - Baseline Version: $Flow_{i,t} = Const + \beta \times \hat{\alpha}_i^{[t-1-T,t-1]} + X_i + \varepsilon_{i,t}$;
    - $FSD_{i,t} = \begin{cases} 1 & \text{if fund i survives the FSD test;} \\ 0 & \text{otherwise.} \end{cases}$

Flow Response, Out of Sample

- $Flow_{i,t} =$
  $Const + \delta_0 \times FSD_{i,t} + (\beta + \delta_1 \times FSD_{i,t}) \times \hat{\alpha}_i^{[t-1-T,t-1]} + X_i + \varepsilon_{i,t}$:

	$Flow_{i,t}$	$Flow_{i,t}$	$Flow_{i,t}$	$Flow_{i,t}$
$\hat{\alpha}_i^{[t-1-T,t-1]}$	2.75***	2.68***	2.66***	2.64***
	[41.26]	[40.59]	[40.58]	[40.45]
$FSD_{i,t}$		0.0063***		0.0031***
		[11.42]		[5.22]
$FSD_{i,t} \times \hat{\alpha}_i^{[t-1-T,t-1]}$			1.29***	0.84***
			[10.06]	[5.74]

- Investors do appreciate the FSD satisfying funds! But not enough to arbitrage away out-of-sample α.

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  - generate larger return gap: Kacperczyk, Sialm, and Zheng (2008);
  - attract more fund flows: Berk and Van Binsbergen (2015), Barber, Huang and Odean (2016).

Outline

Summary

- Benchmark Extension: $\left\{ r_{i,t}^{b} \right\}_{t=1}^{T} \longrightarrow \{\langle \hat{r}_{i,t} \rangle\}_{t=1}^{T}$.
  - Control for both factor loadings and degree of diversification.
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- Contributions:
  - Powerful test on information advantage regarding idiosyncratic risks.
  - Large out-of-sample alphas and various findings on fund characteristics.

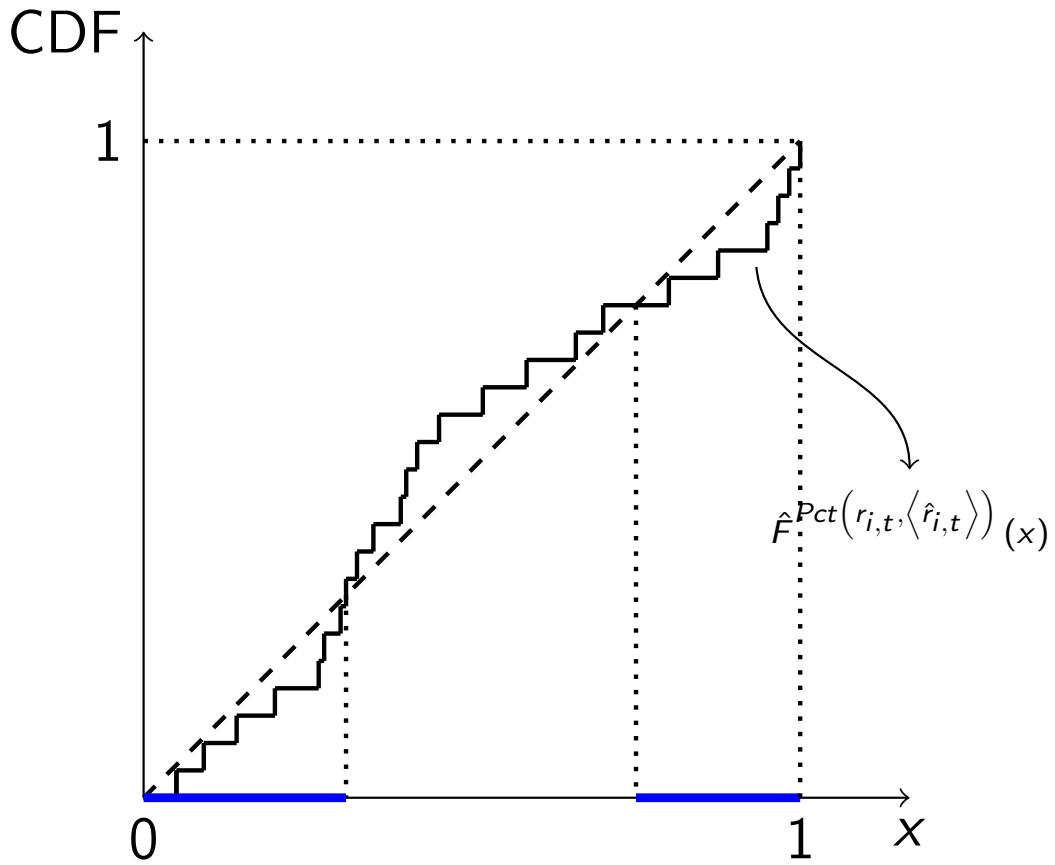
Consistency Spectrum

$\hat{\alpha} > 0$ $\quad r_{i,t} \overset{fsd}{\succ} \hat{r}_{i,t}$ $\quad$ Arbitrage

Outperformance Consistency

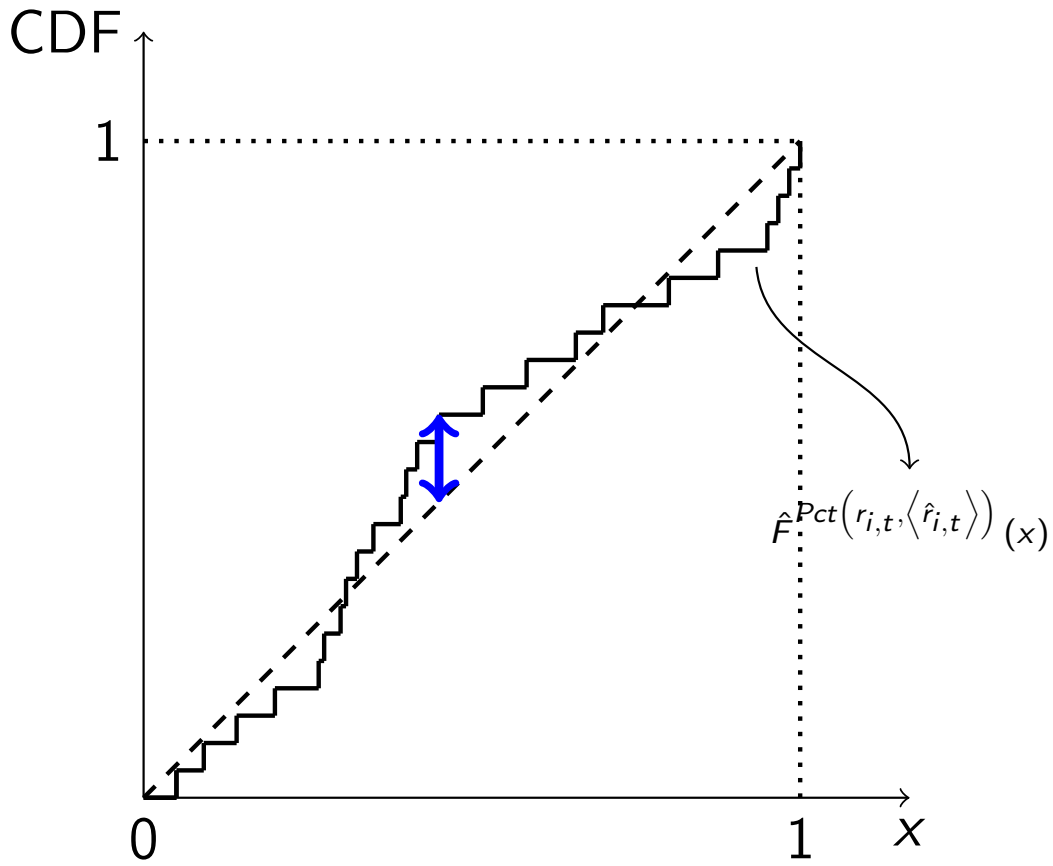
Back

Choices of FSD Test Statistic 1



$$\hat{\theta}_1 = \int 1^{+}\left(x - \hat{F}(x)\right) dx$$

Choices of FSD Test Statistic 2



$$\hat{\theta}_2 = \min\left(x - \hat{F}(x)\right)$$