Judging Fund Managers by the Company They Keep

Cohen, Coval, and Pastor (2005)

February 22, 2019

Introduction

Intuition

- Active Mutual Fund managers rely on many techniques to reach benchmarks
- Managers using similar techniques more likely to make similar decisions
- Then, managers who make similar investment decisions should deliver similar performance

Introduction

Signs

- Can tell if manager is skilled by comparing investment decisions with other skilled managers given private info
- Skilled managers make similar investment decisions because they interpret info well (if public)
- Similar managers should have similar portfolio compositions

Introduction

Intuition for novel measures

- This paper's metric of a manger's skill is a weighted average of traditional skill measures across all managers where weights are covariances between the manager's current portfolio weights and the current weights of the other managers
- Trade-based performance judges manager's skill by extent to which recent changes in his holding match those of managers with outstanding past performance.
    - weighted avg of traditional skill measures, but weights are covariance between concurrent changes in manager's portfolio weights and those of other managers
- Evaluate mutual fund performance by pooling information across funds - instead of single history for single manager

Introduction

Simulations

- Results come by way of simulations:
  - estimators produce higher rank correlations with true skill than standard estimators
  - estimators perform best with high number of managers, small history

Introduction

Fund Return Predictability

- Sort funds in deciles according to both alpha and novel measures
- Find fund returns have persistence after controlling for momentum
- Authors show that their measures contain significant information not found in alpha

New Performance Measures

Two Measures

1. Measure Based on Levels of Holdings
2. Measure Based on Changes in Holdings

New Performance Measures

Equation (1)

$$\bar{\delta}_n = \sum_{m=1}^{M} v_{m,n}\alpha_m$$

Equation (2)

$$v_{m,n} = \frac{w_{m,n}}{\sum_{m=1}^{M} w_{m,n}}$$

for:

- M managers and N stocks which is held by at least one manager.
- α_m denotes reference measure of skill for manager m - here Jensen's alpha
- $w_{m,n}$ is weight of stock n in manager m's portfolio. Then, we call $\bar{\delta}_n$ the quality measure.

Measure Based on Levels of Holdings

Intuition

Equation (1) and (2) say the quality of stock n is the average skill of all managers who hold stock n in their portfolios, weighted by how much stock they hold.

- Implies that skilled managers hold more high quality stocks

From this we get Equation (3), the population performance measure:

$$\delta_m^* = \sum_{n=1}^{N} w_{m,n} \bar{\delta}_n$$

which measures manager's performance as the average quality of all stocks in manager's portfolio, where each stock contributes to its portfolio weight.

Measure Based on Levels of Holdings

To construct our estimator of managerial skill, we replace α_m in equation (1) with $\hat{\alpha}_m$, the usual OLS estimator of alpha:

$$\hat{\delta}_m^* = \sum_{n=1}^{N} w_{m,n} \bar{\bar{\delta}}_n, \tag{4}$$

where

$$\bar{\bar{\delta}}_n = \sum_{m=1}^{M} v_{m,n} \hat{\alpha}_m. \tag{5}$$

Measure Based on Levels of Holdings

- Some derivations via matrix algebra show that a manager's skill is a weighed average of the usual skill measures across all managers. The weight assigned to the performance of a manager is simply a loose measure of covariance between the weights of one manager with another.

$$\hat{\delta}^* = \mathbf{Z}\hat{\alpha}$$

- Additionally, $\bar{\hat{\delta}}^*_m = \bar{\hat{\alpha}}_m$
  - That is, skill measure here has same info as usual measure about performance of mutual fund industry as a whole
  - There will be gains to the skill measure, however.
- If $\hat{\alpha}_m$'s are not perfectly correlated, $\hat{\delta}^*_m$ has a lower standard error.

Measure Based on Changes in Holdings

Intuition

- Last measure inferred managers make similar decisions if they have similar holdings
- Now, assume managers make similar decisions if their trades are similar

Measure Based on Changes in Holdings

Return on portfolio of manager m at time t can be written as:

$$R_{m,t} = \sum_{n=1}^{N} w_{m,n} r_{n,t}$$

where $r_{n,t}$ denotes the return on stock n. Change in weights is:

$$d_{m,n} = w_{m,n,t} - w_{m,n,t-1} \frac{1 + r_{n,t}}{1 + R_{m,t}}$$

which is the difference between the current weight and the weight obtained if the manager neither bought nor sold any of this stock over the past period (one quarter).

Measure Based on Changes in Holdings

- $\mathcal{N}_m^+ = \{n : d_{m,n} > 0\}$ - stocks purchased by manager m between $t-1$ and t
- $\mathcal{N}_m^- = \{n : d_{m,n} < 0\}$ - stocks sold by manager m between $t-1$ and t
- $\mathcal{M}_n^+ = \{m : d_{m,n} > 0\}$ - set of managers who made net purchases of stock n between $t-1$ and t
- $\mathcal{M}_m^- = \{m : d_{m,n} < 0\}$ - set of managers who made net sales of stock n between $t-1$ and t

Measure Based on Changes in Holdings

$$x^{+}_{m,n} = \frac{d_{m,n}}{\sum\limits_{n \in \mathcal{N}^{+}_{m}} d_{m,n}}, \quad x^{-}_{m,n} = \frac{d_{m,n}}{\sum\limits_{n \in \mathcal{N}^{-}_{m}} d_{m,n}}, \tag{17}$$

$$y^{+}_{m,n} = \frac{d_{m,n}}{\sum\limits_{m \in \mathcal{M}^{+}_{n}} d_{m,n}}, \quad y^{-}_{m,n} = \frac{d_{m,n}}{\sum\limits_{m \in \mathcal{M}^{-}_{n}} d_{m,n}}, \tag{18}$$

where $d_{m,n}$ is the difference between the current weight and the weight obtained if the manager neither bought nor sold any of this stock over the past period (one quarter).

- Then, $x^{+}_{m,n}$ ($x^{-}_{m,n}$) captures the fraction of manager m's purchases (sales) accounted for by stock n
- And, $y^{+}_{m,n}$ ($y^{-}_{m,n}$) captures the fraction of purchases (sales) of stock n accounted for by manager m

Measure Based on Changes in Holdings

For each stock n, we define its quality measure $\bar{\delta}_n$ as

$$\bar{\delta}_n = \bar{\delta}_n^+ - \bar{\delta}_n^-, \tag{19}$$

where

$$\bar{\delta}_n^+ = \sum_{m \in \mathcal{M}_n^+} y_{m,n}^+ \hat{\alpha}_m, \tag{20}$$

$$\bar{\delta}_n^- = \sum_{m \in \mathcal{M}_n^-} y_{m,n}^- \hat{\alpha}_m, \tag{21}$$

The quality of stock n is the difference between the average skill of all managers who bought stock n recently and average skill of all managers who sold stock n recently, where the averages are weighted by how much was bought and sold

Measure Based on Changes in Holdings

Trade Based Skill Measure:

$$\hat{\delta}_m^{**} = \hat{\delta}_m^{+} - \hat{\delta}_m^{-}, \tag{22}$$

where

$$\hat{\delta}_m^{+} = \sum_{n \in \mathcal{N}_m^{+}} x_{m,n}^{+} \bar{\delta}_n \tag{23}$$

$$\hat{\delta}_m^{-} = \sum_{n \in \mathcal{N}_m^{-}} x_{m,n}^{-} \bar{\delta}_n. \tag{24}$$

- Difference between average quaility of stocks recently bought by manager *m* and the average quality of stocks recently sold by this manager
- Combines two aspects of stock picking skills
- Example: Stocks of high quality are those that were recently bought mostly by high-skill managers and sold by low-skill managers

New Performance Measures

Note: There is a matrix representation too after some linear algebra allowing for **C** to be a matrix containing the $x^{+}_{m,n}$, $x^{-}_{m,n}$, $y^{+}_{m,n}$, $y^{-}_{m,n}$:

$$\hat{\delta}^{**} = \mathbf{C}\hat{\alpha}$$

$$Cov(\hat{\delta}^{**}, \hat{\delta}^{**\top}) = \mathbf{C}\Omega\mathbf{C}^{\top}$$

New Performance Measures

Some Considerations

- Not necessarily an optimized measure - would be challenging
- May look like "herding" but literature does not factor in trades
- Not just window-dressing since managers not only judged by portfolio, but also its relation to others

Simulations

Design

Let M managers receive signals about expected excess returns of N stocks:

$$r_{n,t} = \mu_{n,t} + e_{n,t}, n = 1, \ldots, N; t = 1, \ldots, T$$

where $\mu_{n,t}$ is the stock's expected excess return and $e_{n,t}$ is an error term. Each are drawn from a normal distribution centered on zero with distinct variances.

- In every period t, each manager m receives a signal $s_{m,n,t}$ about each stock n. With probability γ_m this signal is equal to the stock's true expected excess return, error otherwise:

$$s_{m,n,t} = \begin{cases} \mu_{n,t} & \text{with probability } \gamma_m \\ u_{n,t} & \text{with probability } 1 - \gamma_m, \end{cases} \tag{31}$$

Simulations

Design

Managers know their skill and error volatility. They have no information about expected excess return other than the signal. Then, goal will be to estimate:

1. Traditional Estimator of α and $\hat{\alpha}$ - Jensen's alpha
2. Performance measure based on level of holdings $\hat{\delta}_m^*$
3. Performance measure based on change in holdings $\hat{\delta}_m^{**}$
4. Bayesian estimator $\hat{\alpha}_m^B$
5. Population values δ_m^* and δ_m^{**}

Simulations

Process

- Conduct 10,000 simulations for each set of parameter values
- Set managers M equal to 30, 100, and 300
- Set number of stocks N equal to 30, 100
- Set number of time periods T to 1, 5, 10, 20, and 30
- Let $\sigma_\mu = 0.1$ and $\sigma_e = 0.5$
- Calculate measures for each manager (on previous slide)
- Rank managers according to these measures to uncover correlation with true skill γ

Simulations - Results

Table 1

Rank Correlations with True Skill (γ)

	$N=30$						$N=100$					
M	$\hat{\alpha}$	$\hat{\delta}^*$	$\hat{\delta}^{**}$	α	δ^*	δ^{**}	$\hat{\alpha}$	$\hat{\delta}^*$	$\hat{\delta}^{**}$	α	δ^*	δ^{**}
						$T=1$						
30	0.26	0.34	0.35	0.80	0.80	0.82	0.46	0.64	0.65	0.92	0.92	0.93
100	0.27	0.40	0.42	0.81	0.82	0.85	0.47	0.76	0.77	0.93	0.94	0.94
300	0.27	0.44	0.45	0.82	0.83	0.85	0.47	0.80	0.81	0.93	0.94	0.95
						$T=5$						
30	0.53	0.64	0.63	0.94	0.86	0.87	0.77	0.89	0.90	0.98	0.94	0.95
100	0.54	0.72	0.74	0.95	0.85	0.88	0.78	0.93	0.95	0.98	0.95	0.96
300	0.54	0.76	0.78	0.95	0.84	0.88	0.79	0.94	0.96	0.98	0.94	0.96
						$T=10$						
30	0.66	0.75	0.75	0.96	0.86	0.88	0.86	0.93	0.93	0.99	0.95	0.96
100	0.68	0.81	0.83	0.97	0.85	0.89	0.88	0.94	0.96	0.99	0.95	0.96
300	0.68	0.82	0.86	0.97	0.85	0.88	0.88	0.94	0.96	0.99	0.95	0.96
						$T=20$						
30	0.79	0.82	0.83	0.98	0.87	0.89	0.92	0.94	0.95	0.99	0.95	0.96
100	0.80	0.84	0.87	0.98	0.85	0.89	0.93	0.95	0.96	0.99	0.95	0.96
300	0.80	0.84	0.88	0.99	0.85	0.89	0.93	0.95	0.96	1.00	0.95	0.96
						$T=30$						
30	0.84	0.84	0.85	0.98	0.87	0.89	0.94	0.94	0.95	0.99	0.95	0.96
100	0.86	0.84	0.88	0.99	0.85	0.89	0.95	0.95	0.96	1.00	0.95	0.96
300	0.86	0.84	0.88	0.99	0.85	0.89	0.96	0.95	0.96	1.00	0.95	0.96

Simulations - Results

- Generally, new measures have higher rank-order correlations
- Population means outperform α.
- New measures do well in short return histories
- Also, new measures have higher correlation with population α (next table)
- Mean-Squared Error is low for new measures in short horizon

Simulations - Results

Table II

Panel A: Rank Correlations with Traditional Skill (α)

	$N = 30$						$N = 100$					
M	$\hat{\alpha}$	$\hat{\alpha}^B$	$\hat{\delta}^*$	$\hat{\delta}^{**}$	δ^*	δ^{**}	$\hat{\alpha}$	$\hat{\alpha}^B$	$\hat{\delta}^*$	$\hat{\delta}^{**}$	δ^*	δ^{**}
$T = 1$												
30	0.32	0.32	0.41	0.40	0.96	0.95	0.49	0.49	0.67	0.68	0.98	0.98
100	0.33	0.33	0.48	0.47	0.98	0.97	0.50	0.50	0.80	0.80	0.99	0.98
300	0.33	0.33	0.52	0.51	0.99	0.97	0.50	0.50	0.84	0.84	0.99	0.99
$T = 5$												
30	0.55	0.55	0.66	0.65	0.89	0.91	0.78	0.78	0.90	0.91	0.96	0.96
100	0.56	0.56	0.75	0.76	0.88	0.91	0.79	0.79	0.94	0.95	0.96	0.97
300	0.57	0.57	0.78	0.80	0.87	0.91	0.80	0.80	0.95	0.96	0.95	0.97
$T = 10$												
30	0.68	0.68	0.77	0.77	0.88	0.90	0.87	0.87	0.93	0.94	0.95	0.96
100	0.69	0.69	0.82	0.84	0.87	0.90	0.88	0.88	0.95	0.96	0.95	0.96
300	0.70	0.70	0.83	0.87	0.86	0.90	0.89	0.89	0.95	0.96	0.95	0.96
$T = 30$												
30	0.85	0.85	0.85	0.86	0.88	0.90	0.95	0.95	0.95	0.95	0.95	0.96
100	0.86	0.86	0.85	0.88	0.86	0.89	0.95	0.95	0.95	0.96	0.95	0.96
300	0.87	0.87	0.85	0.89	0.85	0.89	0.96	0.96	0.95	0.96	0.95	0.96

Simulations - Results

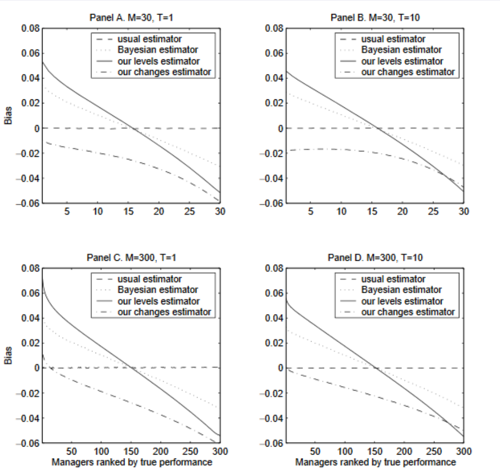
Table II

Panel B: Mean Squared Errors

	$N = 30$						$N = 100$					
M	$\hat{\alpha}$	$\hat{\alpha}^B$	$\hat{\delta}^*$	$\hat{\delta}^{**}$	δ^*	δ^{**}	$\hat{\alpha}$	$\hat{\alpha}^B$	$\hat{\delta}^*$	$\hat{\delta}^{**}$	δ^*	δ^{**}
						$T = 1$						
30	2.65	1.71	1.48	0.75	0.11	0.11	0.78	0.53	0.49	0.23	0.09	0.12
100	2.61	1.65	1.40	0.52	0.12	0.10	0.78	0.52	0.49	0.19	0.10	0.13
300	2.62	1.65	1.40	0.47	0.12	0.10	0.78	0.52	0.49	0.19	0.10	0.13
						$T = 5$						
30	0.53	0.36	0.36	0.23	0.09	0.09	0.16	0.13	0.17	0.11	0.08	0.08
100	0.53	0.36	0.35	0.17	0.09	0.09	0.16	0.13	0.17	0.10	0.09	0.08
300	0.52	0.35	0.35	0.15	0.10	0.09	0.16	0.13	0.17	0.10	0.10	0.08
						$T = 10$						
30	0.26	0.20	0.22	0.16	0.08	0.10	0.08	0.08	0.12	0.10	0.08	0.08
100	0.26	0.19	0.22	0.13	0.09	0.09	0.08	0.08	0.13	0.09	0.09	0.08
300	0.26	0.19	0.22	0.12	0.09	0.09	0.08	0.08	0.13	0.09	0.09	0.08
						$T = 30$						
30	0.09	0.09	0.13	0.12	0.08	0.10	0.03	0.05	0.10	0.09	0.08	0.08
100	0.09	0.08	0.13	0.10	0.09	0.09	0.03	0.05	0.10	0.09	0.09	0.09
300	0.09	0.09	0.13	0.10	0.09	0.09	0.03	0.05	0.11	0.09	0.09	0.09

Simulations - Results

Figure 1



Empirical Analysis

Data

- CRSP mutual fund data (returns net of fees)
- Add fees back in with annual expense ratio
- Spectrum Data from Thomson Financial on WRDS
  - Allows for access to holding reports
  - merge with CRSP via *hand matching*
- Quarterly Data
- April 1982 - September 2002

Empirical Analysis

Steps

1. Compute traditional alpha $\hat{\alpha}$
2. Using $\hat{\alpha}$ as reference, compute $\hat{\delta}^{*}$ and $\hat{\delta}^{**}$
3. Compute nine versions of each measure - with three benchmark models and three lookback periods.
4. Sort funds into decile portfolios at the beginning of each quarter, equal weighting.

Empirical Analysis Results

- All three measures capable of predicting future returns
- Persistence in performance weakens when momentum benchmark is included
- Most predictive power achieved with $\hat{\delta}^*$

Empirical Analysis

Table 3

	Decile										
	1	2	3	4	5	6	7	8	9	10	10-1
Panel A: Sorting Funds by Past 12 Months of Performance											
Fama–French Alphas											
$\hat{\alpha}$	−1.62	−0.39	0.00	0.15	0.43	0.75	0.94	1.19	1.62	3.57	5.19
	(−1.62)	(−0.57)	(0.00)	(0.30)	(0.87)	(1.44)	(1.84)	(2.13)	(2.31)	(3.57)	(3.67)
$\hat{\delta}^{+}$	−1.87	−0.91	−0.75	−0.24	−0.01	−0.01	0.18	2.00	2.72	5.48	7.36
	(−1.30)	(−0.87)	(−1.03)	(−0.42)	(−0.02)	(−0.01)	(0.33)	(2.81)	(2.86)	(4.11)	(3.23)
$\hat{\delta}^{++}$	−1.13	−0.27	−0.12	0.37	0.53	0.07	0.97	0.75	1.51	3.32	4.45
	(−1.23)	(−0.45)	(−0.21)	(0.67)	(1.08)	(0.17)	(1.77)	(1.34)	(2.23)	(3.63)	(4.53)
Four-Factor Alphas											
$\hat{\alpha}$	−1.21	−0.63	0.19	1.13	0.89	0.29	0.65	1.05	1.81	2.48	3.69
	(−1.20)	(−0.80)	(0.31)	(2.13)	(1.81)	(0.54)	(1.29)	(1.68)	(2.63)	(2.60)	(2.64)
$\hat{\delta}^{+}$	−1.58	−0.89	−0.29	−0.11	0.51	0.72	0.67	1.97	1.33	4.30	5.88
	(−1.14)	(−0.81)	(−0.38)	(−0.17)	(0.91)	(1.32)	(1.25)	(2.56)	(1.37)	(3.46)	(2.73)
$\hat{\delta}^{++}$	−0.60	−0.20	0.30	0.38	0.54	0.76	0.18	0.86	1.15	2.92	3.52
	(−0.62)	(−0.31)	(0.47)	(0.81)	(1.10)	(1.56)	(0.32)	(1.55)	(1.66)	(3.11)	(3.25)

Empirical Analysis

New info not contained in α?

- Perform conditional sorts into quintiles based on $\hat{\alpha}$ and then $\hat{\delta}^*$.
- Look chiefly at average of portfolios that buy funds with high $\hat{\delta}^*$ and shorts low $\hat{\delta}^*$ within a given $\hat{\alpha}$ quintile
- Appears that there is info contained in $\hat{\delta}^*$ not in $\hat{\alpha}$.

Empirical Analysis

Table IV

Panel A: Sorting Funds by $\hat{\alpha}$ and Then by $\hat{\delta}^*$

Quintile of $\hat{\delta}^*$	Quintile of $\hat{\alpha}$: 1	2	3	4	5	Avg.	Quintile of $\hat{\alpha}$: 1	2	3	4	5	Avg.
	Fama–French Alphas						Four-Factor Alphas					
1	−2.89	−0.58	−0.12	0.12	−0.18	−0.73	−1.55	−0.95	0.05	−0.76	0.40	−0.56
2	−1.61	−1.79	−0.53	0.46	0.54	−0.59	−1.28	−0.23	−1.08	−0.01	1.18	−0.28
3	−1.73	0.21	0.14	−0.55	2.18	0.05	−2.05	1.21	0.58	0.81	1.28	0.37
4	−1.05	0.22	0.61	0.77	3.77	0.86	−0.85	1.20	0.95	1.81	2.29	1.08
5	2.34	2.40	2.60	4.65	6.58	3.71	1.22	2.27	1.91	2.78	5.41	2.72
5-1	5.22	2.98	2.72	4.53	6.76	4.44	2.77	3.22	1.86	3.54	5.01	3.28
t-stat	(2.68)	(1.66)	(1.74)	(2.58)	(3.38)	(2.77)	(1.57)	(1.66)	(1.09)	(2.00)	(2.66)	(2.06)

Panel B: Sorting Funds by $\hat{\delta}^*$ and Then by $\hat{\alpha}$

Quintile of $\hat{\alpha}$	Quintile of $\hat{\delta}^*$: 1	2	3	4	5	Avg.	Quintile of $\hat{\delta}^*$: 1	2	3	4	5	Avg.
	Fama–French Alphas						Four-Factor Alphas					
1	−2.24	−0.05	0.24	2.00	3.83	0.76	−1.37	−0.90	1.42	1.01	2.36	0.51
2	−2.51	−0.21	0.21	1.52	3.64	0.53	−1.94	0.08	1.05	1.47	2.16	0.56
3	−0.87	−1.26	0.44	0.80	3.66	0.56	−1.19	0.67	0.70	1.63	2.96	0.95
4	−0.94	−0.82	−0.35	0.08	3.22	0.24	−1.12	−0.01	−0.08	1.37	2.83	0.60
5	−0.41	−0.08	−0.36	0.95	6.28	1.28	−0.54	−0.93	0.06	1.09	3.87	0.71
5-1	1.84	−0.04	−0.60	−1.04	2.45	0.52	0.83	−0.04	−1.36	0.08	1.51	0.20
t-stat	(1.49)	(−0.04)	(−0.67)	(−1.07)	(2.61)	(0.82)	(0.68)	(−0.05)	(−1.53)	(0.08)	(1.51)	(0.33)

Empirical Analysis

Useful to Investors?

- Examine “feasible” portfolio strategies.
- Holdings info available to investors comes with a lag
- Form measures on lagged data, using t to predict returns in $t+4$ through $t+6$
  - Normally $t+1$ through $t+3$
- Do double sorts again
- Measures are still helpful, even with lag

Empirical Analysis

Table IX

	Fama–French Alphas						Four-Factor Alphas					
Panel A: Sorting Funds by $\hat{\alpha}$ and Then by $\hat{\delta}^{*}$												
Quintile of $\hat{\delta}^{*}$	Quintile of $\hat{\alpha}$: 1	2	3	4	5	Avg.	Quintile of $\hat{\alpha}$: 1	2	3	4	5	Avg.
1	−3.61	−1.03	−1.16	0.21	0.73	−0.97	−3.03	−0.67	−0.20	−0.67	−0.21	−0.95
2	−0.85	−0.64	−0.07	0.82	1.01	0.06	−1.08	0.22	−0.29	0.30	0.83	0.00
3	−0.33	0.60	0.34	−0.03	2.42	0.60	0.15	0.62	0.28	0.44	1.83	0.66
4	−0.59	0.19	−0.30	0.62	3.37	0.66	−0.12	1.29	0.86	0.01	1.41	0.69
5	1.18	0.71	1.43	1.47	5.60	2.08	0.49	0.45	1.74	1.56	5.05	1.86
5-1	4.79	1.74	2.59	1.27	4.87	3.05	3.51	1.11	1.94	2.23	5.26	2.81
t-stat	(3.07)	(1.35)	(2.11)	(0.98)	(2.76)	(2.56)	(2.09)	(0.79)	(1.48)	(1.68)	(3.20)	(2.20)
Panel B: Sorting Funds by $\hat{\alpha}$ and Then by $\hat{\delta}^{**}$												
Quintile of $\hat{\delta}^{**}$	Quintile of $\hat{\alpha}$: 1	2	3	4	5	Avg.	Quintile of $\hat{\alpha}$: 1	2	3	4	5	Avg.
1	−1.43	−0.38	−0.82	0.89	1.55	−0.04	−1.82	0.04	0.21	−0.06	1.40	−0.05
2	−0.47	1.12	0.08	0.42	0.97	0.43	−0.55	0.76	0.31	−0.45	1.03	0.22
3	−0.59	−0.40	0.88	1.36	3.40	0.93	0.39	0.34	0.58	0.56	1.79	0.73
4	−0.09	0.15	0.75	0.76	2.31	0.78	0.83	1.51	0.30	1.57	0.59	0.96
5	0.06	−0.23	−0.73	−0.62	3.51	0.40	−1.05	0.61	0.33	−0.71	3.68	0.57
5-1	1.49	0.15	0.08	−1.51	1.95	0.43	0.78	0.57	0.12	−0.65	2.28	0.62
t-stat	(1.31)	(0.19)	(0.09)	(−2.06)	(1.62)	(0.82)	(0.70)	(0.61)	(0.14)	(−0.80)	(2.11)	(1.17)