Judging Fund Managers by the Company They Keep

Cohen, Coval, and Pastor (2005)

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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 hoilding 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

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

Measure Based on Levels of Holdings

Intuition

Equation (1) and (2) say the quality of stock n is the average skil 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 simiply a loose measure of covariance between the weights of one manager with another.
- 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

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

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

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 sotck 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

- Example: Stocks of high quality are those that wre recently bought mostly by high-skill managers and sold by low-skill managers

Measure Based on Changes in Holdings

Hence, our trade-based skill measure is

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

where

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

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

This is the difference between the average quality of stocks recently bought by manager *m* and the average quality of the stocks recently sold by this manager.

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:

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

where $\mu_{n,t}$ is the stocks'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 se 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 - Result

Table 1

	N = 30						N = 100					
Rank Correlations with True Skill (γ)												
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