Performance Measurement

Chapter 18

Key Points: Performance Measures

1. We should not compare past returns. We need to account for risk.
   - Positive relation between risk and performance

2. Different measures for different aspects of risk
   - Total Risk: Sharpe Ratio
   - Passive Risk (following a benchmark): Treynor Ratio
   - Active Risk (deviating from a benchmark): Jensen's α or information ratio

3. Different measures for different purposes
   - Choosing among optimal portfolios: Sharpe Ratio
   - Choosing among portfolios/Assets to add to the optimal portfolio: Treynor Ratio
   - To measure the value added of a manager: Jensen's α or information ratio

Key Points: Performance Attribution + Reality

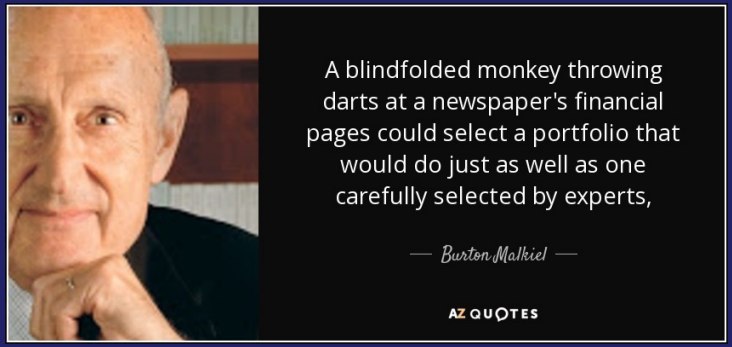
4. Performance Attribution: a tool to decompose overall performance into three components
   - 1 Asset allocation choices (Equity vs. bonds vs. cash)
   - 2 Sector Choice within each asset class (within equity, tech or consumer)
   - 3 Security choice within each sector (within tech, Alibaba or Apple)

5. Reality Check
   - It is hard to disentangle skill from luck
   - Alpha is very sensitive to the model used
   - Evidence for manager skill is weak
     - Low persistence in performance
     - If skillful, most not skillful enough to earn back fees

Performance Appraisal

- My fund earned an 9% return last year.
  - Is this good or bad?
- Compared to what?
  - Opportunity cost: compared to a similar foregone alternative
  - What makes investments similar?
- Compare to a benchmark or model to reflect the risk-return relationship for normal returns
  - CAPM, APT, Fama-French
  - Test for a statistically significant difference in abnormal returns.
    - "statistically significant" = <5% chance that random (note: 5% is arbitrary/convention)

Example: Is Investing No Monkey Business?



- Researchers at Research Affiliates (Investment advisors):
  - Simulated 100 monkeys throwing 30 darts at 1000 large stocks
  - Formed an equally weighted portfolio
  - Repeated every year from 1964 to 2010
- Compared to the 1000-stock value-weighted portfolio
  - 98 of 100 “monkeys” beat the market
  - Average monkey outperformed the market by 1.7%

may put weight small stock → may have higher return

https://www.researchaffiliates.com/en_us/publications/journal-papers/p_2013_aug_surprising_alpha.html
https://www.forbes.com/sites/rickferri/2012/12/20/any-monkey-can-beat-the-market/#6c1d8928630a

How do we know our fund manager is earning their keep?

Return-based performance measures

1. Simple Benchmark
2. Sharpe Ratio
3. M^2 Measure
4. Treynor Ratio
5. Alpha
6. Information Ratio

- Each measure captures different aspects of the risk-return relation
  - Depending on what is important to you, different measures can be better or worse.

1. Simple Benchmark

- Unambiguous
  - Names and weights in securities are known in advance
- Tradable
  - It should be an easy passive option for the manager
- Measurable
  - Must be possible to calculate return periodically
- Appropriate
  - Must reflect the manager's style, i.e. the fund's risk exposures(s)

1. Simple Benchmark: Example

- Suppose you want to evaluate the performance of a portfolio comprised mainly of large, listed Australian stocks.

- What would make a good benchmark?
  - ASX200 Index
  - Even more fair: An ASX200 ETF.

good, but can't be traded

1. Simple Benchmark: Problems

- Is the benchmark, truly the next best alternative?
- It is easy to game a benchmark.
  - How do we know that the benchmark truly has the same risk?
- Solutions:
  1. Use Style Analysis to assign or check the benchmark
     - This is what Morningstar does.
  2. Assume a particular model of behavior or asset pricing
     - Sharpe Ratio, M^2, Treynor Ratio, Alpha, Information Ratio

Style Analysis

- How to interpret the fund with risk exposures
- $r_{i,t} - r_{f,t} = \alpha_i + \beta_{M,i}(r_{M,t} - r_{f,t}) + \beta_{SMB,i} SMB_t + \beta_{HML,i} HML_t + \varepsilon_{i,t}$
- $r_{i,t} - r_{f,t} = 0.01 + 1.1(r_{M,t} - r_{f,t}) + 0.3SMB_t - 0.2HML_t + \varepsilon_{i,t}$
  - R^2 is 73%

over-weighting small stock

over-weighting growth stock

- Style analysis: '*walks like a duck*'
  - High market beta
  - Overweight small and growth stocks
  - Relatively high idiosyncratic risk
    - Other risk factors, e.g., momentum?

Style Analysis

- The idea is to make sure that the chosen benchmark and the fund to be evaluated load similarly on the risks.
  - This is how Morningstar.com.au does it
- An alternate method is NOT to use factor models, but instead examine any portfolio return to see how the fund is correlated.
  - For example:
    - Oil, Coal, Large stock, Value stock, Pharmaceuticals, etc…
- Or just assume a particular model of behavior or asset pricing
    - Sharpe Ratio, M^2, Treynor Ratio, Alpha, Information Ratio

2. Sharpe Ratio

- When selecting an optimal, complete portfolio, we care about the **total** risk
  - Assuming mean-variance optimizing investors, total risk (standard deviation or variance) is the right measure of risk.

- Realized Sharpe Ratio:

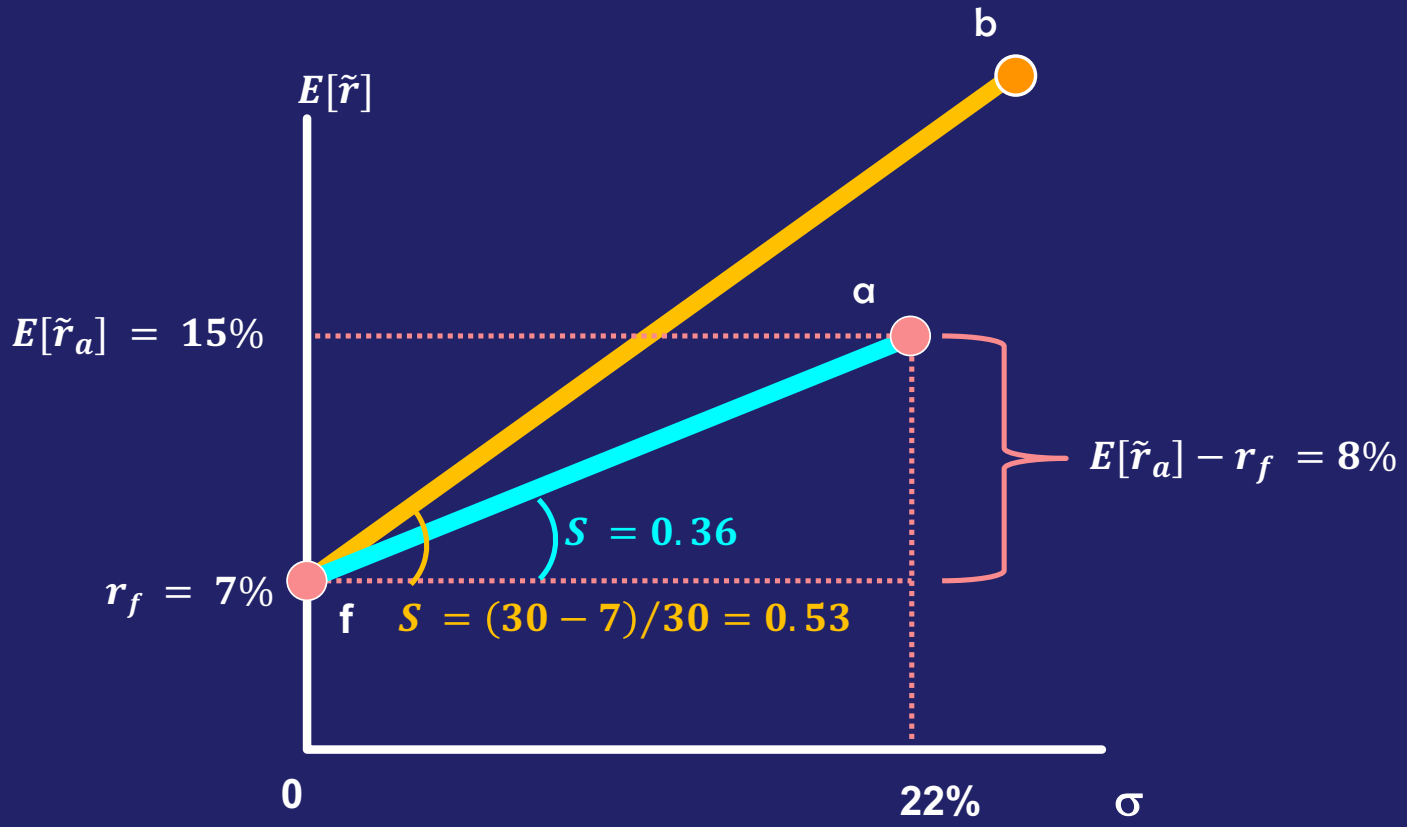
historic average return → if we believe iid, then average will cancel error and close to true value

$$Sharpe\ Ratio = \frac{\bar{r}_P - \bar{r}_f}{\sigma_P}$$

Why are these historic average returns when we care about future (expected) returns?

  - Returns and standard deviation should be measured over the same period.

The better price of risk: Choosing between portfolios a and b?



Morningstar Fund Report

AB Managed Volatility Equities

Retail

Fund Report | Report generated 30 Sep 2019 | Read the Analyst Research Report

Performance

31 Aug 2019

Growth of $10,000

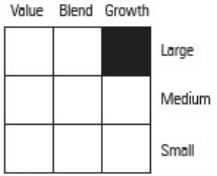
- Fund: AB Managed Volatility Equities
- Index: S&P/ASX 200 TR AUD
- Category: Equity Australia Large Blend

Financial Year Total Returns

	Jun-17	Jun-18	Jun-19	Aug-19
Fund	11.46	13.83	11.85	3.56
+/- Cat	-1.35	0.66	4.62	2.87
+/- Index	-2.63	0.81	0.30	3.05

Current Investment Style

as at 31 Aug 2019



Size | Large **Style** | Growth

Asset Allocation

% as at 31 Aug 2019

Domestic Equity	76.496
International Equity	19.503
Listed Property	0.000
Unlisted Property	0.000
Domestic Fixed Interest	0.000
International Fixed Interest	0.000
Cash	4.001
Other	0.000

https://www.morningstar.com.au/Funds/FundReport/40678

Trailing Total Returns

as at 31 Aug 2019

	Total Return	+/- Cat	+/- Index	Cat Rank
1 Month	0.31	2.50	2.67	7 / 354
3 Month	8.44	4.70	4.21	6 / 353
1 Year	13.34	7.89	4.30	4 / 347
3 Year	12.32	2.71	0.95	16 / 311
5 Year	13.22	6.58	5.32	1 / 291

Risk Analysis

as at 31 Aug 2019

3-Year Risk Measures	Fund	Category	Index
Standard Deviation	7.83	9.14	8.8
Sharpe Ratio	1.3	0.85	1.07
R-Squared	68.81	88.27	--
Beta	0.74	0.97	--
Alpha	3.24	-1.48	--

Fees & Expenses

One-Time

Entry Fee/Contribution Fee	0.00%
Exit Fee/Withdrawal Fee	0.00%
Buy/Sell Spread	0.5068

Annual

ICR pa (30 Jun 2019)	0.5500
Max Management Fee pa	0.55%
Max Admin Fee pa	0.00%
Performance Fee pa (30 Jun 2019)	0.00%
Max Brokerage	0.0000

https://www.morningstar.com.au/Funds/FundReport/40678

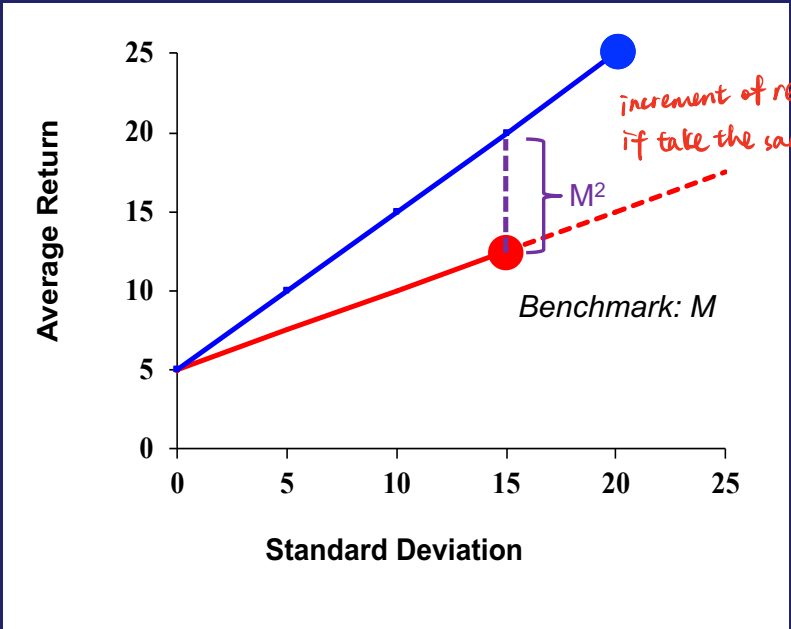
M^2 Measure

- Problem with the Sharpe ratio:
  - Suppose one fund has a Sharpe ratio of 0.74 and another of 0.69
  - What does the 0.05 difference mean?

$$M^2 = (S_P - S_M)\sigma_M$$

- Intuitively, M^2 is the extra reward you get if you invest in portfolio P and take only σ_M amount of risk.
  - Your book walks through the math

M^2: Pictorially



Risk-Adjusted Measures

- The Sharpe ratio and the M^2 measure are good only for choosing your optimal risky portfolio to mix with risk-free assets.

- If you are considering the performance of a portfolio or asset you are considering adding to an already well diversified portfolio:

4. Treynor Ratio
5. Alpha
6. Information Ratio *also called the Appraisal Ratio*

4. Treynor Ratio: Assuming (CAPM or 1-Factor APT)

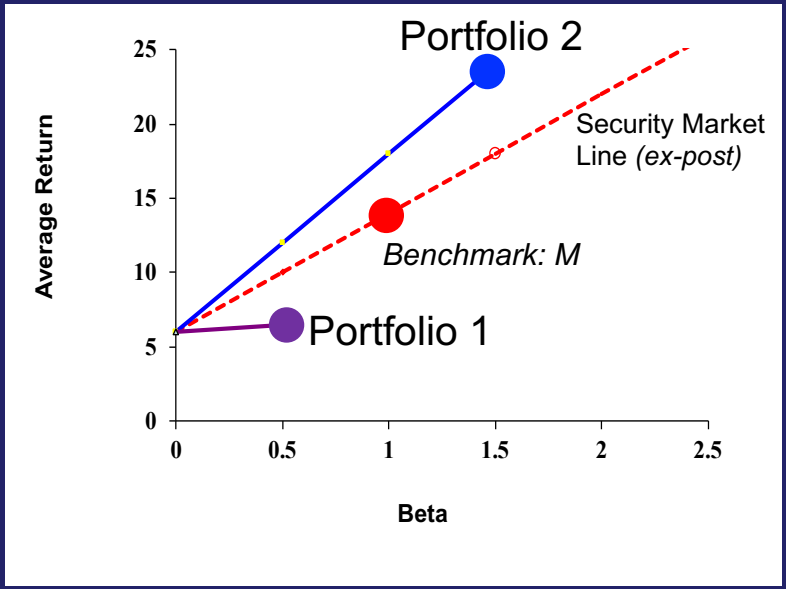
- Treynor compares the excess return per unit of beta with that of its benchmark, M

reward for systematic risk

$$T_p = \frac{\bar{R}_p - \bar{r}_f}{\beta_p} \text{ vs. } T_M = \frac{\bar{R}_M - \bar{r}_f}{\beta_M}$$

only work for one benchmark

- Which is better 1 or 2?
- Who got a better price for systematic risk taken?



5. Alpha

- The return of a fund has two components:
  - Systematic/Passive
  - Active

$$r_{P,t} = \alpha_P + r_f + \beta_P\left(r_{F,t} - r_f\right) + \varepsilon_{P,t} \approx \alpha_P + \beta_P\left(r_{F,t}\right) + \varepsilon_{P,t}$$

in practical, small and less impact on β_P. throw away

α on average

$$r_{P,t} = \beta_P\left(r_{F,t}\right) + \alpha_P + \varepsilon_{P,t}$$

0 on average

Systematic/Passive Active

$$\sigma_i^2 = \beta_i^2\sigma_M^2 + \sigma_{\varepsilon_i}^2$$

Systematic Risk Active Risk

Trailing Total Returns

as at 31 Aug 2019

	Total Return	+/- Cat	+/- Index	Cat Rank
1 Month	0.31	2.50	2.67	7 / 354
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R-Squared	68.81	88.27	--
Beta	0.74	0.97	--
Alpha	3.24	-1.48	--

seems good

Fees & Expenses

One-Time

Entry Fee/Contribution Fee	0.00%
Exit Fee/Withdrawal Fee	0.00%
Buy/Sell Spread	0.5068

Annual

ICR pa (30 Jun 2019)	0.5500
Max Management Fee pa	0.55%
Max Admin Fee pa	0.00%
Performance Fee pa (30 Jun 2019)	0.00%
Max Brokerage	0.0000

https://www.morningstar.com.au/Funds/FundReport/40678

Retail

Trailing Total Returns

as at 31 Aug 2019

	Total Return	+/- Cat	+/- Index	Cat Rank
1 Month	-2.84	-0.65	-0.48	304 / 354
3 Month	4.06	0.32	-0.18	150 / 353
1 Year	5.01	-0.44	-4.03	194 / 347
3 Year	10.76	1.14	-0.62	92 / 311
5 Year	6.84	0.21	-1.05	117 / 291

Risk Analysis

as at 31 Aug 2019

3-Year Risk Measures	Fund	Category	Index
Standard Deviation	9.62	9.14	8.8
Sharpe Ratio	0.93	0.85	1.07
R-Squared	95.72	88.27	--
Beta	1.07	0.97	--
Alpha	-1.15	-1.48	--

easily replicated with benchmark portfolio

Fees & Expenses

One-Time

Entry Fee/Contribution Fee	0.00%
Exit Fee/Withdrawal Fee	0.00%
Buy/Sell Spread	0.4008

Annual

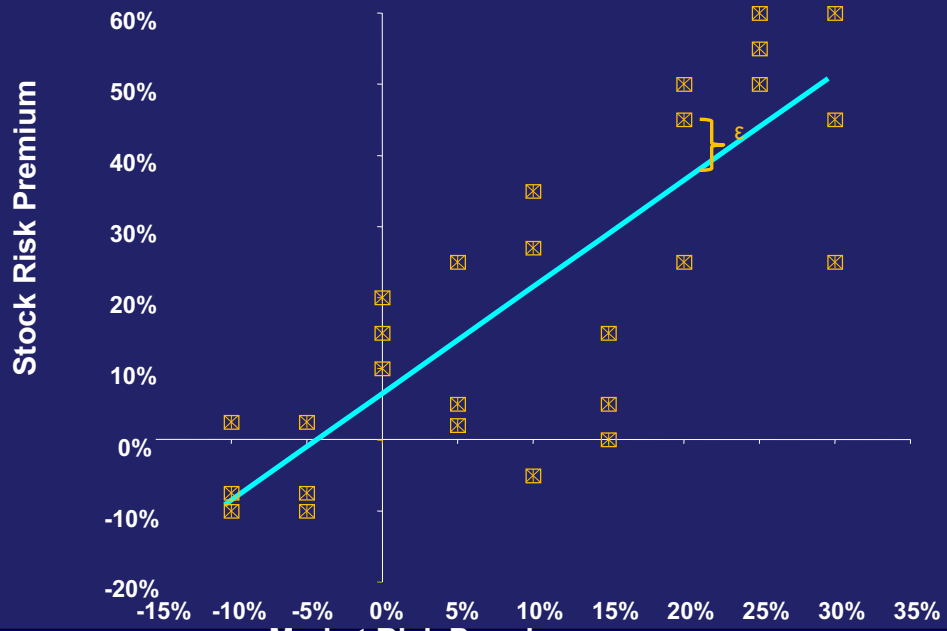
huge fee

ICR pa (30 Jun 2018)	2.0895
Max Management Fee pa	1.85%
Max Admin Fee pa	0.00%
Performance Fee pa (30 Jun 2018)	--
Max Brokerage	0.0000

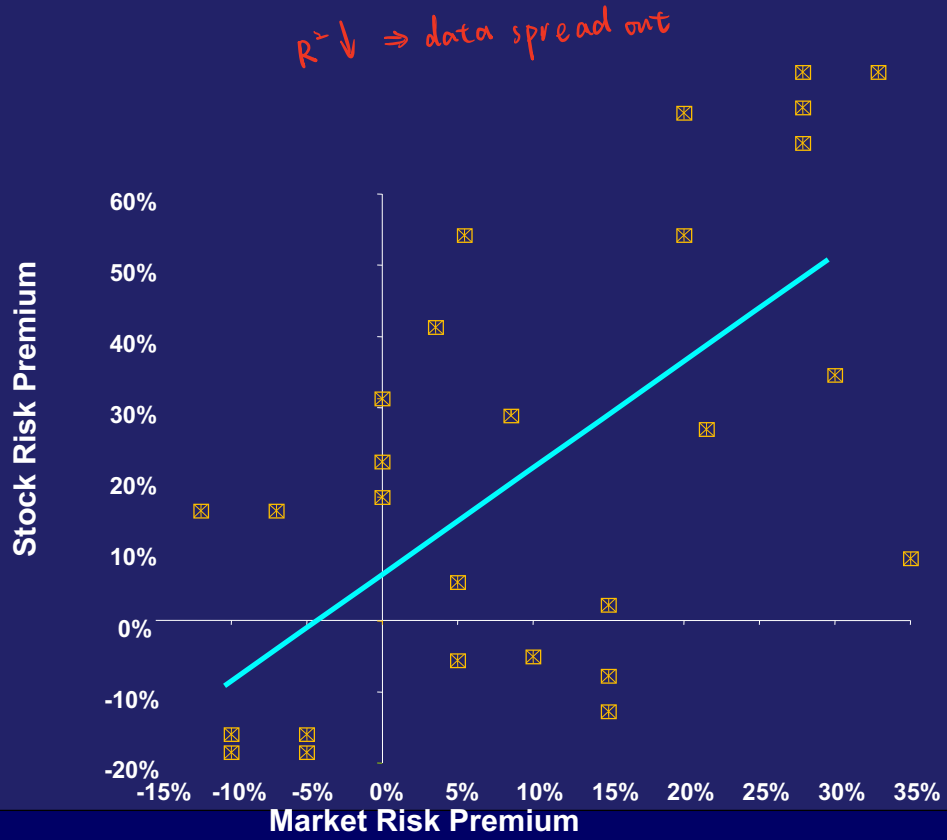
https://www.morningstar.com.au/Funds/FundReport/9105

High R^2: Security Characteristic Line

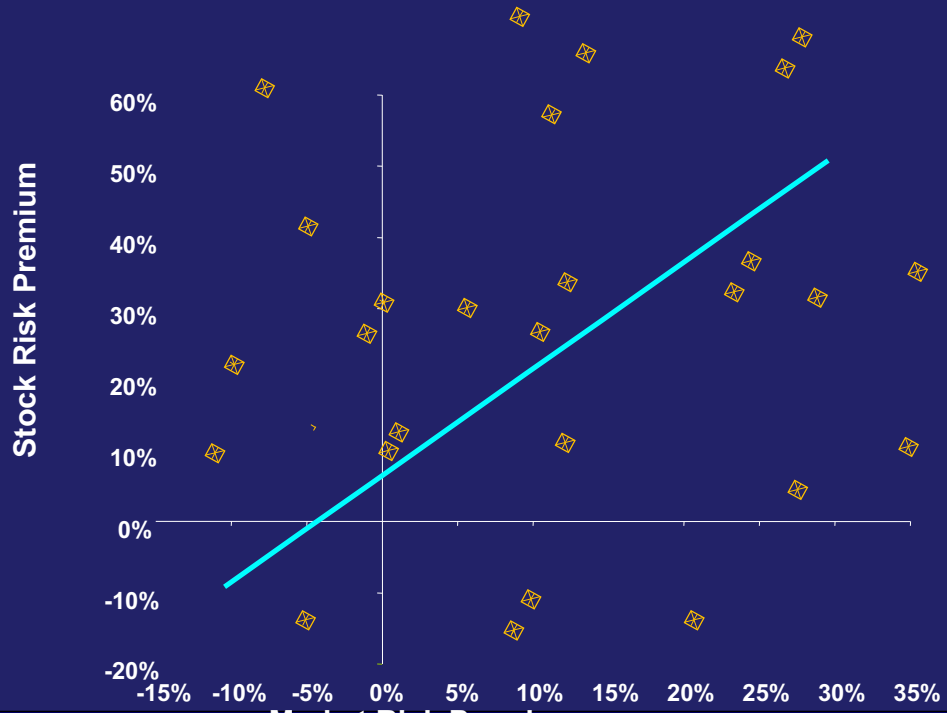
$R^2 \uparrow \Rightarrow$ data are closely around the regression line



Low R^2: Security Characteristic Line



Very Low R^2: Security Characteristic Line



5. Alpha

$$r_{P,t} = \beta_P(r_{F,t}) + \alpha_P + \varepsilon_{P,t}$$

Systematic/Passive Active

$$\sigma_P^2 = \beta_i^2 \sigma_F^2 + \sigma_{\varepsilon_P}^2$$

Systematic Risk Active Risk

- The closer β is to 1, the more similar the risk of the portfolio is to the benchmark
- The higher R^2 is the more the portfolio can be replicated by the benchmark or passive portfolio.

The definition of alpha depends on the asset pricing model

- Alpha tells us how much return we get over and above our compensation for risk

- CAPM alpha

$$E[\tilde{r}_i] - r_f = \alpha_i + \beta_{M,i}\left(E[\tilde{r}_M] - r_f\right)$$

$$\alpha_i = \bar{r}_i - \beta_{M,i}\left(\bar{r}_M - \bar{r}_f\right) - \bar{r}_f$$

- Fama-French 3-factor alpha

$$E[\tilde{r}_i] - r_f = \alpha_i + \beta_{M,i}\left(E[\tilde{r}_M] - r_f\right) + \beta_{SMB,i}E\left[\widetilde{SMB}\right] + \beta_{HML,i}E\left[\widetilde{HML}\right]$$

$$\alpha_i = \bar{r}_i - \beta_{M,i}\left(\bar{r}_M - \bar{r}_f\right) + \beta_{SMB,i}\bar{r}_{SMB} + \beta_{HML,i}\bar{r}_{HML}$$

Example: Calculating Alpha in Excel

= managed funds

- One of the oldest mutual funds in the US:
  - American Funds American Balanced Fund, Class A. (2010-2018)

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.975					
R Square	0.951	R^2 ↑				
Adjusted R Square	0.949					
Standard Error	0.00535332					
Observations	114					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	4	0.060570692	0.015142673	528.3918405	2.28564E-70	
Residual	109	0.003123726	2.8658E-05			
Total	113	0.063694418				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept α	0.001029	0.000532	1.936	0.056	-0.000025	0.002083
rm-rf	0.632496	0.014507	43.599	0.000	0.603743	0.661249
SMB	-0.142830	0.023781	-6.006	0.000	-0.189963	-0.095697
HML	-0.011781	0.024628	-0.478	0.633	-0.060593	0.037031
WML	-0.013629	0.017592	-0.775	0.440	-0.048495	0.021236

low β

Interpreting α

- If the model (CAPM, Fama-French, etc.) is correct, we **expect** α to be zero.

if $\alpha \neq 0$ { model is wrong
model is right & manager find some underpriced (overpriced) stock
model is wrong, manager loads extra risk

- We run a regression, like on the previous slide, using gross returns (**ignoring fees**) and find α is:
  - Insignificantly different ~~from~~ 0:
    - There is no evidence of particular asset or strategy picking skill by the manager.
  - Significantly negative:
    - Suggests the manager has a perverse skill to pick underperforming assets/strategies
  - Significantly positive:
    - Suggests the fund manager has skill picking assets for the portfolio

- This interpretation is only as valid as the model.

$\alpha > 0$ could also mean that the model is wrong, and the manager is loading on unmodeled risks.

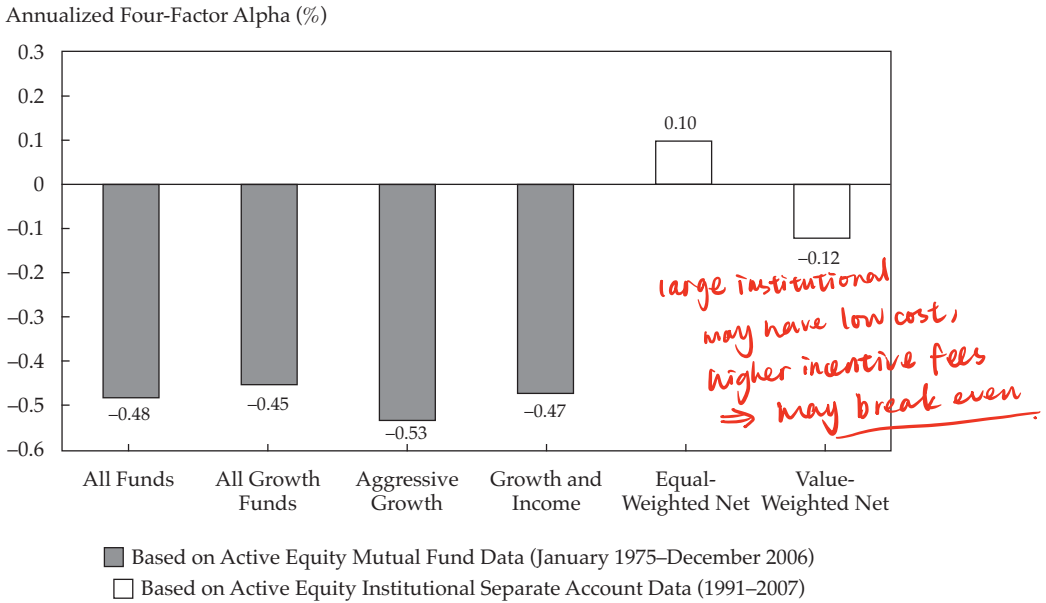
Alphas and Managed Funds

- α can be interpreted (when using gross returns to calculate fund returns) as the maximum you should be willing to compensate a fund manager.

- Some would argue, that the risk-return model you use to compute α should only reflect modeled risks that you can trade easily.
  - This way α represents the returns you cannot replicate yourself with ETFs or other simple and cheap portfolios.
  - For example, if you can't easily trade a momentum strategy, the you shouldn't use the Carhart 4-factor model.

Managed/Mutual Fund α's – Returns are net of fees

Figure 1. Four-Factor Alphas for Active Equity Mutual Funds and Active Equity ISAs, Net of Fees and Expenses



Sources: Barras, Scaillet, and Wermers (2010) for mutual fund data; Busse, Goyal, and Wahal (2010) for ISA data.

Alphas and Portfolio Rankings

- Alpha does not account for risk.
- Consider:
  - A fixed-income manager with an alpha of 1.5%
  - A growth-stock manager with an alpha of 1.75%
  - Given that fixed-income funds usually have lower volatility, is 1.5% worse?
- Alpha can be altered just by changing the amount of leverage
  - But leverage increases risk

6. Information Ratio

- The information ratio is a measure of reward to risk from alpha.

$$IR_P = \frac{\hat{\alpha}_P}{\hat{\sigma}_{\varepsilon P}}$$

alpha from index model

residual standard deviation

Often called the "appraisal ratio" and the variance is the variance of the residual from the regression.

$$IR_P \approx \frac{t_\alpha}{\sqrt{n}}$$

- The Sharpe Ratio of a new risky portfolio that **optimally** mixes your existing fund, M, with a new fund, P, is:

$$S_{New} = \sqrt{S_M^2 + IR_P^2}$$

Example: Calculating Information Ratio in Excel

- One of the oldest mutual funds in the US:
  - American Funds American Balanced Fund, Class A. (2010-2018)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.975
R Square	0.951
Adjusted R Square	0.949
Standard Error	0.00535332
Observations	114

Standard deviation of the residual.

$$IR = \frac{.001029}{.005353} = 0.19224$$

ANOVA

	df	SS	MS	F	Significance F
Regression	4	0.060570692	0.015142673	528.3918405	2.28564E-70
Residual	109	0.003123726	2.8658E-05		
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WML	-0.013629	0.017592	-0.775	0.440	-0.048495	0.021236

Example: Performance evaluation through different lenses

AB Managed Volatility Equities
Retail

Risk Analysis as at 31 Aug 2019

3-Year Risk Measures	Fund	Category	Index
Standard Deviation	7.83	9.14	8.8
Sharpe Ratio	1.3	0.85	1.07
R-Squared	68.81	88.27	--
Beta	0.74	0.97	--
Alpha	3.24	-1.48	--

Alphinity Australian Share Class B
Retail

Risk Analysis as at 31 Aug 2019

3-Year Risk Measures	Fund	Category	Index
Standard Deviation	9.62	9.14	8.8
Sharpe Ratio	0.93	0.85	1.07
R-Squared	95.72	88.27	--
Beta	1.07	0.97	--
Alpha	-1.15	-1.48	--

Recall:

$$\sigma_P^2 = \beta_i^2 \sigma_M^2 + \sigma_{\varepsilon_P}^2$$

$$\hat{\sigma}_\varepsilon \approx \sqrt{\hat{\sigma}_{Fund}^2 - \hat{\beta}^2 \hat{\sigma}_M^2}$$

$$\hat{\sigma}_\varepsilon \approx \sqrt{(.0783)^2 - .74^2\,(.088)^2} = 4.35\%$$

$$IR = \frac{\alpha_{Fund}}{\sigma_\varepsilon} = \frac{3.24}{4.35} = 0.75$$

Strictly:

$$\hat{\sigma}_\varepsilon = \sqrt{\left(\hat{\sigma}_{Fund}^2 - \hat{\beta}^2 \hat{\sigma}_M^2\right)\left(\frac{N-1}{N-2}\right)}$$

Degree of freedom adjustment.

Assuming only 1 regressor

If α came from a 4-factor model, then N-5, not N-2.

Unfortunately, we don't know what N is here

When Sharpe or M^2, when Treynor, when IR?

- The appropriate performance measure depends on what risk is the most relevant.

when choosing optimal portfolio (create complete portfolio).

- The Sharpe ratio and M^2 both capture total risk.
  - Use for choosing among risky portfolios as your optimal portfolio for creating complete portfolios.

when add a stock to a well-diversified portfolio

- Treynor ratio, alpha and the information ratio measure reward incremental to factor or model risk. Use:
  - When considering a mix of well diversified portfolios or
  - When adding assets or portfolios to an already well diversified portfolio.
    - Treynor ratio can only be used with 1-factor asset pricing models
    - The information ratio can be used to rank any additional asset
      - Alpha is used for measuring performance, not for ranking portfolios

(doesn't incorporate any indicator of risk it takes)

Challenges using these measures

- You need many observations to avoid identifying mere luck as skill

- If managers shift the risk of their portfolios over the business cycle, performance evaluation becomes much trickier.
  - For example, if a portfolio manager times the market, then the portfolio beta can significantly change over time.

Performance Attribution

Performance attribution

- In addition to the risk adjusted performance we can identify the main drivers of performance and whether it was
  - Asset allocation (equity vs. bonds vs. cash)
  - Sector choice within each market (within equity, tech vs. consumer goods)
  - Security selection (within tech Alibaba or Apple)

Performance attribution: Some notation

- The return on the bogey (benchmark) portfolio:

$$r_B = \sum_{i=1}^{N} w_{Bi} r_{Bi}$$

- The return on our managed portfolio:

$$r_P = \sum_{i=1}^{N} w_{Pi} r_{Pi}$$

- *i* is an asset class and *N* is the total number of asset classes portfolio

Performance attribution: Step 1 Establish a benchmark

- Step 1: establish a benchmark against which performance ought to be compared (bogey). It measures the returns the portfolio manager would earn if she were to follow a complete passive strategy.

Bogey Performance and Excess Return

$= (.70 \times 5.81) + (.07 \times 1.45) + (.23 \times .48) =$

Component	Benchmark Weight	*Our manager's portfolio*	Return of Index during Month (%)
Equity (S&P 500)	0.60	*.70*	5.81
Bonds (Lehman Bros. Index)	0.30	*.07*	1.45
Cash (money market)	0.10	*.23*	0.48

Bogey = $(0.60 \times 5.81) + (0.30 \times 1.45) + (0.10 \times 0.48) = 3.97\%$

Return of managed portfolio	5.34%
−Return of bogey portfolio	3.97
Excess return of managed portfolio	1.37%

The difference

- The difference between the portfolio and bogey return:

$$r_P - r_B = \sum_{i=1}^{N} w_{Pi} r_{Pi} - \sum_{i=1}^{N} w_{Bi} r_{Bi} = \sum_{i=1}^{N} (w_{Pi} r_{Pi} - w_{Bi} r_{Bi})$$

- *i* is an asset class and *N* is the total number of asset classes portfolio

Performance attribution: Step 2 Asset Allocation

- Step 2: Isolate the effect of the manager's asset allocation choice.
  - Measure the performance of a hypothetical portfolio that would have invested in the same assets as the benchmark, but the manager's allocation.
    - This measures the effect on returns of shifting from 60/30/10 weights to 70/7/23 weights.
  - Returns if the bogey's portfolio was weighted like our manager:

$$(.70\times5.81) + (.07\times1.45) + (.23\times.48) = 4.28\%$$

- Contribution of asset allocation is: 4.28% - 3.97% = 0.31%

Performance attribution: Step 2 Asset Allocation

- More generally, contribution of asset allocation is:

$$= \sum_{i=1}^{N} (w_{Pi} - w_{Bi}) r_{Bi}$$

benchmark portfolio proportion

manager portfolio proportion

A. Contribution of Asset Allocation to Performance

Market	(1) Actual Weight in Market	(2) Benchmark Weight in Market	(3) Excess Weight	(4) Index Return (%)	(5) = (3) × (4) Contribution to Performance (%)
Equity	0.70	0.60	0.10	5.81	.5810
Fixed-income	0.07	0.30	−0.23	1.45	−.3335
Cash	0.23	0.10	0.13	0.48	.0624
Contribution of asset allocation					0.3099

- 0.31% can be attributed to advantageous asset allocation

Performance attribution: Step 2 Asset Allocation

- The contribution from security selection is:

selection in
look at different asset

$$= \sum_{i=1}^{N} w_{Pi}(r_{Pi} - r_{Bi})$$

same weight

	B. Contribution of Selection to Total Performance				
Market	(1) Portfolio Performance (%)	(2) Index Performance (%)	(3) Excess Performance (%)	(4) Portfolio Weight	(5) = (3) × (4) Contribution (%)
Equity	7.28	5.81	1.47	0.70	1.03
Fixed-income	1.89	1.45	0.44	0.07	0.03
Contribution of selection within markets					1.06

  - Note: We could break down Equity and Fixed-income in to sector portfolios to further identify whether returns come for different sectors or different assets within the sector. It gets repetitive.

Value of Active Management

Active vs. Passive Management

It almost goes with out saying:

- Passive management is rule driven management, so stock selection is not considered.
  - There still may be a role for performance evaluation measures like those we just studied to see if a fund is managing the assets particularly badly, or tracking their target portfolio closely
  - But we do not expect there to be exceptional returns to passive management.

- Presumably we choose active managers (and their typically higher fees), precisely because we believe that these managers can give us extra high returns for the same or less risk.

Active Management: Questions

- Does active management add value?

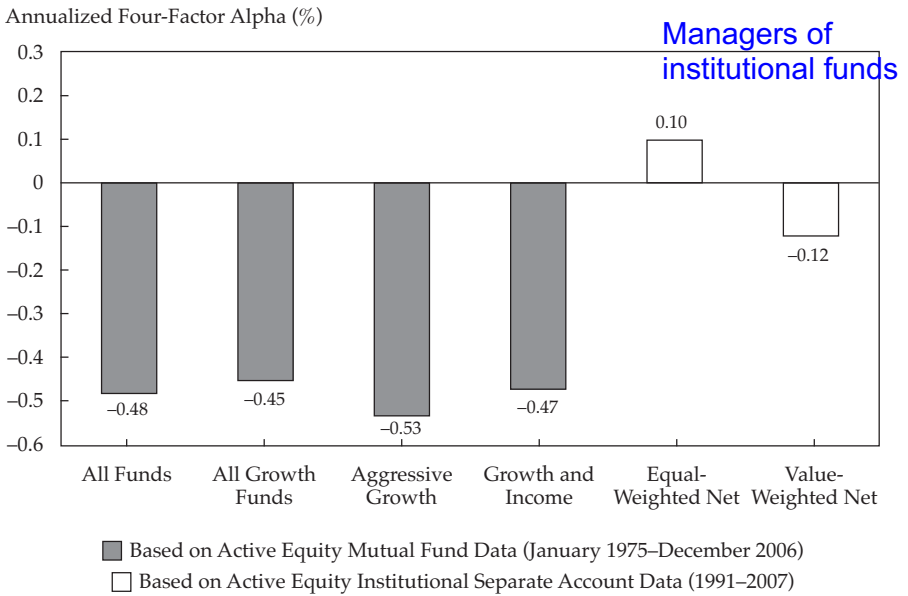
- Can we identify superior asset managers and superior funds ex-ante – before we observe the returns?

Does active management add value?

- On net and on **average**
- Mutual funds must under perform at least by fees and expenses
  - It is a zero sum game: on average they must earn the market – minus costs.
  - In fact, they underperform by more than just their fees.

Performance net of fees

Figure 1. Four-Factor Alphas for Active Equity Mutual Funds and Active Equity ISAs, Net of Fees and Expenses



Sources: Barras, Scaillet, and Wermers (2010) for mutual fund data; Busse, Goyal, and Wahal (2010) for ISA data.

Performance net of fees comment:

- Managers of institutional funds (clear blocks) do better than other active managers.
  - Lower fees
  - Lower cost of account management
  - More performance based pay

- The average non-institutional fund manager does earn a positive alpha (*you cannot see that on the prior chart*)– BUT once you account for fees it all goes away.
  - They do have some ability to pick stock
  - But on average not quite enough ability on average to pay all their fees.

Identifying who is better ex-ante

- Even in a zero sum game, it is possible some can consistently do better.

- Four factors to consider for identifying superior managers:

1. Past Performance
2. Macroeconomic forecasting
3. Fund and manager characteristics
4. Mutual fund holdings

Past Performance: Is skill persistent?

Three Periods of Top Quartile Performance		
Fund Type	# Top Quartile Funds As Of September 2016	Percentage Remaining Top Quartile As Of September 2018
All Domestic Active Mutual Funds	550	7.09%

Source: S&P Dow Jones Indices SPIVA Research, September 2018

Five Periods of Top Quartile Performance		
Fund Type	# Top Quartile Funds As Of September 2014	Percentage Remaining Top Quartile As Of September 2018
All Domestic Active Mutual Funds	561	1.43%

Macroeconomic Forecasting

- Do we see that some managers perform better in some economic environments?
- Can we predict when certain managers will do better?
- The answer appears to be yes.
  - And that suggests a high turnover, high cost strategy of rotating among mutual fund managers

Variation in Manager Ability over Time

- Variation in Manager Ability over Time could be due to:

1. Embedded macroeconomic sensitivity
   - For example, over or under weighting cyclical stocks
2. Time varying skill
3. Time varying opportunities to profit from their skills
   - Example: value investors, like Warren Buffet, performed poorly during the tech boom.

Time-varying benefits strategies

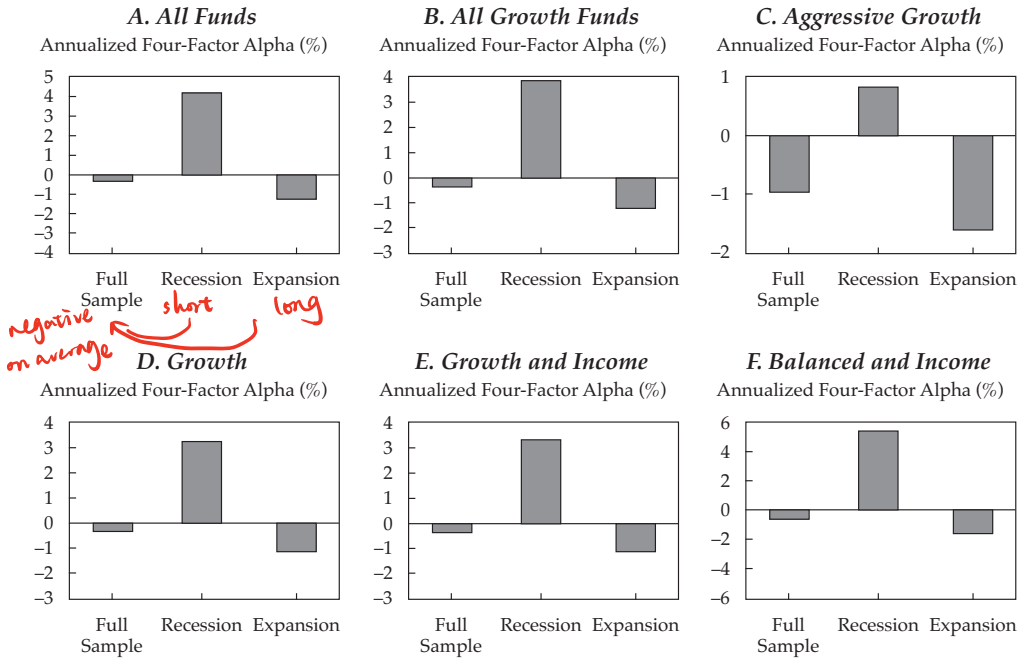
- Most evidence supports the notion that there are time varying benefits to the strategies managers follow.

We see:

- Better performance during recessions
- Better performance when there is higher dispersion in returns
- Better performance when there is higher volatility

Alpha during recessions and expansions

Figure 3. Alpha Performance during Recession and Expansion, 1962–2005



Source: Kosowski (2006).

Predicting Performance with Managerial Characteristics

- These methods involve low levels of turnover and therefore are good for both small and large investors.

- Below I list manager characteristics associate with positive alphas.

Managerial Characteristics: Smarts - learned and innate

- Experienced managers of large funds (above median) outperform less experienced managers by 92 basis points per year.
  - Experience at small funds suggests they've done poorly [Ding and Wermers (2009)]
- High intelligence (reflected in high average SAT scores at college attended) [Chevalier and Ellison (1999)]
- Graduating high quality MBA (reflected in *Business Week* rankings or GMAT score) [Gottesman and Morey (2006)]
  - Not other degrees (e.g. PhD) or CFA designation
- But a CFA designation means lower tracking risk
  - And higher tracking risk if an MBA, but not CFA – but no difference in performance, either due to MBA, CFA or even experience (contrary to Ding and Wermers (2009)) [Dincer, Gregory-Allen and Shawky (2010)]

Managerial Characteristics: Others

- Social connections:
  - managers take larger positions in companies that have social connections with (officers or board members come from the same college)
  - These positions out perform the investments in unconnected firms
    - Insider information? Or better assess quality?
    - Cohen, Frazzini and Malloy (2008)

- Skin in the game:
  - Hedge funds [DeSouza and Gokcan (2003)] and mutual funds [Khorana and Servaes and Wedge (2007)] in which the managers invest their own money out perform Mutual funds in which the managers invest their own money out perform
    - Greater conviction?
    - Less uncompensated risk?

Fund Company Characteristics

- Large fund management companies (compared to small)
  - Economies of scale and scope (lower fees and costs) → more return
  - Greater resources for gathering information
  - Better trade execution (reducing price impact)
- More independent directors on board directors on board ≠ manager of fund
- Flatter organization structure

- Low cash holdings
  - High cash holdings (perhaps due to redemptions and purchases) may increase tracking error.
- Low Fees [Kinnel (2010)]

More Fund Company Characteristics

- Fund Companies that specialize in one industry or sector
- Funds with fewer constraints on investment (allowing short sales)

Predicting Performance Based on Fund Holdings

- Challenging because it requires a lot of difficult to get data
  - But generally involves low turnover
  - And seems to be effective.

1. Each quarter mutual funds report their holdings. Kacperczyk, Sialm and Zheng (2008) compare the returns to reported holdings vs. the returns actually received

   - Funds that earned lower returns that returns to holdings tend to under perform by 18 basis points per month, 216 per year.
     - Window dressing → put good stocks into portfolio but no the right time

   - Funds that earned higher returns that the returns to reported holdings tend to outperform by 10 basis points per month 120/yr.

Holdings

2. Huang, Sialm and Zhang (2010) find that funds that have high or low risk in realized returns compared to the returns on reported holdings under perform
   - If risk is lower, this suggest fund managers are "locking in gains"
   - If risks are higher, this suggests fund managers are "doubling down" in a desperate attempt to catch up to other funds after performing poorly.
     - You want to see funds that maintain a stable risk profile.

3. Wei, Wermers and Yao (2009) find that contrarians, managers who buy when most others sell and vice versa, tend to out perform.
   - Probably contrarians have to be more certain they are right

In summary

- We've learned how to measure mutual fund performance
  - Benchmark methods
  - Factor based methods

- Characteristics of Funds and Managers that perform well.
  - Smart, well connected managers at large, low fee funds
  - With a contrarian bent, but stable tracking errors.