15 Week 5b Mutual Funds

15.1 Background

1. It would be natural, and completely sensible, (and good marketing for MBA programs) if funds outperform darts! Pros outperform in any other field.

2. Except for... competition and free entry. The marginal fund will be worthless, and the average fund may not be very good.

3. The standard empirical approach and view (Jensen 1968):

   (a) There is a big bias problem, and this work is hard! (It’s more severe for hedge funds, venture capital funds)
      i. Survivor bias: Funds that close are not in database. Funds are more likely to close if they have bad returns
      ii. Selection bias. Funds are more likely to report if they have good returns. (Or to report audited returns)
      iii. Backfill bias. Often, when a fund is included in a database or index, all past history of that fund is then included. This biases the results towards winners. There were other funds around during the backfill period that lost money and did not get included in the database.
      iv. Incubator bias. Fund families start “incubator funds,” and then only open the ones that do well. They then report the entire history. It’s amazing that the SEC lets them do this. This bias remains in the CRSP database.
      v. (My addition) Academic interest bias. We’re only interested in hedge funds since they did so well! All t statistics in the Journal of Finance are above 2.1.

   (b) You have to correct for beta. A fund which simply leverages or holds higher beta stocks will seem to outperform with no skill. Thus, run CAPM regressions on funds and examine alphas.

   (c) \( \sigma/\sqrt{T} \) again. Returns are so volatile, it’s very hard to measure mean returns.

   (d) After addressing all these problems, the standard result: The average fund underperforms S&P by about 1%; typically even before fees.
Notes: Average returns of mutual funds over the Treasury bill rate versus their

(e) “Why the average fund?” you might object. Of course the average fund is bad – competition and easy entry into the fund business mean anyone will join. Why aren’t we looking at “the good funds?” What about Warren Buffet?

(f) Answer: There is no way to tell after the fact if a given fund was lucky or skillful. We must look at average performance in a group; we have to look at some strategy we might plausibly have used for picking funds ahead of time, and then see what happens to all funds we might have picked.

i. Just as with stocks, we sort all funds at \( t \) based on some indicator of “good,” then we watch those funds through the following year \( t + 1 \). We have to make sure we include all funds we would have picked at the time, and we have to make sure you keep track of everyone including the losers and the dead in the following year.

ii. Early answers: They looked (as in practice) at funds that had done well in previous years. They found that there is a random walk in funds too: Past winners are no more likely to keep winning. Here “Good group” means past good performance.

(g) What we can’t do: “why is Warren Buffet so good?” (Was he lucky? Where is Elmo Buffet?) “Sure average alpha is bad, but our track record is great.” (Why does everyone who walks in the door have above average alpha?)

(h) What we can do: Find everyone who “looked like” Warren Buffet at \( t \), invest in them through \( t + 1 \), track returns of winners and losers.

4. More background

(a) Most variation in ex-post fund returns is due to different strategies (small, large, value, growth, sector) etc. not to differences in particular stocks that funds pick (“style” not
“selection”). Quantitatively, suppose you run

\[ R_{t_i} = \alpha_i + \beta_{im} R_{t_i}^{em} + \beta_{i1} f_1^t + \beta_{i2} f_2^t + \varepsilon_i^t; \ t = 1, 2,...T \] for each i

(Here, we’re doing a style analysis or variance analysis, so the factors don’t have to be “priced” factors. Even before smb and hml, people understood that stocks moved when their industries moved together. The CAPM just says that these betas don’t raise expected returns.) Mutual funds hold quite diversified portfolios, so even individual funds (not just portfolios of funds as in Carhart) have very high \( R^2 \). More importantly, when you look at average returns in a sample, say 5 years, (E here means a 5 year average)

\[ E \left( R_{t_i} \right) = \alpha_i + \beta_{im} E \left( R_{t_i}^{em} \right) + \beta_{i1} E \left( f_1^t \right) + \beta_{i2} E \left( f_2^t \right), \]

then think about how \( E(R_{t_i}) \) varies across mutual funds in that sample, you find almost all variation across funds in \( E(R_{t_i}) \) comes from variation across funds in their \( \beta \) choices and luck-of-the-draw in how the factors \( f \) that they load on happen to do, not from variation across funds in the alphas they achieve. (In 5 year samples, many “factors” such as industry that give no long-term average return and thus are not “priced” will nonetheless do well or poorly for 5 years.) Again, “most variation in results comes from style not selection.”

(b) Puzzles, to me:

i. Why are there so many styles, and these are so unrelated to any betas or sensible risks I’ve ever heard of? What does “growth and income” mean? Is this just marketing, so we can always have some type of fund that did well last year to tout?

ii. If value/size is important, why are we arguing about performance relative to the Market/CAPM? Why do value funds not blow away the graph? FF answer: Most funds were not really following value. (Davis, Fama, French, below; h breakpoints are -0.08 and 0.3 in my graph above). OK, but why not? (New facts, p.51) If funds didn’t know about the value premium, how can it be an equilibrium risk premium? (Their answer: “growth is where I can find alpha.”)

iii. For 40 years we have been railing about the wasted money on active management. From Jensen 1968 to Ken French 2009. Yet it persists. Everywhere else, free market economists say “if something persists, it must be serving a function,” not “Active management persists because investors are dumb.” We don’t allow the “investors are dumb” story for price movements, how do we allow it for active management?

iv. Related, Carhart’s Table III shows that fees and turnover are bad for investors. Why? This makes no sense from a market-at-equilibrium perspective. Management wants you to think more fees pay for more research, which raises alpha, and they split that alpha with you. OK, a perfectly cynical competitive market perspective would say that returns to investors must always be the same, so fees raise alpha just enough to pay the fees. How in the world can fees hurt investors in a long-run (40 year) equilibrium? It’s fun to be cynical but it doesn’t make any sense.

(c) What are we asking here, really? Once upon a time, mutual fund performance was a test of “semi-strong form” efficiency – can you do better with public, but hard to get information? In this analysis, the question is, implicitly, do funds have “stock picking ability” to find “undervalued stocks,” i.e. “inefficiencies,” “information not reflected in market prices,” and the alternative is “can I replicate fund returns by passive or mechanical portfolio formation strategies (without paying high fees)"
Note, I think this *question* is really passé. The real issue for most active management is that the managers may understand multifactor betas you don’t understand, a view you will see emerge over the next two weeks. But nobody knew multifactor betas existed in 1970, and old habits die hard.

5. Building up to Carhart: Reexamining the evidence, several authors did find “hot hands” – Last year’s funds do better this year. (p. 57). We see this like momentum – by forming portfolios of last year’s winners and noticing they do well. Why was it missed earlier? Well, it wasn’t really. This is like my analysis of momentum; we’re using a new telescope to make an old puzzle seem more important than it used to. There is still only a very small autocorrelation of individual fund returns.

Suppose a winner is only 52% likely to win again, which is the old version of the facts. In the old days, you’d say “there’s next to no skill; funds that went up last year are almost exactly as likely to go up as to go down next year.” Like momentum, though the *same* fact has a much more dramatic-looking implication for a *portfolio of funds*. The portfolio of wining funds went up 100% last year, so only a 0.01 $R^2$ means a 10% mean return for this *portfolio* next year. The chance that the *portfolio* does better is much more than 52/48 because you diversify across fund risk. This is just like momentum in stocks – you don’t have to buy just one stock! Recall how momentum is a way of magnifying a small return autocorrelation. Thus, by looking at portfolios, we confront the fact that Maybe that 52% is meaningful, and has important economic implications.
15.2 Carhart on funds – questions

The introduction summarizes his conclusions:

1. Momentum in *stocks* accounts for momentum in *funds*. Funds that did well last year have stocks that went up and those stocks will keep rising a bit. It is *not*
   
   (a) Persistent skill, or
   
   (b) Good returns for momentum funds.

2. Momentum funds do poorly after transactions costs.

3. There is some persistent *under* performance.

4. Survivor bias free data – includes funds that die. (Lots of hard work by Carhart, and another great CRSP dataset.)

We need to look for the facts! *Find the facts behind these assertions in the paper.*

Now *Questions for Class:*

1. On p.61 Carhart defends the four-factor model as a *performance attribution* model.
   
   (a) Why is it OK to use a “momentum factor” even if that is not a “state variable for investment opportunities?”
   
   (b) What *question* are we using the multifactor model to answer, and how is that question different from Fama and French’s question?
   
   (c) Suppose you find, looking at very long samples, that $E(smb) = 0$. Might you still use *sml* for *performance attribution* in a shorter sample? If so, why?

2. Does Carhart’s “momentum factor” solve the return puzzles in Fama French’s last table – does it account for returns in momentum-sorted stock portfolios? (There is no table here, but he does report some results verbally. What does he say?)

3. (Hint: table III is the most important. Spend most of your time to understand it.) How does Carhart form portfolios of mutual funds - -what are Portfolio 1A 1B...10C in column 1 of Table III?

4. Do funds that did well last year continue to do well next year? Point to numbers – is this serious or a tiny effect?. Is the phenomenon stronger among winners or among losers?

5. Do the funds that went up last year always continue to go up? How much risk is there in this investment strategy? To quantify these questions, what is the chance that portfolio 1A will earn a positive return next year?

6. Perhaps the funds that do better in the test year continue to do well on average because they have high CAPM betas. What does Carhart say about that?

7. How do the CAPM $R^2$ values compare to those for stocks you have seen before? What accounts for the difference?
8. Are all the alphas zero after the 4 factor model is done, or is there a puzzle? Who seems still to be outperforming and who is underperforming?

9. Which factor’s betas seems to be accounting for the “hot hands” (spread in average returns)?

10. What puzzle does Table IV address? What is its conclusion?

11. Fund managers claim that fees and turnover do not reduce returns to investors. How could charging more money not reduce returns to investors? (Try to be a good salesperson for a high-turnover high-fee fund. Why should I give you my money? Then try to be a good supply-demand economist. What should the equilibrium relationship be between fees, expenses and returns to investors?)

12. (Table V. Make sure you understand how this table was created. How are Table IV and Table V different?) What does Carhart find about fees and turnover? How much does a 1% change in fees change returns to investors? How much does turnover – selling one stock and buying another – change returns to investors?

13. What are the two hypotheses that Carhart spends the rest of the paper distinguishing (see bottom of p. 70)

14. What is the point of Figure 2? (Hint: what would it look like if the sort on one year performance indicated skill?)

15. What does Carhart say about momentum funds – funds that seem to follow a momentum strategy, as revealed by high loadings on the momentum factor? (Hint: no table, but text on p. 73)

16. One year lagged returns are probably mostly luck, not skill. What if you sort funds by the more common 5 year performance averages? (Hint: Figure 3)

17. Does Carhart suggest any trading strategies? (Hint. Look on p. 80)

15.3 Fama and French Mutual Fund Performance Questions

So far, we have been looking for “skill” by guessing some characteristic associated with skill – past returns, MBA by manager, etc. – and looking at the return of a sorted portfolio going forward. This paper tells us whether there is any skill at all, without us taking a stand on what characteristic can be used to find good funds. It answers the question “sure the average fund is mediocre, but there are some good funds.” Read 1916 top to understand why they’re different than persistence tests – if there is skill, lagged returns are a very noisy measure of that skill.

1. What do Fama and French mean by “Equilibrium Accounting” (1915)

2. Table 2 tells us about the performance of mutual funds as a whole – it studies the portfolio of all mutual funds. What does it tell us? Do mutual funds as a whole outperform benchmarks? What kinds of indices are most similar to the performance of all mutual funds? Do mutual funds as a whole generate alpha, before or after fees?
3. Fama and French focus on the alpha t statistic. Why not look at alphas or information ratios?

Why don’t FF just use the t distribution, to judge how many funds should have alpha t statistics above a certain cutoff? Explain the bootstrap procedure. (Hint, p. 1924)

4. Explain the numbers in Table 3-4.

(a) What would they look like if all funds had zero true alpha, but the pattern of luck fully conformed to the assumptions of the t distribution (normal, independent, etc.)?

(b) What would they look like if there were some funds with +5% alpha and other funds with -5% alpha, so that the average fund was not skilled but some were good and some were bad?

(c) Why is the probability of a t greater than 2 or less than -2 not the usual 5% value that we expect for a t statistic?

15.4 Berk Questions

1. What happens to future returns and flows, according to Berk, if a manager does have some skill?

2. Berk says, unlike FF, that managers do have some skill even though alphas are all zero. How can that be?

3. Berk says that when investors chase past returns, investing in funds that have done well in the past, they are not being irrational, even though future returns are no better than average. How can this be?

4. Berk says that even though skill is permanent, returns will not be persistent. Why not?