

## Portfolio Performance Evaluation

### Types of Abnormal Performance:

- Stock Selectivity
- Market Timing

### Related:

- Style Analysis

## Performance Evaluation

The market model regression in excess returns form (subtracting the risk-free interest rate from the asset return being studied) essentially uses the CAPM as the benchmark, so the intercept  $a(i)$  measures the average excess return (compared with the prediction of the CAPM):

$$[R(it) - R(ft)] = a(i) + b(i) [R(mt) - R(ft)] + e(it)$$

The CAPM says

$$E[R(it) - R(ft)] = b(i) E[R(mt) - R(ft)]$$

and  $E[e(it)] = 0$ , so  $a(i)$  should equal 0  
 – this is sometimes called “Jensen’s alpha”

## Performance Evaluation

- $R(it)$  is the mutual fund return, including dividends, subtracting fees and expenses
- $R(ft)$  is the feault-free interest rate of the time interval (e.g., 1 month Tbill yield)
- $R(mt)$  is the CRSP value-weighted portfolio return (or the S&P 500 index with dividends, or some other “market” index)
- If you want to use the F-F 3-factor model, just use SMB and HML as additional variables in the regression model, and the loadings on SMB and HML tell you whether the portfolio behaves like a large or small cap, or a growth or value fund

## PRIMECAP Odyssey Stock (POSKX)

- This is a large-cap “blend” fund (not specifically either value or growth)
- It is a \$7.4B fund that is highly rated (\*\*\*\*\* by Morningstar)
- Since I picked this example by searching for a fund that performed well, you should expect to find evidence of “abnormal” performance
- Monthly data from January 2005 through February 2017 in BRN481MF.XLSX (also BRN481MF.ZIP)

## Stock Selectivity and Style for POSKX, 2005-2017

	2005-2017		2005-2010		2011-2017	
a(i)	0.0013	0.0013	0.0014	0.0010	0.0012	0.0011
t(a(i))	1.37	1.41	1.07	0.79	0.91	0.80
b(i)	0.9357	0.9224	0.9411	0.9139	0.9262	0.9332
t(b(i)-1)	-2.98	-3.23	-2.18	-2.88	-1.97	-1.63
s(i)		0.0785		0.1822		-0.0333
t(s(i))		1.82		3.13		-0.52
h(i)		-0.0156		-0.0348		0.0202
t(h(i))		-0.43		-0.78		0.33
Rsq	0.9284	0.9291	0.9448	0.9507	0.8933	0.8908
s(e(i))	0.0109	0.0109	0.0111	0.0105	0.0109	0.0110

## Stock Selectivity and Style for POSKX, 2005-2017

- It looks like POSKX has slightly positive abnormal returns/stock selectivity
  - a little over 0.1% per month, or about 1.5% per year, but the largest t-stat is only 1.4
- Market risk is slightly below average of 1.0
  - .93 with t-stats of 2-3 for being below 1.0
- Slight tilt toward low-cap stocks in 2005-2010, but not in 2011-2017
  - $s(i) = .18$  with t-stat of 3 for 2005-2011
- No tilt toward or away from value/growth
- Overall, these results are not surprising, since this fund is highly rated by Morningstar (which is largely based on estimates of a(i))

## Testing for Market Timing

- If you thought you had the ability to “time” the market (i.e., you could tell when stock returns were likely to be higher than Treasury bill returns), you should be more heavily invested in stocks in those periods
  - This would imply that the beta of your portfolio would be higher when market risk premiums were positive (and lower when they were negative)

$$[R(it) - R(ft)] = a(i) + b(i) [R(mt) - R(ft)] + b_{up}(i) D(t) [R(mt) - R(ft)] + e(it)$$

where  $D(t) = 1$  if  $[R(mt) - R(ft)] > 0$ , and 0 otherwise

$b_{up}(i)$  represents the increase in risk (if any) due to market timing

## Market Timing for POSKX, 2005-2017

	2005-2017	2005-2010	2011-2017
a(i)	0.0007	0.0006	0.0008
t(a(i))	0.52	0.29	0.40
b(i)	0.9210	0.9231	0.9091
t(b(i)-1)	-2.06	-1.69	-1.10
bup(i)	0.0311	0.0427	0.0287
t(bup(i))	0.47	0.49	0.23
Rsqr	0.9280	0.9442	0.8919
s(e(i))	0.0110	0.0112	0.0110

## Market Timing for POSKX, 2005-2017

- It looks like POSKX has slightly positive market timing
  - Beta is higher by about 0.03 in “up markets,” but none of the t-stats are bigger than 0.5, so this is not reliable evidence of anything
- This is not surprising, since very few people claim to be able to time the market (and even fewer have evidence of successful market timing)

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