Enhanced indexation example question

The table below shows the stock prices and index values over a number of time periods, together with the current portfolio.

Period	A	B	C	D	E	Index
0	39.7	3.1	38.2	72.9	3.6	2655.8
1	73.5	0.5	96.3	60.4	77	5039.7
2	17.3	42.3	62.2	49.7	91.5	4717.7
3	31.6	70.8	57.2	5.2	54.7	4946.7
T=4	64.4	86.9	76.1	27.1	14.3	6506.6
Current portfolio	5	67	8	6	10	

For example in period 3 the stock/share price for stock A is 31.6 and the index value is 4946.7. The current portfolio contains 5 units (shares) of stock A, 67 of B, etc.

Use this data to construct (enhanced indexation) tracking portfolios containing K=3 stocks with:

- values of λ of 0.99, 0.95, 0.90 and 0.80
- an aim of achieving 0.5% and 1% excess per time period. Here use just the specified and semispecified objectives.

Which of your constructed portfolios do you prefer and why ?

Note:

- The above data is the data you used in the previous tutorial. If you saved the spreadsheet you created there you can use that as a starting point for this tutorial.
- If you do not have the spreadsheet from the previous tutorial then download the file estart.xls from http://www.brunel.ac.uk/depts/ma/research/jeb/finance/ That file contains the index tracking model we constructed in the lectures for the data we used in the lectures. You can therefore start from that spreadsheet (which includes the index tracking Solver model).

Enhanced indexation example solution

Recall from the previous tutorial that because Solver utilises a heuristic solution technique you will probably get different solutions from those shown below.

Utilising the enhanced indexation Solver model as constructed in the lecture I get the portfolios shown below for values of λ of 0.99, 0.95, 0.90 and 0.80. Note that as we are using λ explicitly here we must be dealing with the unspecified objective and we must set the excess percentage in the spreadsheet to zero.

We also show below the average portfolio return as well as the difference between that and the average index return, which for the example dealt with here is 22.40178%

	A	B	C	D	E	Average portfolio return	Difference from index return
λ = 0.99	0	35.01	48.49	12.06	0	22.76286	0.36108
λ = 0.95	0	35.04	48.46	12.02	0	22.79549	0.393715
λ = 0.90	9.20	38.45	41.07	0	0	30.87252	8.470738
λ = 0.80	0	39.00	48.22	0	0	31.99487	9.593094

Here the lower values of λ (less emphasis on tracking, more emphasis on excess return) give a better performance, as we would have expected.

With an aim of achieving 0.5% and 1% excess per time period and utilising the specified or semispecified objectives we get the results shown below.

Objective	Aim	A	B	C	D	E	Average portfolio return	Difference from index return
Specified	0.5%	0	35.29	48.28	11.72	0	23.04374	0.641963
Semispecified	0.5%	0	35.99	47.79	10.85	0	23.76365	1.361875
Specified	1%	0	35.59	48.07	11.37	0	23.33498	0.933199
Semispecified	1%	13.11	40.71	35.18	0	0	31.64756	9.245784

Note here that the fundamental difference between specified and semispecified is that the specified objective tries to achieve precisely the excess percentage given (and above you can see how well it does). The semispecified objectives tries to exceed the excess percentage given.

Here the choice of portfolio comes down to your brain and personal objectives. Recall that all we have done here is to choose portfolios that, on past history, would have achieved the returns given above. This is no guarantee of future performance.