
Question 2: Portfolio Management**(36 points)**

a)

The “asset allocation effects” gives the contribution to the returns produced by intentional deviation in asset allocation from the fund’s policy asset mix and by deviation caused by market price changes.

The “security selection effects.” refers to the returns obtained by active management rather than passive management against the benchmark.

The asset allocation effects can be measured by subtracting the returns achieved through passive management conforming to the policy asset mix (I) from the returns obtained by active asset allocation (II):

$$\text{asset allocation effects} = (\text{II}) - (\text{I})$$

The security selection effects can be found by deducting the returns obtained by passive management (I) from the returns obtained by active security selection (III):

$$\text{security selection effects} = (\text{III}) - (\text{I})$$

b)

Fiscal year	Security selection effects	Asset allocation effects	Cross effects	Total active effects
1999	4.0	-2.8	-0.4	0.8
2000	0.5	-3.0	0.1	-2.4
2001	2.0	-1.5	0.2	0.7
2002	1.0	-3.0	0.0	-2.0
2003	-2.0	4.7	-0.2	2.5
2004	-8.0	0.0	0.0	-8.0
2005	-3.0	5.2	0.2	2.4

$$\text{Total active effects} = (\text{IV}) - (\text{I})$$

$$= \sum w_{Pj} \cdot R_{Pj} - \sum w_{Ij} \cdot R_{Ij} = [0.4 \cdot (-6) + 0.6 \cdot 48] - [0.5 \cdot (-2) + 0.5 \cdot 50] = 26.4 - 24 = 2.4$$

$$\text{Security selection effects} = (\text{III}) - (\text{I})$$

$$= \sum w_{Ij} \cdot [R_{Pj} - R_{Ij}] = 0.5 \cdot [-6 - (-2)] + 0.5 \cdot [48 - 50] = -3$$

$$\text{Asset allocation effects} = (\text{II}) - (\text{I})$$

$$= \sum [w_{Pj} - w_{Ij}] \cdot R_{Ij} = [0.4 - 0.5] \cdot (-2) + [0.6 - 0.5] \cdot 50 = 5.2$$

$$\begin{aligned} \text{Cross effects} &= \text{Total active effects} - \text{Security selection effects} - \text{Asset allocation effects} \\ &= 2.4 - (-3.0) - 5.2 = 0.2 \end{aligned}$$

Comment:

The security selection effects were positive for the 4-year period beginning 1999, but turned negative in 2003. The total security selection effect over the 7 years was -5.5%.

The asset allocation effect was negative during the first 4 years but turned positive for the 3 years beginning 2003. Its 7-year total was roughly 0%.

The total active effect including the cross effect was -6% for the 7-year period, but the -8% issue selection effect in 2004 was a major factor in this.

c)

The beta of the equity portfolio is 0.9926. In other words, the portfolio has a sensitivity against the benchmark of nearly 1, so a 1% rise (fall) in the benchmark will produce a 1% rise (fall) in the portfolio as well.

On the other hand, the alpha is -1.651%, so active management has not been effective.

The coefficient of determination of 0.9454 indicates that 94.54% of the fluctuation in portfolio returns can be explained by fluctuation in benchmark returns.

d)

In the bond portfolio, Issue A is a short-term corporate bond and the fund is taking credit risk, while Issue B is a long-term government bond and the fund is taking interest-rate risk. Issue B has a higher weight within the portfolio, resulting in a portfolio duration of $20\% \cdot 2.9 + 80\% \cdot 11.8 = 10$ years

The benchmark has a duration of 5 years, so the portfolio is more sensitive to interest rates than the benchmark. For example, a 1% rise in interest rates would result in approximately 10% decline in portfolio pricing [exact: $10\% / (1 + YTM)$] instead of approx. 5% decline in benchmark.

e)

Rising interest rates result in falling bond prices and avoiding this will require to reduce the weighting of bonds in the portfolio from the current 40%. In addition, Issue B, which is a long-term bond, could be sold and replaced with bonds of shorter duration so as to reduce the duration of the portfolio as a whole and mitigate interest-rate risk.