

Question 2: Portfolio Management

(36 points)

Mr. Miyamoto is the director of the pension fund of Company ABC. He receives the information below regarding the pension fund.

Table 1 reports the results for the last 7 years (for the sake of simplicity, the investments are limited to domestic bonds and domestic equities).

Table 2 depicts the attribution analysis applied to analyse the pension fund performance.

Figure 1 graphs the relationship between benchmark returns and portfolio returns, and therefore gives the equity portfolio's sensitivity to the domestic equity benchmark.

For domestic bonds, Mr. Miyamoto calculated the duration for bond holdings A and B as shown in Table 3 and then estimated the impact of an expected rise in interest rates.

Table 1: Performance of Company ABC's Pension Fund (all figures in %)

Fiscal Year	Policy Asset Mix		Actual Weight		Benchmark Return		Actual Return	
	Domestic Bonds	Domestic Equities	Domestic Bonds	Domestic Equities	Domestic Bonds	Domestic Equities	Domestic Bonds	Domestic Equities
1999	50	50	60	40	2	30	4	36
2000	50	50	40	60	5	-25	5	-24
2001	50	50	40	60	0	-15	1	-12
2002	50	50	40	60	5	-25	6	-24
2003	50	50	40	60	-2	45	-3	42
2004	50	50	50	50	2	0	4	-18
2005	50	50	40	60	-2	50	-6	48

Note: Both the benchmark return and the actual return are excess returns over the risk-free interest rate.

Table 2: Illustration of performance attributions analysis by Brinson et al.

		Security Selection	
		Active [$R_{P,j}$]	Passive [$R_{I,j}$]
Asset Allocation	Active [$w_{P,j}$]	$IV = \sum w_{P,j} \cdot R_{P,j}$ <i>Active weights, Active returns</i>	$II = \sum w_{P,j} \cdot R_{I,j}$ <i>Active weights, Passive returns</i>
	Passive [$w_{I,j}$]	$III = \sum w_{I,j} \cdot R_{P,j}$ <i>Passive weights, Active returns</i>	$I = \sum w_{I,j} \cdot R_{I,j}$ <i>Passive weights, Passive returns</i>

Figure 1: Equity Portfolio Analysis

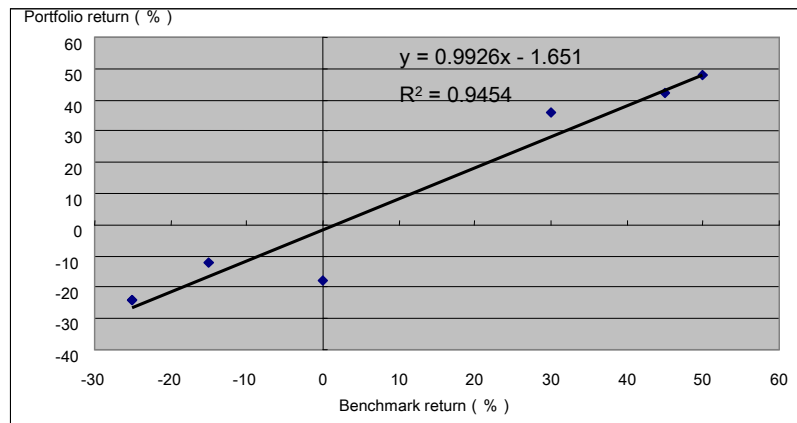


Table 3: Properties of Bond Holdings

	Issue A	Issue B
Type	Corporate Bond	Government Bond
Coupon	1.8%	2.5%
Weight	20%	80%
Duration	2.9	11.8

Note: The benchmark bond has a duration of 5 years.

- a) The fund's actual weight differs from the policy asset mix. The actual returns are also different from the benchmark returns. Using Table 2, explain the "asset allocation effects" and the "security selection effects" and show how they can be measured. (8 points)
- b) Complete the performance attribution analysis shown below for 2005 and comment on the performance of Company ABC's pension fund. (11 points)

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				

Note: all figures in %.

- c) Using Figure 1, comment on the characteristics of the domestic equity portfolio. In particular assess the portfolio's beta, alpha and coefficient of determination. (6 points)
- d) The bond portfolio consists of Issue A and Issue B, as shown in Table 3. Discuss the important features and characteristics of this bond portfolio (focus your comment on the risk linked to holding these bonds). (6 points)
- e) Mr. Miyamoto is considering modifications to the asset allocation and the bond portfolio in order to avoid that rising interest rates will have an impact on the portfolio. You are required to provide advice to him on this matter. (5 points)