
SOCIETY OF ACTUARIES
Retirement Plan Investment & Risk Management Exam

Exam RETRPIRM

Date: Friday, May 1, 2015
Time: 2:00 p.m. – 4:15 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 40 points.

This exam consists of 6 questions, numbered 1 through 6.

The points for each question are indicated at the beginning of the question.
2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate Exam RETRPIRM.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.

****BEGINNING OF EXAMINATION****

1. (4 points)

- (a) (3 points) Explain why actively managed funds could underperform market indices using the efficient market hypothesis.
- (b) (1 point) Explain why plan sponsors continue to invest in actively managed funds.

2. (6 points)

- (a) (2 points) Describe four of the administrative issues to consider when structuring the investment options of a member-directed defined contribution pension plan.

XYZ sponsors a member-directed defined contribution pension plan with the following investment options:

- money market fund;
- broad fixed income fund; and
- equity index fund.

A member of XYZ's Pension Plan Committee has stated that "XYZ's fiduciary obligations are limited because the investment of plan assets is member-directed."

- (b) (2 points) Critique the statement made by this Committee member.
- (c) (2 points) Identify how XYZ could further limit its fiduciary liability with respect to the investment of the plan assets.

3. (10 points) You are given the following for a defined benefit pension plan:

Projected beginning of year cashflows:

Year	Cashflow
1	\$50,000
2	\$50,000
3	\$50,000
4	\$650,000
5	\$80,000

Assets at beginning of Year 1: \$800,000

(a) (3 points) Calculate the effective duration of the liabilities at a discount rate of 5.0% per annum.

Show all work.

(b) (5 points) Using the effective duration calculated in (a):

(i) Estimate the liability at a discount rate of 8.0% per annum.

(ii) Calculate the duration of the assets needed to minimize funded status volatility.

(iii) Calculate the change in funded status for a 1.0% per annum increase in discount rate using the asset duration calculated in (ii).

Show all work.

(c) (2 points) Explain the difference between discounting the cashflows at 8.0% per annum and using duration to estimate the impact of the discount rate change from 5.0% per annum to 8.0% per annum.

4. (7 points) ABC Inc. sponsors a large final average defined benefit pension plan.

You are given the following:

- The plan is open to new members.
- The plan's assets are invested in 60% equities and 40% bonds.
- The duration of the total asset portfolio is 6 years.
- The duration of the pension plan's liabilities is 12 years.

(a) (3 points) ABC's CFO makes the following statement:

“To completely eliminate interest rate risk from our plan, the duration of the plan's assets should match the duration of the plan's liabilities. The only way to accomplish this is to sell all of the plan's equities and purchase long-term fixed income products.”

Critique the CFO's statement.

ABC Inc. also sponsors a small final average defined benefit pension plan with the following characteristics:

- The plan is frozen and closed to new members.
- There are no future service accruals.
- There are no future salary increases.
- Annual post-retirement cost of living adjustments (COLA) equal to the greater of:
 - 0%, and
 - 50% of the increase in the consumer price index.

(b) (1 point) Describe how inflation risk differs between ABC's two pension plans from ABC's perspective.

(c) (3 points) Assess which of ABC's two pension plans is a better candidate for an annuity purchase.

5. (8 points)

- (a) (4 points) Describe the practical considerations in implementing a liability-responsive (dynamic) approach to asset allocation.
- (b) (4 points) KMB Company sponsors both an open and a frozen defined benefit pension plan.

The following dynamic asset allocation strategy has been proposed for both plans:

Plan Termination Funded Status	Equity or Return- Seeking Allocation	Liability-Matching Fixed Income Allocation
110%	20%	80%
100%	30%	70%
90%	40%	60%
80%	50%	50%
70%	60%	40%
60%	70%	30%

Each plan is currently 60% funded on a plan termination basis.

Evaluate the proposed dynamic asset allocation strategy for each plan.

6. (5 points)

- (a) (3 points) Describe the advantages and disadvantages of using risk-adjusted performance appraisal methods to evaluate manager performance.
- (b) (2 points) You are given the following information:

Economic Sector	Equity Portfolio Weight	Sector Benchmark Weight	Portfolio Return	Sector Benchmark Return
Financial	50%	60%	3.0%	3.5%
Consumer	25%	25%	4.0%	3.0%
Energy	25%	15%	1.5%	1.2%
Total	100%	100%		

The standard deviation of the difference between the returns on the portfolio and the returns on the benchmark is 0.03.

Calculate the Information Ratio.

Show all work.

****END OF EXAMINATION****

USE THIS PAGE FOR YOUR SCRATCH WORK

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