

Exam RETRPIRM

Date: Tuesday, October 30, 2018

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.

Recognized by the Canadian Institute of Actuaries.

Tournez le cahier d'examen pour la version française.

****BEGINNING OF EXAMINATION****

1. (7 points)

- (a) (3 points) Explain how each of the following risks may affect an individual's retirement income from a defined contribution pension plan:
- (i) Subpar investment growth
 - (ii) Market risk
 - (iii) Inflation risk
 - (iv) Increasing longevity
- (b) (4 points) Describe four characteristics of an ideal secure income solution that could be incorporated into a target date fund glide path to improve the income security of a defined contribution plan member during the payout phase.

2. (9 points) You are given the following key rate durations for a 9% non-callable bond:

t	Key rate duration
0.25	0.03
1	0.1
2	0.1
3	0.3
5	0.5
7	0.8
10	X
15	1.7
20	1.5
25	1.3
30	3.1

You are also given the following for the bond:

Price	\$102.00
Effective duration	10.83

- (a) (2 points) Calculate the change in the key rate at year 10 which results in a price of \$102.60.
- (b) (4 points) Describe in words how the effective duration and key rate durations would change if:
- (i) A sinking fund was added to the bond;
 - (ii) A European put option was added to the bond; or
 - (iii) The bond was a 10% callable bond.
- (c) (3 points) Describe three fixed income strategies that could be used to diversify and reduce the interest-rate sensitivity of a bond portfolio within a defined contribution plan target date fund.

3. (7 points) You are given the following excerpt of the Investment Policy Statement for the ABC Investment Group Retirement Savings Plan:

Plan Sponsor	ABC Investment Group, a private company
Plan Type	Defined Contribution
Trustee	CEO of ABC Investment Group
Investment Manager	CFO of ABC Investment Group
Asset Classes Represented	Common Stocks, Real Estate, Cash
Fund Options / Management Expense Ratio (MER)	ABC Investment Group Large-Cap Value Index / 1.25% per year ABC Investment Group Raw Land REIT / 2.00% per year ABC Investment Group Money Market Fund / 0.25% per year
Frequency of allowed investment allocation changes	Semi-Annually (June 30, December 31)
Default Investment Option	ABC Investment Group Large-Cap Value Index

Critique the policies outlined above with respect to ABC Investment Group's fiduciary obligations.

4. (7 points)

- (a) (5 points) Explain why public pension plans tend to be underfunded.

The pension department of a government that sponsors a defined benefit pension plan is considering the following strategies:

- (i) Implementing better asset/liability matching
 - (ii) Optimizing the amount of equity exposure in the plan
- (b) (2 points) Describe how these strategies could improve the funded status of the plan.

- 5.** (6 points) XYZ Company sponsors a defined benefit pension plan.
- (a) (2 points) Describe the advantages of implementing a glide path strategy.
 - (b) (2 points) Describe the considerations in designing and implementing a glide path strategy.
 - (c) (2 points) Critique glide path strategies from a financial economics perspective.

- 6.** (4 points) Describe how each of the following regulatory incentives can promote counter-cyclicality of funding rules for defined benefit pension plans:
- (i) Avoid excess reliance on current market values
 - (ii) Allow appropriate levels of overfunding through flexible tax ceilings
 - (iii) Limit contribution holidays and access to surplus
 - (iv) Encourage stability of long-term contribution patterns through appropriate actuarial methods

****END OF EXAMINATION****

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