RET RPIRM Model Solutions
Fall 2015

1. Learning Objectives:

2. The candidate will recognize and appropriately reflect the role of plan investments in retirement plan design and valuation.

Learning Outcomes:

(2d) Apply and evaluate strategies and techniques for asset/liability management.

Sources:

RPIRM 113-13: How the liability benchmark is developed and used in practice

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Explain how to construct a liability benchmark.

Commentary on Question:

Generally this part was done well. Candidates that didn't do well were those who did not describe the types of benefit cash flows that could be used or the types of yield curves.

1. Obtain projected benefit cash flows from plan actuary or plan trustees.
   a. Will need to determine the appropriate benefit payment profile (ABO vs. PBO)
2. Calculate the present value; need to determine the discount rate to be used.
   a. There is a shift away from using non-market interest rates. Measure liabilities using a full yield curve approach based on either corporate or government yield curves.
   b. Using the full yield curve approach allows for better measurement of each cash flow and its contribution to the volatility of the liabilities benchmark.

1. Continued

(b) Describe four characteristics of an effective liability benchmark

Commentary on Question:
Candidates generally did well in this section. Those who did not do well were those who did not describe the characteristics but only listed them.

1. Investable
   a. The option is available to forgo active management and simply hold the benchmark
2. Unambiguous
   a. The names and weights of securities comprising the benchmark are clearly defined
3. Appropriate
   a. The benchmark is consistent with the manager's investment style biases
4. Measurable
   a. It is possible to calculate the return on the benchmark on a reasonably frequent basis

(c) Explain how a liability benchmark is used in practice.

Commentary on Question:
Candidates generally did not do well in this section. Most candidates were able to determine that liability benchmarks are used in LDI strategies, but they didn't describe how it was used in an LDI strategy. Most candidates discussed what an LDI strategy was and the benefits of adopting an LDI strategy.

1. Serves as a scorecard for plan sponsors to measure plan performance.
   a. In an LDI framework, where liabilities are the focus, the appropriate benchmark is the plan liabilities.
   b. Aligning the plan assets to make certain of the benefits to be paid from the pension plan requires measuring their performance relative to the liabilities they are expected to support.
2. This benchmark can be used to compare to plan results utilizing standard benchmark analysis.
   a. Goal of LDI is to minimize tracking error by reducing unrewarded risks to the portfolio (i.e. interest rate and inflation risk).
      i. Tracking error (measures funded status volatility): Indicates how closely returns of the assets are tracking liability returns.
   b. Can replicate the liability benchmark using index-provided swap securities.
      i. Automated daily values would also be available from these providers, as well as daily and monthly performance information.

2. Learning Objectives:

3. The candidate will understand how to evaluate the stakeholders' financial goals and risk management with respect to their plan.

Learning Outcomes:

(3a) Compare the interests of plan sponsors, employees, shareholders, taxpayers and other stakeholders related to the financial management of a retirement plan.

Sources:

References: RPIRM 126-13: Funding Regulations and Risk Sharing

Commentary on Question:

Some candidates scored well on this question. Most of the candidates who did NOT score well on this question addressed investment risk rather than regulatory risk. There were many fully-formed answers discussing all the risks of investing plan assets, but they failed to address the regulatory aspect that the question focused on.

Solution:

Describe four risk factors that should be considered in a risk-based approach to regulating pension plans.

Four risk factors that should be considered are:

1. Regulators should consider the nature of risks and the guarantees offered under different pension plan designs. These include market risk, biometric risk (especially longevity risk for annuities), and operational risk.
2. Regulators should consider the extent to which plan benefits are conditional and can be adjusted. For example, they should take into account whether or not plan sponsors can make discretionary benefit adjustments or if benefits can be adjusted based on the fund's financial performance.
3. Regulators should consider the extent to which contributions may be raised to cover any funding gap.
4. Regulators should consider any guarantees from the sponsoring employer and any insolvency guarantee arrangements.

3. Learning Objectives:

1. The candidate will understand how to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations.

Learning Outcomes:

(1b) Distinguish the various strategies, approaches and techniques used to manage retirement fund assets.

Sources:

RPIRM-104-15: Maginn and Tuttle, Managing Investment Portfolios, Third Edition Chapter 12

Commentary on Question:

The candidate must understand the qualities of a good benchmark and the criteria for measuring benchmark quality. Simply listing the qualities is not enough, as the question asked for the qualities to be used to judge two suggested benchmarks.
The candidates that knew the qualities tended to do well, though a few failed to realize that neither suggested benchmark were appropriate due to style differences.

Solution:

Your colleague is interested in evaluating the performance of a fund manager who specializes in U.S. large-cap stocks with a value stock selection style. As a benchmark to evaluate the fund manager's performance, your colleague proposes using either:

(i) the median return of all U.S. large-cap fund managers; or

(ii) the return of the S&P 500 Index.

Evaluate the use of each proposed benchmark.

The median return of all U.S. large-cap fund managers is not a good benchmark for a number of reasons:

1. It is not consistent with the fund manager's style, as the manager's specialty is in large, value stocks. The universe of all U.S. large-cap fund managers would also include those who specialize in growth stocks.
2. The median can't be specified in advance, which also means it is not investable.
3. It is subject to survivorship bias.
4. The only quality of a good benchmark that it possesses is that it is measurable.

The S&P 500 Index meets a number of the qualities of a good benchmark:

1. It can be specified in advance.
2. It is measurable and investable.
3. It is not subject to survivorship bias.
4. It is unambiguous.

3. Continued

However, it does fail one important quality of a good benchmark. It is not consistent with the manager's style, as it contains growth stocks as well as value stocks.

4. Learning Objectives:

2. The candidate will recognize and appropriately reflect the role of plan investments in retirement plan design and valuation.

Learning Outcomes:

(2b) Evaluate the interaction and relationship between plan investments and valuation assumptions/methods

(2d) Apply and evaluate strategies and techniques for asset/liability management.

Sources:

RPIRM-119-13, Accounting for Pension Buy-In Arrangements
Longevity Risk Management: New Tools for Defined-Benefit Pension Plans

Commentary on Question:

The candidate must understand the difference between buy-in and buy-out transactions and explain the risk, valuation and accounting implications of each.

Solution:

(a) Identify the key features of an annuity buy-in contract.

Commentary on Question:

Candidates generally did well on this part of the question, but could have listed additional features. Note that not all of the points below were required to receive full credit for this part.

- Buy-in – purchase a contract (bulk purchase of annuities) from an insurer which generates returns designed to equal all future benefit payments to participants covered by the buy-in contract (essentially reimburses the plan for all future benefit payments)
- The annuities become assets of the plan and reflect the mortality and demographic characteristics of the plan beneficiaries
- Contract is generally a single-premium arrangement where a payment is made by the pension plan to the insurer in exchange for the contract
- Does not generate settlement accounting
- Are often used as stepping stones to a buy-out
- Priced similar to a buy-out annuity since the economics are nearly the same
- Often allows the holder to convert to a buy-out annuity for no additional cost

(b) Describe how the annuity buy-in affects the risks borne by the Company with respect to the pension plan.

Commentary on Question:

Candidates often included the last two bullet points in the list below, but seldom included any of the others on the list.

4. Continued

- Offers the employer the ability to "lock in" the cash cost of some of its pension obligation and virtually eliminate future volatility
- Enables employer to continue to maintain the plan and offer benefits to employees who may feel more comfortable than if their benefits are transferred to another party
- The net ongoing cash flow to the plan for the covered participants is zero
- The cost of providing benefits is entirely funded by the buy-in contract
- Allows sponsors that would like to complete a buy-out to avoid the large up-front payment for plans that are underfunded
- Permits sponsors to take advantage of periods in which annuity pricing is favorable
- Employer has eliminated risks associated with changes in the benefit obligation due to changing mortality rates, fluctuating interest rates, etc.
- While the plan remains responsible for paying the benefits, all risk is not eliminated because the employer would still be responsible for all promised benefit payments if the insurer becomes unable to make payments in full on the contract

(c) Describe two ongoing accounting methods for valuing annuity buy-in assets and the associated Projected Benefit Obligations.

Commentary on Question:
Most candidates did not do well on this part of the question, missing many of the important details and often not describing two approaches for both assets and liabilities (often just assets were discussed in the answer). Not all of the points below were required to get full credit for this part of the question.

Buy-In Asset

- Typically the pension trust (not the employer) would acquire the buy-in contract and it would be accounted for as a plan asset
- Plan assets are recorded at fair value
- First approach – fair value of the buy-in contract is directly measured at each measurement date
  - Initially the fair value would be based on the purchase price of the contract
  - In subsequent measurements, fair value would be estimated based on the contract's "exit price", or the amount at which the contract could be sold to a willing third party
    - Includes considerations similar to what was used in the original pricing
- Second approach – based on valuation of insurance contracts that are not annuities which notes that such contracts should be reflected at fair value, but if the contract has a surrender value, this can be used as a proxy for fair value

4. Continued

Projected Benefit Obligation

- First approach – obligation would continue to be measured with the traditional discount rate, mortality, and other assumptions used by the employer.
  - Expect the buy-in contract asset to exceed the value of benefit obligation because discount rate inherent in obligation would be higher than buy-in contract (mortality may also be different)
- Second approach – Value of benefit obligation is set equal to the fair value of the buy-in contract asset value at each measurement date
  - Supportable because the guidance on establishing discount rates calls for use of a rate at which the obligation could be effectively settled – which the buy-in contract could be considered
  - Also considered acceptable to use mortality reflected in the value of the buy-in contract
  - Actuarial loss will need to be measured at next measurement date to match the (generally higher) purchase price of the buy-in contract

(d) Compare and contrast the accounting treatment of annuity buy-in contracts and annuity buy-out contracts under U.S. GAAP.

Commentary on Question:
Most candidates described the settlement treatment for buy-ins and buy-outs, but the other supporting points below were often omitted. While not all of the items were required to receive full credit for this part of the question, candidates generally should have provided more details to support both the balance sheet and income statement impact (for example, explicitly stating how the pension obligation and assets are affected under each approach).

Balance Sheet impact

Buy-in

- No impact on balance sheet
- Pension obligation remains in the plan
- Buy-in contract remains a plan asset

Buy-out

- Reduces plan's balance sheet footprint
- Removes pension obligation from balance sheet
- Removes related plan assets from balance sheet

4. Continued

Income Statement impact

Buy-in

- Does not trigger settlement gain/loss
- Continued amortization of gain/loss deferred in AOCI
- Expense could increase if expected return on buy-in asset is less than previous assumed return
- However, ongoing expense will be less volatile

Buy-out

- Triggers settlement accounting
- Including the gain/loss arising on purchase of the annuity
- No future amortization of the gain/loss that was deferred in AOCI
- No expense volatility going forward

In order to qualify for a settlement, requires that the three criteria all be met

- The action is irrevocable
- The employer is relieved of primary responsibility for the obligation
- The transaction eliminates significant risks related to the obligation and assets used to effect the settlement

5. Learning Objectives:

1. The candidate will understand how to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations.

Learning Outcomes:

(1a) Assess the different types and combinations of investment vehicles for providing retirement benefits given the particulars of the stakeholders' financial circumstances, philosophy, industry, work force and benefit package.

(1g) Solve for a measure of investment performance relevant to a given benchmark.

Sources:

RPIRM 100 -14: Chapter 24 of Retirement Plans (Allen text book, 11th edition)

Litterman ch28 (private equity)

McGill ch26 (CAPM, starting on 700, plus asset class discussion)

RPRIM 108-13: Introduction and overview of retirement plan investments

Commentary on Question:

Part (b): Candidates that were successful were able to describe

Solution:

(a) List the assumptions made about individual investor behaviour that form the basis of the CAPM.

Commentary on Question:

Candidates that were successful were able to identify and list assumptions regarding individual investor behavior. Candidates that described assumptions not applicable to the individual investor (e.g. candidates explaining in general the Efficient Market Hypothesis and other market conditions that are not necessarily individual investor behavior assumptions of the CAPM model), or critiqued/discussed the model without listing the assumptions did not receive full credit

The following is assumed regarding the individual investor behavior:

- It is assumed that investors act rationally to maximize the expected utility of wealth.
- It is assumed that investors have homogenous expectations and use the same input list. In other words, all investors have the same information and the same expectation of the market
- There are many investors, each with an endowment of wealth which is small compared to the total endowment of all investors. In other words, investors are price-takers.
- All investors plan for one identical holding period.

5. Continued

(b) Calculate the risk-adjusted return for each of the proposed funds using CAPM.

Show all work.

Commentary on Question:
Candidates that were successful were able to identify the expected risk-adjusted return formula from the CAMP model and the components of the formula. No additional credit was given for other measures (for instance, the Treynor ratio) that are not the expected risk-adjusted return.

Basic CAPM formula for the predicted risk-adjusted rate of return is

$$R_P = R_f + \left(R_M - R_f\right) \times \beta$$

WX REIT Fund:
$R_{REIT} = R_f + \left(R_{Benchmark\ REIT} - R_f\right) \times \beta_{REIT}$ = 0.03 + (0.065 – 0.03) x 1.05 = 0.06675
YZ Private Equity fund:
$R_{PE} = R_f + \left(R_{Benchmark\ Priv\ \ Equity} - R_f\right) \times \beta_{PE}$ = 0.03 + (0.09 – 0.03) x 0.85 = 0.081

(c) Describe the advantages and disadvantages of investing pension plan assets in REITs and private equity.

Commentary on Question:
Candidates that were successful were able to identify specific advantages and disadvantages particular to each type of investment instrument. Candidates that discussed general investment selection considerations without recognizing the particular characteristics of these two investment vehicles did not receive full credit

Real Estate Investment Trusts (REITs)

Advantages:
- Potential for inflation hedge
- Diversifier again traditional stocks
- Potential for lower volatility
- Higher liquidity than other real estate investments since they trade on a stock exchange

Disadvantages:
- May be difficult to quantify risk
- More difficult to obtain good, reliable data for real estate

5. Continued

Private Equity

Advantages:

- Information about them may not flow as easily (less regulated and transparent) – opportunity to generate large returns
- Private equity investors can control company outcomes more easily than with public companies
- Lack of liquidity can lead to higher return
- Long-term view of private equity means they are willing to take short-term losses for future potential large returns

Disadvantages:

- Lack of information makes it more challenging to use equilibrium approach
- Not as liquid as public equities can make it more challenging to generate cash
- Historical research suggests returns may not be significantly higher than public equities with much higher volatility
- Costs are higher than with public equities

6. Learning Objectives:

3. The candidate will understand how to evaluate the stakeholders' financial goals and risk management with respect to their plan.

Learning Outcomes:

(3a) Compare the interests of plan sponsors, employees, shareholders, taxpayers and other stakeholders related to the financial management of a retirement plan.

(3d) Compare the financial economics perspective to the traditional perspective on funding and accounting for retirement plans.

Sources:

RPIRM-120-13; RPIRM-121-13; RPIRM-118-13; RPIRM-124-13; RPIRM-125-13

Commentary on Question:

The question was asking for arguments for and against including public equities in a defined benefit pension plan from the perspective of (i) a shareholder in a public company and (ii) a tax payer in a governmental unit that sponsors a defined benefit pension plan.

To receive full credit, a candidate should provide several reasons for and against under both perspectives. The solution could be in list form but should have descriptions of what the list items mean.

Many candidates provided arguments from the plan sponsor, governmental agency, or employee perspective which was not what the question asked.

Solution:

List the arguments for and against including public equities in a defined benefit pension fund from the perspective of:

(i) shareholders of a publicly traded company; and

(ii) taxpayers of a government that sponsors the pension plan.

(i) Shareholder perspective

For

- Higher expected return for equities reduces pension expense
- Equities in the pension plan conceal volatility and risks
- Equities in the pension plan may make financial statements appear better

Against

- Pension benefits are mispriced in negotiations and compensation decisions
- Risks are borne by individuals not institutions
- Shareholder would prefer investment in bonds in the pension plan due to tax arbitrage

6. Continued

- Valuing plan using equities does not reflect the real market value
- Shareholder unlikely to recover any surplus since surplus often belongs to the plan participants

(ii) Taxpayer perspective

For

- Prefer lower taxes now
- Can move to avoid troubled pension fund

Against

- Equity investments invite underpricing of pension plans
- Intergenerational risk means lower contributions now pass higher taxes to future generation
- Employees and not tax payers usually have claim on surplus
- Benefits are mispriced in negotiations and compensation decisions
- Higher government borrowing costs for government entities who invest in equities

7. Learning Objectives:

1. The candidate will understand how to analyze the issues facing retirement plan sponsors regarding investment of fund assets and make recommendations.

Learning Outcomes:

(1b) Distinguish the various strategies, approaches and techniques used to manage retirement fund assets.

Sources:

RPIRM 103-14: Fiduciary Liability Issues for Selection of Investments

RPIRM 132014: CAPSA, Guideline No. 6

Commentary on Question:

In general, candidates scored very well on parts (a) and (c) of this question. On part (b), the most common mistake candidates made was to focus on the hiring of the investment manager. This is one of the considerations, but there are many others as well. The candidates who identified these other considerations scored much better overall.

Solution:

(a) Describe the circumstances in which XYZ would consider delegating this function.

XYZ should consider delegating the investment of plan assets if they believe they lack the skill, resources, or investment expertise needed to perform the duties.

(b) Describe the considerations XYZ should address before delegating this function.

There are a number of considerations XYZ should address:

- XYZ should exercise prudence in the selection of the investment manager. This includes investigating his or her qualifications, assessing that he or she has in place appropriate structures and resources, and ensuring that relying on the expert's advice is justified.
- XYZ should ensure that the assets are invested in accordance with the Investment Policy Statement. The governance documents should be updated to clearly set out the authority to delegate the investment function. The documents should also clearly set out the terms of the delegation.
- XYZ must exercise prudence in the instructions given to the investment manager. They must provide him or her with complete and accurate information.
- XYZ must have processes that include due diligence in selecting, reporting, and monitoring investments.

7. Continued

(c) Describe XYZ's responsibilities after delegating this function.

After delegating the investment activities, XYZ is still responsible for the actions of the new investment manager. XYZ must exercise prudence in supervising the manager, monitoring and reviewing the delegated activities. They must also monitor and review the performance of the investment manager to ensure they are still acting in the best interest of the plan participants.