RET RPIRM Model Solutions
Fall 2018

1. 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:

(1f) Identify and assess the sources of investment risk applicable to retirement fund assets.

Sources:

Designing the Future of Target Date Funds
https://www.alliancebernstein.com/sites/library/Instrumentation/DCI-7213-0615.pdf

Commentary on Question:

This question focused on the candidate's knowledge of investment risks. Plan participants are increasingly exposed to these risks as the burden of responsibility to fund retirement shifts to individuals through DC plans. Candidates should be prepared to discuss the how plan participants are impacted by these risks. Additionally, they should be prepared to discuss plan characteristics desirable to participants.

Candidates did well on this question overall.

Solution:

(a) 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

1. Continued

Commentary on Question:
Candidates generally did well on part A. Successful candidates defined each risk and focused the remainder of their answer on explaining the specific means by which each risk would impact retirement income.

(i) **Subpar investment growth**
Subpar investment growth in a participant's DC account can negatively impact the amount of retirement income available to an individual. A significant portion of an account balance is derived from investment returns over the course of an individual's lifetime. The lack of sufficient investment growth would leave an individual with less money to fund their retirement than was planned. An individual may be forced to delay retirement to attain sufficient income.

(ii) **Market risk**
Market risk derives for the timing of investment withdrawals and market fluctuations. Withdrawing funds during a falling market could permanently deplete the amount of capital available to fund the remainder of a participant's retirement. Younger participants are better able to bear market fluctuations because they are further from needing to withdraw funds.

(iii) **Inflation risk**
Inflation reduces the amount of real returns on a traditional investment portfolio. High levels of inflation erode the purchasing power of a given amount of money. Participant's may be forced to lower their standard of living and spending if their investments returns do not keep pace with inflation.

(iv) **Increasing longevity**
Mortality improvements have increased expected future lifetimes. A shortfall in available assets may result if a participant planned to fund their retirement based on an assumption for life expectancy shorter than their actual lifetime. This may cause a retiree to outlive their available retirement income.

(b) 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.

1. Continued

Commentary on Question:
Candidates who recalled the characteristics described in the study note did well. Successful candidates focused their explanations on the characteristics themselves rather than specific items that could be implemented by a plan. In other words, what goal is there a desire to achieve rather than what specific feature could achieve the goal?

- **Income Certainty**
  An ideal solution would provide a regular income payment guaranteed for the individual's lifetime. The longevity risk an individual is exposed to in a traditional DC plan would be mitigated as individuals would not have to worry about outliving their retirement savings. The option to partially annuitize their account would be one example.

- **Access to Retirement Account**
  Flexibility to withdraw additional funds when necessary would benefit retirees. Unexpected expenses can occur and occasionally will occur in large amounts. Financial hardships can be avoided if participants have options to vary the amount and/or timing of funds withdrawn.

- **Ability to Capture Market Upside**
  Inflation and lifestyle choices can vary the amount of money needed to live comfortably during retirement. Exposure to some market returns during retirement can provide additional funds for a retiree to meet expenses for the duration of retirement. The purchasing power of a strictly fixed income portfolio would decline over time and equity exposure during retirement years could mitigate this effect.

- **Known Fee and Benefit Rate**
  Fees can impact the amount of income available to an individual during retirement. To the extent these fees are known and unchanging, a participant will be able to more successfully budget for their retirement needs. Similarly, varying benefit amounts could cause financial difficulties if the benefit received unexpectedly decreases. Transparency of fees and benefits allow retirees to plan their retirement more successfully.

2. 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:

(1f) Identify and assess the sources of investment risk applicable to retirement fund assets.

Sources:

RPIRM-148-17: Key Rate Durations: Measures of Interest Rate Risks

RPIRM-151-18: Designing the Future of Target Benefit Funds

Commentary on Question:

Candidates performed well on parts a and b.

Solution:

(a) Calculate the change in the key rate at year 10 which results in a price of $102.60.

.03+.1+.1+.3+.5+.8+x+1.7+1.5+1.3+3.1 = 10.83

Tenth key rate duration x = 10.83-(.03+.1+.1+.3+.5+.8+1.7+1.5+1.3+3.1) = 1.4

Formula $P^* - P = -P D(i) d(i)$

where P = initial price, P* = revised price, D(i) = ith key rate duration, d(i) = shift of ith key rate

Change in price 102.6-102 = – 102 (1.4) d(i)

d(i) = .6/-142.8 = -.0042

(b) Describe in words how the effective duration and key rate durations would change if:

(i) A sinking fund was added to the bond;

i. The sinking fund reduces the effective duration of the bond
ii. The sinking fund makes the bond more sensitive to shorter-term key rates
iii. The sinking fund significantly reduces the long-term key rate durations

2. Continued

(ii) A European put option was added to the bond; or
   i. Option has a large negative effective duration
   ii. Option has a large positive key rate duration at expiration
   iii. Option has large negative key rate durations beyond expiration

(iii) The bond was a 10% callable bond.
   i. Effective duration is lower than 9% callable bond due to higher coupon or Effective duration is lower than 10% noncallable bond due to call feature
   ii. Callable bond is more sensitive to shorter-term key rate changes
   iii. Higher coupon bond tends to be less sensitive to long-term key rate risk

(c) 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.

Commentary on Question:
Some candidates who received partial credit listed strategies without any description. Some candidates listed strategies related to DB plans, even though this question specifically asked in regards to target date funds in DC plans; partial credit was awarded.

i. High-Income Strategies
   - Effective diversifiers since higher returns than traditional bonds

ii. Global Bond Strategies
   - Can lessen impact of a sharp rise in US interest rates

iii. Low-Duration Strategies
   - Help reduce interest rates sensitivity and volatility

iv. Fixed-Income Diversifiers
   - Returns driven primarily by manager skill rather than broad market exposure
   - Non-traditional bonds and market-neutral strategies are two examples

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:

(1c) Given a context, analyze a Statement of Investment Policy.

Sources:

RPIRM-132-14: CAPSA Guideline No. 6, Pension Plan Prudent Investment Practices

RPIRM-103-15: Fiduciary Liability Issues for Selection of Investments

RPIRM-155-18: CAPSA Guideline No. 4, Pension Plan Governance Guideline and Frequently Asked Questions

Commentary on Question:

The question sought to test candidates' understanding of the fiduciary responsibilities of the sponsors and trustees for a defined contribution plan. To this end, a scenario was presented in which several questionable elements were present in the excerpt from the Investment Policy Statement (IPS).

Given that the question was worth 7 points (21 minutes), a comprehensive answer was expected, beginning with what fiduciary obligations there are in DC plans and how what was known from the IPS excerpt compared to those. Credit was also awarded for making recommendations for improving the plan design and administration so that it was more in concord with fiduciary obligations.

Some candidates who did not score so well spent a significant amount of their response listing various elements that were not mentioned in the IPS excerpt, even though the question was to critique the IPS excerpt as outlined in the question.

Many candidates were able to identify some fiduciary responsibilities, including details on those related to delegation. Most recognized that the funds offered did not cover asset classes well and that a more diversified mix of funds should be offered, that expense ratios were high, a fixed income fund should be offered, and at least quarterly changes should have been permitted instead of semi-annual.

Many mentioned the likely conflicts of interest in having the CEO and CFO of the company serve as trustee and investment manager, respectively. However, relatively few mentioned getting an independent manager and trustee, or offering a QDIA. Almost none mentioned that the raw land REIT failed to make property productive, a core fiduciary duty under ERISA.

3. Continued

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

The trustee may be required to delegate if they lack investment expertise or knowledge of trust law.

If trustee delegates, the trustee must exercise prudence when selecting and monitoring an investment manager.

Trustee retains responsibility for plan even if they delegate.

Under ERISA, fiduciary duties include:

- Loyalty
- Care (prudent professional investor standard)
- Diversification
- Delegation

Also, under CAPSA:

- when the employer acts as plan administrator, they must act in the best interest of plan beneficiaries
- it is the participants in defined contribution plans who are responsible for investment objectives, risk tolerance, asset allocation, due diligence, and investment selection

In light of the situation with ABC Investment Group, one should particularly watch out for:

- possible breaches of loyalty to plan beneficiaries,
- self-dealing, and
- conflicts of interest

3. Continued

In light of the funds offered, it seems clear that:

- the funds offered do not cover asset classes well
- each fund is inadequately diversified within its class
- the stock fund is not diversified since it excludes growth stocks
- the raw land REIT fails to make property productive
- expense ratios are high; fee litigation is a risk
- conflict of interest is likely
- the default option is not a QDIA because it is not one of the recognized types (such as a target date fund)

Recommendations:

- Get an independent trustee and fund manager
- Eliminate the raw land REIT fund
- Replace funds with a diversified, broader menu of lower-cost funds, including a diversified fixed-income fund
- Provide a QDIA
- Allow at least quarterly changes

4. 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.

(3e) Provide advice and analysis to stakeholders regarding the economic assumptions used in the valuation of their retirement plans.

(3f) Provide advice and analysis to plan sponsors and other stakeholders regarding the mitigation of pension plan risks.

Sources:

Study Note(s): RPIRM-115-13: Pensions in the Public Sector, Ch. 9

RPIRM-123-13: Risk Management and Public Plan Retirement Systems - (appendix background only)

Commentary on Question:

This question was trying to test the candidate's understanding of public pension plans' characteristics and how they affect the funding of these plans.

Solution:

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

Regulations for public pension plans tend to allow, if not lead, to underfunding.

- Public plans are not governed by ERISA: thus, not subject to minimum funding rules.
- In case of default in contribution payments, not protected by PBGC.
- Public plan participants are generally protected by the same state constitutional clauses that forbid the government entity from using its power to revoke or repeal contracts.

The methods and assumptions used when calculating the contributions for public pension plans can also lead to underfunding:

- Contributions are determined by measuring liabilities deterministically, ignoring the asymmetry of pension system.
- Many plans raise benefits when plan funding improves but cannot cut benefits when funding deteriorates.
- System can be "gamed" by assuming a higher discount rate, permitting cuts in current contributions without any other change in policy.
- Investment policy can be changed to increase equity exposure to justify higher expected rate of return to calculate contributions.
- When higher risk is not recognized, current costs appear to be reduced, but there is a higher chance of reduced funded level.

4. Continued

Compared to private sector pension plans, the accounting plays a significantly larger role in how public pension plans are funded**:**

- Most public systems consider the required contribution amount as the accounting cost.
- Funding cost is thus important for budgetary purposes.
- Elected administration prefers funding costs are as low as possible so that more of the budget is available to finance the administration's goals.
- Assets tend to be kept at "book" value or smoothed market value.
- Discount rate used to measure liabilities usually set artificially, such as the long-term expected return on the portfolio.

Finally, the actions taken by public plan sponsors, considering the specific characteristics of theses plan, can lead to underfunding:

- Surplus assets tend to be used to increase the benefits, which in turn leads to increased costs and long run underfunding.
- The burden of appropriate funding seems to fall mainly on the shoulders of the plan actuary who is usually a hired consultant and not in a very strong position.
- It is usually economically more efficient for tax payers to aim lower rather than higher given the asymmetries of bearing all the downside risk but not owning all the upside return. Tax payers thus demand less funding, rather than more funding.
- Insufficient funding by legislative bodies, explained by slippery slope of skipping contributions.
- Public pension plans often provide excessive benefit levels in relation to the risk capacity of the plan sponsor to fund them, because of challenge of managing plan surplus in relation to ongoing investment risk.

(b) Describe how these strategies could improve the funded status of the plan.

Commentary on Question:
For this question, it was of primary importance to describe how these strategies could improve the funded status of the plan, considering that it was sponsored by a government, rather than only providing general comments on the strategies.

(i) **Asset/liability matching:** Asset/liability matching is investing in assets that move in tandem with liabilities. For public pension plans, there exists an “asymmetry in payoff pattern” because shortfalls lead to higher tax burden while surpluses lead to increase in benefits. Having liabilities that move in tandem with assets will therefore reduce the eventuality of a funding shortfall.

4. Continued

(ii) **Amount of equity exposure:** Considering the plan design of most public pension plans (final average pay, cost of living adjustments, early retirement subsidies, etc.), there is almost always presence of “noise”. The “noise” in the liabilities is the “volatility in the relationship between bonds and liabilities”. The presence of noise increases the optimal equity exposure because in this case, increasing the equity exposure increases returns more sharply than it increases risk. Using the optimal equity exposure will consequently improve the funded status over time.

5. Learning Objectives:

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

Learning Outcomes:

(3b) Describe how the retirement plan financial and design risks integrate with the sponsor's risk management strategy.

(3d) Understand and apply the principles of financial economics with respect to pension plan investing.

Sources:

RPIRM-149-17: Practical De-Risking Solutions: Asset Duration and Interest Rate Risk;

RPIRM-121-13: The Case for Stock in Pension Funds Pension Actuary's Guide to Financial Economics

Commentary on Question:

This question tests a candidate's knowledge on glide path strategy. Candidates are expected to discuss the advantages of implementing a glide path strategy. Candidates should also be prepared to describe the considerations in the process of designing and implementing a glide path strategy. Candidates are expected to critique glide path strategy from financial economics perspective.

Solution:

(a) Describe the advantages of implementing a glide path strategy.

Commentary on Question:

Successful candidates listed the advantages of implementing a glide path strategy instead of simply describing a glide path strategy. Candidates did well on this question overall.

- A glide path balances strategic policy with tactical implementation. Achieves two goals at once.
- Risk management is incorporated into the investment policy. This is a logical and tangible approach.
- De-risking occurs incrementally based on pre-established triggers, effectively mitigating the risk of mistiming or second-guessing a decision
- Avoids inaction, changes investment strategies based pre-defined triggers
- De-risking decisions are pre-determined. Therefore, removing emotions from decision making and manages regret risk.

5. Continued

(b) Describe the considerations in designing and implementing a glide path strategy.

Commentary on Question:
Successful candidates described considerations on the design and implementation stage and went beyond simply describing a glide path strategy. Candidates generally did well on part B.

A good glide path will be customized to the circumstances and objectives of the plan sponsor. Below are the elements of designing and implementing glide path strategy:

- **Governance** - Outlining and documenting a formal process governing the way in which the glide path will be executed.
- **Clear determination of the end state** – this should reflect the plan sponsor's strategic objectives. This will typically be associated with a risk profile that best supports the plan's desired long-term objectives.
- **Appropriate trigger points** –Trigger points that will drive the de-risking process is consistent with the end statement objectives. Examples could be interest rate levels, interest rate spreads, funded status, plan maturity and time. This trigger depends on the plan sponsor's objective and the plan's current funded status.
- **Trigger distance** – If the increments between triggers are too small, the glide path could induce an unnecessarily large number of trades, resulting in excessive transaction cost. If increments are too large, then gains to the plan might be missed.
- **Monitoring frequency** – a monitoring process should be put in place and policy should be reviewed periodically to assure execution and spot where changes need to be made

(c) Critique glide path strategies from a financial economics perspective.

The glide path might not be supported by someone who believes in the financial economics approach for funding a pension plan. From a financial economics perspective, pension plans should invest in a portfolio that will match the cash flows of the pension plan.

5. Continued

De-risking should be achieved by matching assets and liabilities. Financial economists believe bonds are the better matching asset and should primarily be used in pension plans. Optimal cash flow matching should include some equity to the extent that stock will successfully hedge the economic risks in the benefits promised. In addition, shareholders lose out on tax arbitrage when the pension plan is not invested in bonds.

An asset portfolio should be rebalanced based on changes in cash flows and not pre-determined trigger points.

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:

(3f) Provide advice and analysis to plan sponsors and other stakeholders regarding the mitigation of pension plan risks.

Sources:

RPIRM-128-13: The Impact of the Financial Crisis on Defined Benefit Plans and the Need for Counter-Cyclical Funding Regulations, excluding appendices

Commentary on Question:

Candidates should describe how regulators could make an impact and not just describe how each issue may influence long-term funding. Candidates receiving higher marks were those who could suggest specific regulations to assist with counter-cyclical funding.

Solution:

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

(i) Avoid excess reliance on current market values

- Regulators should operate flexibly when reviewing a funding position.
- Regulators could encourage plan sponsors to dampen the volatility of market prices moderately when determining contributions.
- Funding regulations should encourage increased contribution to reduce deficit and appropriate build-up of surplus when plan sponsor finances are strong.

6. Continued

(ii) Allow appropriate levels of overfunding through flexible tax ceilings

- High funding levels during good economic times can act as a buffer under adverse market conditions due to a double shock with liabilities rising as a result of lower discount rates while asset values plunge.
- Maximum contribution to span a multi-year period rather than be set on an annual basis to allow greater management of cash flows by the plan sponsor.
- Government should consider raising the maximum level of surplus before contributions must be suspended.
- Government could introduce smoothing into the maximum limit rather than setting limits based on marked-to-market surplus level.

(iii) Limit contribution holidays and access to surplus

- Regulators can consider limiting the extent to which plan sponsors can take contribution holidays.
- Sponsors could offer additional benefits or withdraw a portion of the pension surplus, but regulators should only allow a holiday when a certain funding level is achieved.
- Regulators could require that any such surplus reducing action is introduced in a gradual fashion, reducing the risk of a quick depletion of the buffer.

(iv) Encourage stability of long-term contribution patterns through appropriate actuarial methods

- There are various actuarial funding methods and valuation methods for pension liabilities, they are different in terms of degree of transparency and impact on the volatility of contribution levels.
- Plan sponsors tend to choose the straightforward yet somewhat volatile projected unit method since it is typically required for accounting disclosure.
- Regulators should encourage plan sponsors to adopt actuarial methods that lead to smoother contribution patterns, for example, amortize gains/losses over multiple years instead of one-time recognition.