

RET RPIRM Model Solutions

Spring 2022

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.
2. The candidate will recognize and appropriately reflect the role of plan investments in managing plan sponsor risk.

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.
- (1b) Distinguish the various strategies, approaches and techniques used to manage retirement fund assets.
- (1e) Describe the regulatory restrictions on retirement plan assets.
- (1f) Identify and assess the sources of investment risk applicable to retirement fund assets.
- (2a) Evaluate the interaction of plan investments with plan design, valuation, accounting and funding.
- (2b) Evaluate the interaction and relationship between plan investments and valuation assumptions/methods.
- (2c) Evaluate how factors including cash flow requirements, various plan designs and various economic environments affect setting investment strategy.
- (2d) Apply and evaluate strategies and techniques for asset/liability management.
- (2e) Provide advice and analysis to plan sponsors regarding the mitigation of pension plan risks.

Sources:

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

RPIRM-165-21: A guide-to-delegated-investment-management

1. Continued

RPIRM-138-16: FSCO's IGN 001 – Buy in Annuities for Defined Benefit Plans

Commentary on Question:

Most candidates did well on this question.

Solution:

- (a) Compare and contrast the following strategies:
- (i) Purchasing a buy-in annuity for the liabilities of the retired participants.
 - (ii) Delegating the investment management operations of the pension plan.

Commentary on Question:

Full credit was given to candidates who named at least eight points for each strategy.

(i) Annuity buy-in

- Removes interest rate risk of pensioners
- Removes mortality/longevity risk of pensioners
- Meets the objective of reducing the volatility of the plan's funded status, as part of the risks have been transferred
- Buy-in annuity with cost of living adjustment for retirees is very expensive to purchase, especially given the low interest rate environment
- The plan is well under-funded, which means that most of the plan assets would be used to purchase annuities, leaving very little to be invested. A top up will likely be needed.
- Since liabilities cannot be fully discharged after buy-in, plan sponsors will still need to make regular contributions, pay PBGC premium, and spend time/resources on managing the plan. This may also complicate the governance of the investments of the pension plan.
- Since the plan is relatively small in AUM, the buy-in annuity quote may not be as competitive comparing to larger plans
- Credit/Default risk if insurer stops paying benefits

(ii) Delegated investment management

- Plan sponsors have more time to focus on key strategic issues and long-term goals such as reducing the volatility of the plan's funded status for the pension plan
- Plan sponsor retains accountability for the investment strategy (overall risk and return) and works with the manager to determine time horizon, return and risk
- Separation of governance and execution functions helps simplify the governance of the investments of the pension plan

1. Continued

- Ease of monitoring of investment performance
 - As the fund has a cost of living adjustment component, hiring managers with expertise in inflation risk management can be beneficial
 - Access to more investment opportunities that normally a small pension fund cannot access
 - As smaller pension funds usually pay higher investment management fees, the economies of scale of the delegated investment manager can potentially provide savings
 - As the pension plan is well underfunded, the plan sponsor can delegate the investment manager to prioritize on reducing funded status volatility via asset-liability glide path strategies as the plan gradually improves its funded position
 - As the pension plan matures, the delegated investment manager can set up a journey plan, which outlines how the plan hopes to reach its funding objective. This aligns the interest of manager and plan sponsor, which allows better investment risk management
- (b) Recommend whether Company ABC should employ Vendor XYZ for their services. Provide justification for your recommendation.

Commentary on Question:

Most candidates did well on this question. Full credit was given to candidates who provided sufficient justification on various aspects as shown below.

No, Company ABC shouldn't employ Vendor XYZ for the following reasons:

- Breaches duty of loyalty
 - Company ABC has a duty to administer the plan for the benefit of beneficiaries
 - Providing bundled service (including actuarial valuation) itself is not a problem, but the use of a more optimistic approach is. Using a more optimistic discount rate can artificially lower the plans liabilities and funding requirements. This can save expenses for the employer, but ultimately the plan participants may not be getting the proper funding.
 - Instead, best estimate of actuarial assumption should be used.
- Breaches duty of care
 - The fiduciary must conduct due diligence and shop around for quotes from other vendors
 - Although XYZ provides above average performance, the use of leverage may not be allowed in the plan's investment policy statement (IPS) and also may not be in line with Company ABC's goal to reduce the volatility of the plan's funded status. Company ABC must make sure the delegated manager complies with any limitations stated by the IPS.

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:

- 1b) Distinguish the various strategies, approaches and techniques used to manage retirement fund assets.
- (1f) Identify and assess the sources of investment risk applicable to retirement fund assets.

Sources:

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

Commentary on Question:

Commentary listed underneath question component

Solution:

- (a) Describe the risks faced by plan members of a defined contribution (DC) pension plan with assets invested in target date funds during the:
 - (iii) accumulation phase; and
 - (iv) decumulation phase.

Source: RPIRM-151-18: Designing the Future of Target-Date Funds

Commentary on Question:

Overall, candidates performed well on part (a). Most candidates can describe the main risks based on their understanding of the target date funds.

- (i) Accumulation phase
 - Subpar investment growth - the risk that stocks and bonds will fail to generate enough investment returns resulting in lower asset values at retirement which cannot be recouped through future income and savings.
 - Market risk - the risk of a short-term market loss right before retirement where retirees do not have the time to recoup the losses.
 - Inflation risk – when inflation rises, the benefits of traditional diversification can break down, exposing participants to potential larger-than-expected downside risks.

2. Continued

(ii) Decumulation phase

- Inflation risk – the risk that high inflation will decrease equity and bond valuations. In addition, the retiree’s spending power declines since the annual expenses increase while portfolio values are declining.
- Longevity risk - the risk of living longer than expected and outliving your retirement savings.
- Market risk – the risk that the equity/bond mix (glide path) doesn’t provide adequate return. For example, bonds may not return enough during an equity market plunge. Also, high concentration in bonds may not generate enough total portfolio growth from equity investments.

(b) Recommend strategies to mitigate the risks identified in (a).

Commentary on Question:

Candidates recommended some of the strategies to mitigate the risks, but most received partial credit. Candidates generally mentioned the strategy to mitigate longevity risk, but many did not provide the strategies to mitigate subpar investment growth and market risk.

Subpar investment growth

- Long/short equity – hedge risk using short positions that will benefit from underperforming stocks.
- Risk parity – in addition to investing in equities, add other asset classes such as commodities, corporate bonds, and government bonds to the portfolio.
- These strategies benefit even more during a long period of a down market.

Market risk

- Equity Risk Management:
 - Defensive equities – as participants near retirement, add low volatility equities and companies with dividends to the portfolio.
- Fixed Income Interest rate sensitivity
 - High-Income strategies – high yield bonds and emerging market bonds are not as sensitive to interest rates
 - Global bond strategies – hedges against rise in US interest rates
 - Low duration strategies – reduces interest rate sensitivity but with lower returns
 - Fixed-Income Diversifiers – include non-traditional bonds such as high-yield, securitized loans, and corporate debt in the portfolio

2. Continued

Inflation risk

- Historically real estate/commodities have performed well with rising inflation
 - Can raise rent prices for real estate
 - Commodities cause inflation
 - Good diversifiers since low correlation with each other
- TIPS will provide bond portfolio protection against upward movement of inflation

Longevity risk

- Can purchase annuity to provide lifetime income option in the DC plan.

Strategies for all risks:

- Dynamic asset allocation – ability to monitor and adjust asset allocation based on current market volatility and conditions.
- Multi-managers – research has shown using multiple managers results in more stable returns than a single manager.

3. 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:

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:

Commentary listed underneath question component.

Solution:

- (a) Describe four advantages of counter-cyclical funding regulations for defined benefit pension plan sponsors.

Commentary on Question:

Candidates generally performed well on this question, though many repeated the same advantage twice. To receive maximum points, candidates had to list 4 distinct advantages. Points were given for reasonable advantages not listed below. Points were not given if a candidate provided more than 4 advantages.

- Can help make defined benefit plans more attractive pension schemes to plan sponsors by providing additional flexibility around contribution requirements, benefit reductions, surplus utilization, and benefit improvements. This may deter plan sponsors from moving DB plans to DC designs.
- Can promote the long-term viability, stability, and security of member benefits as the burden on plan sponsors may be eased during times of economic instability.
- Can encourage deficit reduction contributions and appropriate build-up of surplus when plan sponsor finances are strong. In doing so, plan sponsors may be better able to withstand market fluctuations and may be better positioned to utilize corporate capital more effectively.
- Can help maintain predictable costs and dampen volatility as plan sponsors are able to align pension plan security and contribution requirements with corporate objectives.

3. Continued

- Can give plan sponsors more control to manage risks and costs, especially for financial reporting purposes, where DB plans are accounted for based on market conditions at the time of valuation and fluctuations in the market can make DB plans appear to be more expensive due to timing of the valuation.
 - Other relevant advantages not described above
- (b) Describe four regulatory incentives that could promote the counter-cyclical of funding rules.

Commentary on Question:

Candidates generally performed well on this question. To receive maximum points, candidates needed to describe, not just list, four distinct regulatory incentives. Candidates were not given points if more than 4 incentives were stated. Almost all candidates noted the reliance on market value of assets, and suggested the use of smoothing to counteract market value related issues. Many candidates outlined restrictions or changes to the PBGC or PGBF premiums, and were given points for reasonable explanations.

1. Avoid excessive reliance on current market values for purposes of determining contributions
 - Regulators should enable pension funds and plan sponsors to dampen the volatility of market prices
 - Regulators should promote increased contribution levels and build-up of surplus during strong economic times, allowing for reduced contributions and surplus drawdown during weak economic times
 - Funding regulations could permit the use of smoothed valuation of assets to avoid volatility of market values
 - Funding regulations could permit the averaging of discount rates to avoid spot market discount rates
2. Set minimum funding levels or targets that are consistent with the goal of benefit security
 - Funding levels could be set relative to a plan's investment strategy, thereby making a quantitative assessment of the plan's risk profile to determine required contribution levels and funding buffers
 - Funding levels should also be viewed in conjunction with other country security mechanisms, such as pension guarantee funds or insurance schemes
 - Funding levels should take into account the relative degree of conservatism in the valuation methodology

3. Continued

3. Allow appropriate levels of over-funding in good economic times via more flexible tax ceilings
 - Maximum contribution limits could be smoothed over a multi-year period, promoting high funding levels in good economic times and permits cash-flow management for the plan sponsor
 - Regulators could consider raising maximum level of surplus before contributions must be suspended
 - Regulators could introduce smoothing into the maximum contribution limits, perhaps by setting the maximum funding limit as a specified percent above the smoothed minimum funding requirement
4. Limit contribution holidays and plan sponsor access to surplus
 - Regulators could consider restricting plan sponsor's ability to take contribution holidays
 - Regulators could only allow benefit improvements or withdrawal of surplus once a certain level of funding is achieved
 - Regulators should limit a plan sponsor's access to surplus, or require a gradual drawdown of surplus
 - Regulators should permit the use of buffer accounts, or "Pension Security Trusts" to provide additional flexibility to plan sponsors
5. Encourage stability of long-term contribution patterns via appropriate actuarial methods
 - Regulators should permit the use of sensible actuarial funding methods
 - Different actuarial methods can produce different contribution requirements from a funding valuation
 - Different actuarial methods can lead to different volatility of contribution levels
 - Regulators should promote the use of actuarial methods that lead to greater stability of contribution levels
6. Incorporate flexibility into funding rules to reflect the overall volatility of funding valuations
 - Funding regulations should be structured to avoid plan sponsor strain during times when plan sponsor profitability is under stress
 - The amortization periods to eliminate funding deficits should reflect the overall volatility of funding levels
 - If no smoothing is permitted, regulators should allow for longer amortization periods

3. Continued

- If smoothing is permitted, shorter amortization periods may be more appropriate
 - Regulators could grant plan members priority creditor status
 - Plan sponsors could allocate corporate assets for the pension plan without locking those assets into the pension fund through contributions
 - Regulators should permit the use of letter of credits to secure otherwise required deficit reduction contributions
7. Avoid over-regulation and maintain a stable regulatory environment
- Regulators should avoid continuous change of regulations
 - Regulators should avoid overly complex funding regulations

4. Learning Objectives:

2. The candidate will recognize and appropriately reflect the role of plan investments in managing plan sponsor risk.

Learning Outcomes:

- (2d) Apply and evaluate strategies and techniques for asset/liability management.
- (2e) Provide advice and analysis to plan sponsors regarding the mitigation of pension plan risks.

Sources:

RPIRM-163-21: Liability Driven Investment Explained

Commentary on Question:

Overall, candidates performed well on this question, although many struggled to appropriately answer part (d)

Solution:

- (a) Describe the limitations of using bonds to hedge a defined benefit liability.

Commentary on Question:

Candidates were expected to list and describe at least two valid limitations of using bonds to hedge DB liabilities. Simply listing a limitation without appropriate description did not receive full credit.

While bonds can be a key part of hedging strategy, there are a few limitations that can be less than ideal. The maturity spectrum of the corporate bond market tends to be skewed towards shorter-duration bonds, and there is a high demand for the available longer-duration bonds from both DB plans and insurers. These factors can limit the availability of appropriate hedging instruments, particularly for larger plans. Additionally, moving into bonds requires raising cash, often at the expense of return-seeking instruments. Reducing the return-seeking portion of the portfolio can make it more difficult for some plans to achieve their funded status goals without making additional contributions.

- (b) Explain how holding interest rate swaps hedges interest rate risk.

Commentary on Question:

Most candidates did well on this portion of the question

A swap is an agreement between two parties to exchange one flow of payments for another. A plan holding swaps typically pays a variable rate of interest in exchange for a fixed rate of interest. The movement in the swap is the same behavior exhibited by a pension plan's liabilities, i.e., if interest rates rise, the swap decreases in value, and if interest rates fall the swap increases in value.

4. Continued

- (c) Describe steps to mitigate counterparty risk, as it relates to the interest rate swap contracts.

Commentary on Question:

Full credit on this question required the description of at least two different strategies to mitigate counterparty risk. Some candidates simply listed multiple forms of collateralization, which was not sufficient for full credit.

In order to mitigate counterparty risk, or the risk that a bank defaults and is unable to settle any profit that has accrued within a swap contract, plan sponsors should carefully select the counterparty/banks traded with. It is also prudent to diversify exposure over a number of banks in order to limit the impact of a single default. Finally, plans can ensure that positions are collateralized daily and/or work through a central clearing house to limit risk exposure.

- (d) Company XYZ is considering the following strategies to increase the hedge ratio to 80%.
- Increasing the duration of the fixed income assets
 - Increasing the fixed income allocation
 - Entering into an interest rate swap contract

Compare and contrast the three strategies.

Commentary on Question:

Many candidates included hedge ratio calculations within their answer to this portion of the question, requiring them to make assumptions about the durations of the various asset strategies. This was neither requested nor helpful in answering the question and received no credit. The numerical detail provided in the prompt was intended to inform candidates about the plan's funding level and current liability-hedging allocation to help candidates weigh the pros/cons of the various strategies.

Overall: Company XYZ's plan is currently only 80% funded, which means that there is a sizable funding deficit that will ultimately need to be made-up, whether through contributions or asset returns. Given that Company XYZ wishes to minimize contributions, strategies that reduce the expected return of the portfolio could be less than ideal.

4. Continued

Increasing the Fixed Income Allocation:

While increasing the overall allocation to fixed income could help increase the hedge ratio, it also means that XYZ will likely have to reduce the amount of return-seeking assets in its portfolio. Reducing these assets may make it more difficult to close the funding gap over time. Additionally, depending on whether the fixed income assets are government or corporate, increasing the fixed income allocation may introduce additional credit exposure into the portfolio, which may not be desirable. However, increasing the fixed income allocation would not require the plan to use leverage or introduce material counterparty risk into the portfolio (unless heavily allocated to specific bonds), so may be less risky than the swaps approach.

Increasing the Duration of the Fixed Income:

Increasing the Duration of the existing Fixed Income allocation would allow the plan's hedge ratio to improve without requiring a reduction in the return-seeking assets needed to close the funded status gap with minimal contributions. Longer duration fixed income assets also often provide higher returns than similarly rated short duration bonds, which could improve the plan's ability to minimize cash contributions. Like the increase in fixed income allocation, the introduction of longer duration credit instruments could introduce additional credit exposure into the portfolio, however, it is likely that some of the longer duration instruments needed to get this plan to 80% hedge ratio would be government bonds. Also similar to the prior answer, increasing the fixed income duration would not require the plan to use leverage or introduce material counterparty risk into the portfolio (unless heavily allocated to specific bonds), so may be less risky than the swaps approach.

Entering into an Interest Rate Swap Contract:

Interest Rate Swaps could be an advantageous way for XYZ to achieve both their hedge ratio objective and their goal of minimizing contributions. Swaps would require no up-front capital and could allow the plain to maintain, or potentially even increase, the return-seeking allocation. Swaps also do not introduce any additional credit exposure into the portfolio, which is an advantage over both fixed income approaches. Despite these advantages, swaps would introduce leverage into the portfolio, which needs to be monitored/adjusted over time. Swaps also introduce potential counterparty risk (which can be partially mitigated as previously discussed) and may not be as liquid as fixed instruments would be.

- (e) Recommend a strategy that meets the Company's objective. Justify your recommendation.

4. Continued

Commentary on Question:

Full credit was available for any choice of strategy but only if the candidate picked a single strategy and described how it met XYZ's objectives. The question intended for candidates to select from one of the three options in part (d) of the question, however, full credit was available for other reasonable strategy choices as well if properly described.

XYZ should consider entering into an Interest Rate Swap contract in order to meet their objectives. Interest rate swaps would allow XYZ to increase the hedge ratio as desired, which will contribute to limiting cash contribution volatility. The plan can simultaneously either maintain or increase the return-seeking allocation within the portfolio, helping to reduce expected future cash contributions and enable XYZ to better close the funded status gap. While swaps would introduce some additional risk into the portfolio (e.g., counterparty risk and leverage), the risk would likely be more than justified by the benefit received from the swap contract.

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:

- (3c) Analyze how the retirement plan integrates with the sponsor's overall financial position.
- (3d) Understand and apply the principles of financial economics with respect to pension plan investing.

Sources:

Corporate Pension Risk Management and Corporate Finance: Bridging the Gap between Theory and Practice in Pension Risk Management

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Calculate the following ratios for each company, adjusted for the net pension obligation:
 - Debt-to-equity ratio;
 - Long-term debt to equity ratio; and
 - Asset-to-equity ratio.

Commentary on Question:

Some candidates scored well in this section. Candidates that did not do well made unnecessary adjustments or did not understand the balance sheet components.

Company A Debt-to-equity ratio = $34,453 / 12,709 = 2.71$

Pension deficit = $12,983 - 11,663 = 1,320$

Total long-term debt = $20,994 + 1,320 = 22,314$

Long-term debt to equity ratio = $22,314 / 12,709 = 1.76$

Asset-to-equity ratio : $47,162 / 12,709 = 3.71$

Company B: Debt-to-Equity ratio = $52,267 / 18,392 = 2.84$

Pension deficit = 0

Total long-term debt = 24,437

Long-term debt to equity ratio = $24,437 / 18,392 = 1.33$

Asset-to-equity ratio : $70,659 / 18,392 = 3.84$

5. Continued

(b) Calculate the following ratios for each company using a holistic corporate balance sheet approach:

- Debt-to-equity ratio;
- Long-term debt to equity ratio; and
- Asset-to-equity ratio.

Commentary on Question:

Candidates generally did not do well in this section. Many candidates did not understand the pension plan adjustments needed for the holistic corporate balance sheet approach. Some candidates did not realize that long term debt is already included in the balance sheet liabilities.

Company A: Liabilities excluding pension deficit = $34,453 - 1,320 = 33,133$
Total liabilities = $33,133 + 12,983 = 46,116$
Debt-to-Equity ratio = $46,116 / 12,709 = 3.63$

Total long-term debt = $20,994 + 12,983 = 33,977$
Long-term debt to equity ratio = $33,977 / 12,709 = 2.67$

Pension surplus = 0
Assets excluding pension surplus: $47,162 - 0 = 47,162$
Total assets : $47,162 + 11,663 = 58,825$
Asset-to-equity ratio : $58,825 / 12,709 = 4.63$

Company B: Liabilities excluding pension deficit = $52,267 - 0 = 52,267$
Total liabilities = $52,267 + 2,298 = 54,565$
Debt-to-Equity ratio = $54,565 / 18,392 = 2.97$

Total long-term debt = $24,437 + 2,298 = 26,735$
Long-term debt to equity ratio = $26,735 / 18,392 = 1.45$

Pension surplus = $3,764 - 2,298 = 1,466$
Assets excluding pension surplus: $70,659 - 1,466 = 69,193$
Total assets : $69,193 + 3,764 = 72,957$
Asset-to-equity ratio : $72,957 / 18,392 = 3.97$

(c) Describe the advantages of using the holistic corporate balance sheet approach in (b) versus the traditional balance sheet approach used in (a).

Commentary on Question:

Generally this part was done well. Candidates could have earned more grading points by relating their answer to Companies A and B.

5. Continued

The inclusion of the net pension obligation only in the balance sheet does not reflect the risk of pension plan investments because it does not adequately account for the size of the pension plan relative to the company.

When adding pension liability and pension assets to the corporate balance sheet, the pension plan of Company A has a significant effect on the ratios showing that the pension plan is relatively important compared with the other operations of the company, which is not the case for Company B.

Using the holistic approach consolidates the asset and liability information for determination of financial ratios commonly used for corporate leverage.

All ratios increase when pension plans are consolidated into the corporate balance sheet. The ratios of company A and B increase by 0.9177 and 0.1249 respectively.

When pension liability and assets are added, The Debt-to-Equity ratio and Asset-to-Equity ratio of company A become above company B which was not apparent from the unadjusted balance sheet.

Company A is more leveraged than company B when taking into account the pension liabilities.

Liabilities are understated on the balance sheet when using the traditional approach. It only shows the pension deficit (i.e. AL minus assets).

6. 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:

- (1d) Assess the potential effects of various investments and investment policies on all of the stakeholders, including tax implications.

Sources:

RPIRM-104-15: Maginn and Tuttle, *Managing Investment Portfolios*, 3rd Edition, Ch. 12 (sections 1-6) – study note only sections 1 - 6

Commentary on Question:

Candidates generally did very well on this question. However, many candidates missed the point on part (c) by failing to provide a critique, or assessment, of how the manager failed or succeeded by choosing appropriate sector weightings and individual stocks within each sector.

Solution:

- (a) Calculate the Pure Sector Allocation Return.

Can be calculated as the sum of arithmetic excess returns from allocation, using the benchmark return:

$$\begin{aligned} &(35\% - 32\%) \times 7.23\% + \\ &(19\% - 27\%) \times 5.78\% + \\ &(16\% - 5\%) \times 1.56\% + \\ &(22\% - 25\%) \times 4.31\% + \\ &(8\% - 11\%) \times 0.41\% = -0.2155\% \end{aligned}$$

- (b) Calculate the Within-Sector Selection Return.

Can be calculated as the sum of arithmetic excess return from selection, using the benchmark weight:

$$\begin{aligned} &(3.25\% - 7.23\%) \times 32\% + \\ &(6.59\% - 5.78\%) \times 27\% + \\ &(2.82\% - 1.56\%) \times 5\% + \\ &(5.22\% - 4.31\%) \times 25\% + \\ &(-0.50\% - 0.41\%) \times 11\% = -0.8645\% \end{aligned}$$

- (c) Critique the manager's sector-weighting and security-selection decisions.

Sector Weighting Decisions: Underweighting the manufacturing sector (favorable sector) and overweighting the natural gas sector (unfavorable sector) contributed to the poor pure sector allocation return.

6. Continued

Security Selection Decisions: The securities selected within the banking and finance sector vastly underperformed those of the benchmark, and was the largest source of the poor Within-Sector Selection Return.

- (d) Describe the last component required to explain the total portfolio return.

The last component is interaction - it is the effect resulting from the combination of, or interaction between, allocation and selection effects.