

CFE FD Model Solutions

Spring 2022

1. Learning Objectives:

3. The candidate will understand how managerial accounting impacts performance evaluation and decision making.
5. The candidate will understand the application of quantitative methods and techniques with a risk management focus to business problems for financial and non-financial companies.

Learning Outcomes:

- (3b) Assess and recommend methods a company may use to allocate its costs and how these methods impact the perceived performance of a company or its component lines of business..
- (5a) Assess and apply methods and processes for quantifying and managing hedgeable and non-hedgeable risks within any business enterprise
- (5b) Evaluate model risks and processes
 - (i) Assess model tradeoffs among usefulness, resource constraints, timeliness, fidelity, and accuracy
 - (ii) Assess processes for vetting models
- (5c) Evaluate results of deterministic, stress-testing, stochastic and simulation methods and models
- (5d) Assess techniques to measure risks given limited information

Sources:

F-147-20; Bolle-Reddat, Bernard (et al.), Modeling in Life Insurance - A Management Perspective, Chapter 11

F-148-20: Kaye, A Guide to Risk Measures, Capital Allocation & Related Decision Support Issues

ASOP 56: Modeling, Dec 2019 (excl appendices)

Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 7: Cost Allocation: Theory

Case study

1. Continued

Commentary on Question:

The primary goal of this question is to examine candidates' ability to rationalize the selection and assessment of certain risk measure and capital allocation schemes and

A secondary goal of the question is to test the candidates' on the softer aspects related to capital management (i.e. model management and decision-making).

Solution:

(a) Explain one advantage and one disadvantage for each of the following with respect to Darwin's risk management:

- (i) VaR(95) as the risk measure
- (ii) Shapley method as the capital allocation method

Commentary on Question:

For each response in (i) and (ii), if the answer does not relate specifically to Darwin, only partial credit was awarded.

(i) VaR(95) advantage:

- VaR aligns with Darwin's capital risk appetite statement and is easy to understand and
- It's computationally simpler than CTE (only need one point on the distribution) which is good for Darwin because the IUL products are new so this allows them to start simpler.

Var(95) disadvantage:

- Only focuses on a single point of the distribution - disregarding tail behavior. Since the IUL products are new, Darwin should want to learn more about tail behavior than a single point estimate can provide and
- Not a coherent risk measure which can cause capital to be inappropriately allocated among the products.

(ii) Shapley Method advantage:

- No scaling is required – the parts naturally add up to match the whole which allows Darwin to be efficient with its capital requirements (avoid overcapitalization).

Shapley Method disadvantage:

- It's computationally challenging which could be a problem considering the product is new and some of Darwin's systems are out of date and
- The capital allocation to non-IUL products might change depending on whether the two IUL products (IULF & IULV) are considered one product or two. Theoretically, this shouldn't impact the capital allocation to, say, Current UL, but with the Shapley method it does.

1. Continued

- (b) Calculate values for the 'Shapley Value Table' using the information provided for the Current UL, IULF, and IULV portfolios in Case Study section 6.7.1. Show your work.

Commentary on Question:

The calculation of Shapley values is a natural extension of the independent and marginal methods already discussed and is based on the average of the "1st in", "last in" and all the intermediate "ins". Most of the candidates did not pick up the right VaR(95) [see the excel solution]. Nevertheless, partial points are awarded when the candidates processed the "1st in", "2nd on", "3rd in", and "average" correctly.

See the solution in the excel worksheet Q1-b

- (c) Explain the impact of the capital allocation from your calculation in part (b) on Darwin's overhead cost allocations.

Commentary on Question:

Most of the candidate did not answer this question correctly. The primary error came from overhead allocation being affected by capital allocation.

The capital allocation will not impact Darwin's overhead cost allocation. Capital is held for future uncertainty while overhead costs are amounts that have already been incurred

An overhead allocation assigns common or indirect costs while capital is required to support the future uncertainty of a given exposure.

- (d) Explain three reasons why Darwin would make strategic decisions that may disagree with the model results.

Commentary on Question:

Points will be given with valid explanations. Note: The e-mail titled 'Re: Indexed Universal Life Product' starting on page 79 of the case study is a good source to reference.

Examples of the reasons include:

- The model results may not have been analyzed under the correct scenario/proper probability level
Justification: Aaliyah mentions that the risk metrics for the risk dashboard are yet to be decided - implying that either a higher loss VaR metric or a different metric may be better to adequately reflect the risk of offering the new IUL than what was selected for the conducted analysis

1. Continued

- Model results are simply one dimension of decision-making - qualitative considerations such as commercial positioning, know-how, legal issues, etc. must also be considered
Justification: Aaliyah mentions that Marketing wants 'to increase the interest rate floor for the fixed account and to increase the cap for the indexed account', that there are potentially 'operational issues because of the multiple investment segments' and that there has been concerns about the product's investment portfolio/interest rate risk management. All of this suggests that there are more aspects to consider about the project beyond the economic capital model results. Aaliyah also mentions not wanting to have a 'misfire' like company XYZ did.
- The assumptions used by the model may not appropriately reflect the views of those responsible for making the decision
Justification: Aaliyah mentions that the model 'looks very promising in terms of both revenue and profit', but then later requests 'a more comprehensive review than usual to evaluate if the models are adequate to capture all the major risk categories and if the additional risk-taking is aligned with our risk appetite'. Aaliyah seems suspicious of the current model output and may want to approach the analysis from a different angle.
- The decision criteria may be reach beyond the model output
Justification: Darwin needs to consider growing its annuity book given the growing market trend for longevity products and/or other products;
The model analysis was performed under a loss scenario/only with the life book -it does not consider Darwin's other LOBs or potential profit scenarios.

- (e) Identify four disclosures you should include in Darwin's model documentation per the requirements of ASOP 56.

Commentary on Question:

The purpose of the question is to primarily assess the candidate's knowledge of ASOP 56 so full credit came from the ASOP 56 required list however credit was given for applicable items from ASOPs 23 and 41.

From ASOP 56's required disclosure list

- The intended purpose of the model;
- Material inconsistencies, if any, among assumptions, and known reasons for such inconsistencies;
- Unreasonable output resulting from the aggregation of assumptions, if material;
- Material limitations and known weaknesses;
- Extent of reliance on models developed by others, if any; and
- Extent of reliance on experts, if any

1. Continued

From ASOP 56's additional disclosure list

- If any material assumption or method was prescribed by applicable law;
- If the actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and
- if, in the actuary's professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

From ASOP 23's required disclosure list

- The source(s) of the data for the model;
- Any limitations on the use of the actuarial work product due to uncertainty about the quality of the data or other information relevant to the use of the data; and
- Any other relevant disclosure from ASOP 23 related to data quality

From ASOP 41's Required Disclosure List

- The intended users of the actuarial report;
- The acknowledgement of qualification as specified in the Qualification Standards; and
- Any other relevant disclosure from ASOP 41 related to actuarial communications

2. Learning Objectives:

5. The candidate will understand the application of quantitative methods and techniques with a risk management focus to business problems for financial and non-financial companies.

Learning Outcomes:

- (5a) Assess and apply methods and processes for quantifying and managing hedgeable and non-hedgeable risks within any business enterprise
- (5b) Evaluate model risks and processes
 - (i) Assess model tradeoffs among usefulness, resource constraints, timeliness, fidelity, and accuracy
 - (ii) Assess processes for vetting models
- (5c) Evaluate results of deterministic, stress-testing, stochastic and simulation methods and models

Sources:

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 9 Evaluations

F-150-20: Bohme et al., A Fundamental Approach to Cyber Risk Analysis

Commentary on Question:

This question tests the candidate's ability to calculate and understand the meaning of a confusion matrix in relation to Snappy's underwriting model. It further tests the candidate's ability to relate precision and recall rates to Snappy's underwriting model/strategy as well as an alternative model. Finally, the question tested a high-level understanding of symptomatic and systemic cyber risk for Snappy.

To get full marks, Snappy needed to be incorporated into the solutions.

Solution:

Describe the steps of hold-out sampling.

Commentary on Question:

Most candidates received at least half of the grading marks on part (a)

- 1) Split out the data into training, validation, and test sets
- 2) Train the model using the training data set
- 3) Use a validation set to avoid overfitting (not necessary for full credit)
- 4) Use the test set to evaluate model performance

2. Continued

(b)

- (i) Describe the four outcomes of the confusion matrix for the AI software.

True Positive (TP): The application is accepted by the model when the target indicates it should be accepted.

True Negative (TN): The application is rejected by the model when the target indicates it should be rejected.

False Positive (FP): The application is accepted by the model when the target indicates it should be rejected.

False Negative (FN): The application is rejected by the model when the target indicates it should be accepted.

- (ii) Construct the confusion matrix. Show your work.

Commentary on Question:

Most candidates received at least 2 of the 6 grading marks. Points were awarded for labeling target/prediction and approve/reject appropriately, which almost all candidates received credit. Order did not matter, or the exact words used if they made sense. Each calculation was worth a grading mark. The table below received full credit.

		Prediction	
		Approve	Reject
Target	Approve	4,300	800
	Reject	3,700	1,200

$$FN = 10,000 \times .2 \times (1-.6) = 800$$

$$TN = 10,000 \times .2 \times .6 = 1,200$$

$$FP = 10,000 \times .45 - 800 = 3,700$$

$$TP = 10,000 - 800 - 1,200 - 3,700 = 4,300$$

(c)

- (i) Calculate precision and recall rates based on the confusion matrix from (b)(ii). Show your work.

- (ii) Evaluate the performance of the AI software as a simplified underwriting software, using the precision and recall rates calculated in (c)(i). Justify your answers.

2. Continued

Commentary on Question:

Because the formulas were straightforward, there was no partial credit. Each of the precision and recall rates were worth points. If the values in the confusion matrix were incorrect, grading marks were awarded if the formulas were used properly with the wrong numbers.

In part ii, the evaluation of Snappy's software utilized the calculated values in part i. Credit was given for logical arguments consistent with Snappy's objectives.

(i) Precision Rate = $TP/(TP+FP) = 4,300/(4,300 + 3,700) = 53.75\%$

Recall Rate = $TP/(TP + FN) = 4,300/(4,300 + 800) = 84.31\%$

- (ii) The precision rate captures how often, when a model makes a positive prediction, the prediction turns out to be correct. Snappy has a precision threshold of 50%, so any rate above that level is acceptable. Because the precision rate is almost 54%, Snappy should be happy with the model's performance.

The recall rate is the percentage of approvals that are identified as approved by the model. A recall rate of over 84% is very good. Given that Snappy wants to "make the sale every time" they would prefer an even higher recall rate, i.e., the model should ideally reject even less than 800 of the 5,100 policies that should have been accepted.

- (d) Assess whether Snappy should buy the commercial underwriting software or keep using their current artificial intelligent software.

Commentary on Question:

Similar to part c.ii, credit was given for logical arguments consistent with Snappy's objectives.

The software should emphasize capturing the acceptable cases and minimizing rejecting acceptable cases based on Snappy's motto of "make the sale every time!" A high recall rate is most suited to achieve this goal. Because the recall rate is so low on the commercial software, Snappy should continue to use their own software. The much higher precision rate of the commercial software compared to Snappy's system does not outweigh its much lower recall rate.

2. Continued

(e) Evaluate Snappy's symptomatic and systemic cyber risk vulnerabilities for each of the underwriting software that Snappy is considering:

(i) Snappy's current artificial intelligence software

(ii) The commercial underwriting software

(i) Symptomatic risk: Snappy would have symptomatic vulnerabilities if there are software weaknesses exploitable by outside parties.

Systemic risk: Snappy is unlikely to have systemic risk as its software is proprietary and is not connected to a third party.

(ii) Symptomatic risk: Snappy still has symptomatic risk if hackers can exploit a weakness in Snappy's systems that does not impact other users of the commercial underwriting software.

Systemic risk: Snappy has exposure to this risk if there is a software problem affecting all clients of the commercial software company.

3. Learning Objectives:

1. The candidate will understand how a company optimizes its corporate finance decisions based on its business objectives.

Learning Outcomes:

- (1a) Recommend an optimal capital structure for given business objectives and the competitive environment.
- (1b) Compare and contrast methods to determine the value of a business or project, including the impact on capital budgeting and allocation decisions.
- (1c) Evaluate the impact of non-financial factors on capital structure or capital budgeting decisions.

Sources:

Corporate Finance, Fifth Edition, Chapter 25 – Jonathan Berk and Peter Demarzo

Corporate Finance, Fifth Edition, Chapter 27 – Jonathan Berk and Peter Demarzo

Case Study

Commentary on Question:

This question was testing the understanding of leasing vs. buying options, as well as short-term financial planning. Common mistakes made on this question were answering “Describe” questions with lists and not making recommendations specific to Frenz’s situation where requested.

Solution:

- (a)
 - (i) Explain the steps to compare the leasing option to the buying option.
 - (ii) Recommend which option Frenz should select for the new storefronts based solely on the above proposals. Justify your answer.
 - (iii) Assess the appropriateness of the recommendation in ii) given Frenz’s overall financial situation.

Commentary on Question:

Candidates generally understood how to set up the Free Cash Flows for both leasing and buying, discounting back to time zero, and comparing the present values to determine which option to recommend. Candidates generally did not calculate the after-tax borrowing rate correctly. Many candidates did not include the residual value in the calculation of the FCF for the buy option.

3. Continued

- (i) To compare lease to buying, the fair comparison is to determine the amount of the loan that leads to the same level of fixed obligations that Frenz would have with the lease.

The lease-equivalent loan is the loan that is required on the purchase of the asset that leaves the purchaser with the same obligations as the lessee would have. Therefore, the lease equivalent loan needs to be calculated.

Steps:

1. Calculate the free cash flow for leasing and buying.
 - The additional operation expenses and annual sales are same between the two
 - The cash flow difference is between the capital expenditure, residual value and tax savings
 2. Calculate the after-tax borrowing rate.
 - The discount rate for free cash flow is after-tax borrowing interest rate since the risk of the lease is no greater than the risk of secured debt and because Frenz would lose depreciation tax shields
 3. Discount the difference in leasing vs buying free cash flows at time zero using the after-tax borrowing interest rate.
 - If the present value of the difference of lease less buy free cash flows is positive (i.e. the PV of lease free cash flows is higher), then leasing is preferable.
 - If the present value of the difference of lease less buy free cash flows is negative (i.e. the PV of buy free cash flows is higher), then buying is preferable.
- (ii) Since the present value of the difference between leasing less buying is positive, leasing is preferable. Frenz should lease the store fronts.

Lease Payments, Annual	12M Euros
Buy, Initial Price	150M Euros
Annual Depreciation	5M Euros
Borrowing rate	6%
Tax Rate	20%
After-Tax Borrowing Rate	4.80%

3. Continued

Buy (Unit Euros in Millions)	Year										
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
Purchase Price	-150.0										
Residual Value											100.0
Depreciation Tax Shields		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Free Cash Flow	-150.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	101.0
Lease (Unit \$Millions)											
	<u>Yr 0</u>	<u>Yr 1</u>	<u>Yr 2</u>	<u>Yr 3</u>	<u>Yr 4</u>	<u>Yr 5</u>	<u>Yr 6</u>	<u>Yr 7</u>	<u>Yr 8</u>	<u>Yr 9</u>	<u>Yr 10</u>
Lease Payments	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	
Income Tax Savings	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	
Free Cash Flow	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	-9.6	0.0
FCF Difference (Lease-Buy)	140.40	-10.60	-10.60	-10.60	-10.60	-10.60	-10.60	-10.60	-10.60	-10.60	-101.00
Discounting Factor	1.00	0.95	0.91	0.87	0.83	0.79	0.75	0.72	0.69	0.66	0.63
Discounted FCF Difference	140.40	-10.11	-9.65	-9.21	-8.79	-8.38	-8.00	-7.63	-7.28	-6.95	-63.20
Sum of Discounted FCF Difference	1.18										

- (iii) The decision to lease is appropriate given Frenz's overall financial situation. The buying proposal's initial capital layout is \$150M, which is almost the size of Frenz's total equity of 159M Euros as of 12/31/2020.

Additionally, Frenz has significant debt issuance, so it will be challenging for Frenz to find adequate capital or financing for the initial 150M Euros capital expenditure.

- (b) Evaluate how each concern will affect the decision between leasing and buying. Justify your answer.

Commentary on Question:

Candidates generally did well with identifying how the options were each impacted by Real Estate Value Fluctuation, but they generally did more poorly with recognizing how Foreign Currency concerns impact the decision. Candidates who received full credit were able to identify how both leasing and buying were impacted by each concern.

3. Continued

Real Estate Value Fluctuation:

Leasing: Because the lease payments are constant over the life of the 10-year lease term, the fluctuation in real estate value will not impact leasing.

Buying: Real estate value fluctuation will impact the buying option. If the value of the real estate increases, the appreciation of the storefront may outweigh the large initial capital investment. A decrease in the real estate value will decrease the value of the buying option. Depending on Frenz's belief of future real estate price trends in Asia, this could affect the decision significantly.

Foreign Currency:

Leasing: The exchange rate will impact the annual lease amount in Euros. The foreign exchange rates at the time funds are transferred will determine the magnitude of foreign currency risk. If the Euro appreciates, the lease option will become more appealing. If the Euro depreciates, the lease option will become less appealing. Sales revenue and operating expenses will also be impacted, but the impact will be the same on leasing vs. buying for these items.

Buying: The exchange rate will largely not affect the initial capital layout in the buying option, since it will be paid in the near future. Sales revenue and operating expenses will be impacted, but the impact will be the same on leasing vs. buying for these items.

- (c)
- (i) Describe the two financing policy choices.
 - (ii) Recommend which financing policy choice in (i) is more appropriate for Frenz when financing the lease payment and operating expenses. Justify your recommendation.

Commentary on Question:

Candidates generally did very poorly on this question. Many candidates listed or described methods of financing (e.g. equity, debt, commercial paper, bank loans) opposed to funding policies. Many candidates listed funding policy choices or methods of financing but did not describe them.

3. Continued

- (i) The two funding policy choices are Aggressive and Conservative. Aggressive: Financing part or all of the permanent working capital with short-term debt. In an environment where the yield curve is sloping upward, the interest rate on short-term debt is lower than the rate on long-term debt. As a result, the firm is also exposed to interest rate risk. This policy may be beneficial in the existence of market imperfection but expose the company to funding risk.

Conservative: Financing short-term needs with long-term debt. Frenz will use a long-term source of funds to finance its fixed assets, permanent working capital and some of its seasonal needs. A conservative policy requires periods where excess cash is available, when Frenz requires little or no investment in temporary working capital. Funding risk is reduced, but excess cash may earn below-market interest rates, reducing the firm's value. Additionally, even if the cash is invested at a competitive rate, interest income on the cash will be subject to double taxation. Holding excess cash within the company increases the possibility that managers will use it non-productively.

- (ii) Frenz should choose a conservative funding policy. The term of the lease is ten years, so it would follow the matching principle. Frenz is also concerned about interest rate volatility, and short-term debt would expose Frenz to more interest rate volatility.

(d)

- (i) Identify two potential short-term financing needs based on Frenz's risk profile and strategy. Justify your response.
- (ii) Describe three financing methods that Frenz can use for its short-term financing needs.
- (iii) Recommend an appropriate financing method for Frenz from (ii) for each need identified in (i). Justify your answer.

Commentary on Question:

Candidates generally did well at identifying short-term financing needs relevant to Frenz's risk profile and strategy. However, while many candidates were able to list financing methods, very few described them. When recommending an appropriate financing method, many candidates based their recommendations on general attributes of financing methods rather than tying their recommendation to Frenz specifically. Some candidates did not tie their recommendations in part (iii) to the needs identified in part (i).

3. Continued

- (i) Two potential short-term financing needs based on Frenz's risk profile and strategy:
1. Negative Cash Flow Shock: A regional embargo has caused coffee bean prices to increase unexpectedly, with an unknown date of resolution. Additional funding is needed to purchase coffee beans.
 2. Seasonality: Sales of coffee may show seasonal trends. Frenz could find themselves with a surplus of cash during some months that is sufficient to compensate for a shortfall during other months. This creates a short-term financing need. The surplus during higher times of sales can be invested in a short-term investment option.

Other reasonable answers could receive full credit if the examples pertained to 1. Seasonality, 2. Negative Cash Flow Shocks, or 3. Positive Cash Flow Shocks.

- (ii) Three short-term financing methods:
1. Bank loans: One of the primary sources of short-term financing. Bank loans are typically initiated with a promissory note, which is a written statement that indicated the amount of the loan, the date payment due, and the interest rate. Since Frenz has significant debt issuances, it might have to put up collateral and/or pay borrowing interest rate higher than that other competitors are paying on their loans.
 - a. Single, end-of-period payment loan: The most straightforward type of bank loan. The firm pays interest on the loan and pays back the principal in one lump sum at the end of the loan. The interest rate may be fixed or variable. Since Frenz has significant debt issuances, it might have to put up collateral and/or pay borrowing interest rate higher than that other competitors are paying on their loans.
 - b. Line of credit: A bank agrees to lend a firm any amount up to a stated maximum. This flexible agreement allows Frenz to draw upon the line of credit whenever it chooses. The amount and interest rate of the line of credit will depend on Frenz's financial strength countering interest rate risk due to interest rate volatility and capital risk.
 - c. Bridge loan: Often used to bridge the gap until a firm can arrange for long-term financing. After a natural disaster, lenders may provide businesses with short-term loans to serve as bridges until they receive insurance payments or long-term disaster relief. Bridge loans are often quoted as discount loans with fixed interest rates. Frenz might pay borrowing interest rate higher than market rate due to large debt.

3. Continued

2. Commercial paper: Short-term, unsecured debt used by large corporations that is usually a cheaper source of funds than a short-term bank loan. The interest on commercial paper is typically paid by selling it at an initial discount. The average maturity of commercial paper is 30 days and the maximum maturity is 270 days. Extending the maturity beyond 270 days requires a registration with SEC, which increases issue costs and creates a time delay in the sale of the issue. Since Frenz has significant debt issuances, it might have to sell commercial paper at a large discount.
3. Secured financing: This uses secured loans, which are loans collateralized with short-term assets. Most typically the firm's accounts receivables, or inventory. Commercial banks, finance companies, and factors, which are firms that purchase the receivables, of other companies, are the most common sources for secured short-term loans. Frenz might have large short-term assets such as accounts receivables and inventory because it is dominant in the high-end specialty coffee market and has a big presence in various major markets.

Grader Commentary: Not all details are required under each method for full credit.

- (iii) Situation 1: Temporary price increase on coffee beans. Since the length of the embargo is unknown, a line of credit is appropriate. Secured financing using inventory as collateral is not the most appropriate option here since the coffee bean inventory needs to be used in production. Commercial Paper may not be appropriate because the time frame is uncertain.

Situation 2: Coffee sales seasonality. Because the seasonality can likely be predicted and is recurring, a line of credit with no fixed maturity is appropriate, since the line of credit can be drawn upon as needed. Secured financing using inventory as collateral is not the most appropriate option here since the coffee bean inventory needs to be used in production. Commercial Paper may not be appropriate depending on the time horizon of the seasonality. Since extending the maturity beyond 270 days requires registration with the SEC, if the period of seasonality for highest sales is the holiday season, or only 2 months of the year, the time horizon for short-term financing may need to be longer than 270 days.

4. Learning Objectives:

1. The candidate will understand how a company optimizes its corporate finance decisions based on its business objectives.
2. The candidate will understand how to gauge a company's performance through an evaluation of its financial reports.

Learning Outcomes:

- (1b) Compare and contrast methods to determine the value of a business or project, including the impact on capital budgeting and allocation decisions.
- (2a) Analyze the interrelationships between the income statement, cash flow statement, and balance sheet, in order to measure a corporation's financial performance.
- (2b) Identify and analyze the impact of unusual accounting practices on the quality of earnings and assets of a corporation, including analyzing the signs of questionable accounting.

Sources:

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 11 Financial Reporting Quality

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 17 Evaluating Quality of Financial Reports (Section 1-6 Only)

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 6 Financial Analysis Techniques

Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 25: Leasing
Case Study

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a)
 - (i) Describe what classification is with respect to financial statements.
 - (ii) Identify three specific examples of classification choices that BJA could make.
 - (iii) Describe the impact to BJA's financial statements of each choice in (ii).

4. Continued

Commentary on Question:

Candidates scored well on this part of the question. Most candidates demonstrated good understanding on what's classification and were able to provide examples and analyst impacts on different classification choices.

- (i) Classification choices typically affect one financial statement
Classification choices relate to how an item is classified within a particular financial statement.
The balance sheet, the statement of comprehensive income, or the cash flow statement may be the primary focus of the choice.
 - (ii) Depreciation period and residual value estimates on planes and business lounges will impact earnings pattern.
If rewards program is implemented, it creates a potential future economic liability (i.e. customers using their rewards points to pay for flights in lieu of cash), but will it be recognized on balance sheet.
Changing lease contracts from Finance to Operating could have an impact (although new accounting rules seem to be trying to level the playing field).
 - (iii) Decreasing the depreciation period or reducing the estimated residual value will accelerate expense recognition.
Recognizing the rewards program liability on Balance Sheet will decrease earnings as rewards are earned, but offset that loss when rewards are redeemed.
With either type of lease, BJA should recognize a financial liability and measure at amortized cost.
- (b)
- (i) Critique Elmer's statement on revenue.
 - (ii) Critique Elmer's statement on expense classification.

Commentary on Question:

Candidates are expected to provide sufficient justifications to receive full marks. Candidates scored well in part i) and scored fairly in part ii).

- (i) The statement in (i) is correct
Blue Jay's classification is sustainable
BJA recognizes passenger and service revenues only when the transportation is provided and defers airline passenger advance sales.
Blue Jay does not overstate its revenue and recognizes income only when transactions actually happen.
Three correct statements

4. Continued

- (ii) The statement in (ii) is also correct
BJA 's classification of expenses between operating and non-operating seems fair and sustainable.
BJA does not misclassify its expenses. The operating expenses are incurred from day-to-day functioning of the company while non-operating expenses are non-daily operations such as interests and foreign exchange translation.
- (c)
- (i) Assess qualitatively the impact on the following financial ratios for each type of lease classification before the 2019 lease accounting rule change:
- I. Debt to equity ratio
 - II. Current ratio
- (ii) Recommend what type of lease is more suitable based on BJA's risk profile and your assessment in (i). Justify your recommendation.
- (iii) Analyze how the recommendation in (ii) may be affected after 2019 by the new lease accounting rules.

Commentary on Question:

Candidates scored well in i). Some candidates did calculations in part i) which is beyond what's asked here. In this case, full credits were granted if the assessments are correct based on the calculation.

Majority of candidates were able to suggest the more suitable type of lease along with justifications.

Only some candidates pointed out differences between 2019 and 2016 account rules and were able to do proper analysis to get part iii) correct.

- (i) Debt to equity ratio:
- Operating lease does not report asset or lease payment liability on its balance sheet. There is no impact to D to E ratio.
 - Capital lease needs to list asset acquired and present value of future lease payments as liability on the balance sheet. This will increase the D to E ratio
- Current Ratio
- Current ratio is current assets/current liabilities
- Operating lease will not change current ratio since it doesn't affect balance sheet
 - Capital lease will report on balance sheet, but they will not be included in current asset and current liability. So, there is no impact to current ratio.

4. Continued

- (ii) BJA is a highly leveraged capital-intensive company and is concerned about its crediting rating (CS 2.4). They may not want to further increase its D to E ratio given those concerns. Operating lease will be more suitable as it doesn't change BJA's D to E ratio.
 - (iii) The new accounting standard announced in 2016 (effective in 2019) requires firms to recognize all leases with terms longer than one year on their balance sheet. The lease terms BJA is considering is 5 years. In this case, BJA will have to report on its balance sheet no matter it is an operating lease or capital lease. This will take away operating lease's advantage for not affecting D to E ratio. BJA will need to decide on the two types based on other considerations.
- (d) Describe the problem caused by bias in financial reporting.

Commentary on Question:

Candidates are expected to describe the problem and also touch on the consequences of bias in financial reporting. Candidates scored well in this question.

Biased choices result in financial reports that do not faithfully represent the economic substance of what is being reported.

The problem with bias in financial reporting, as with other deficiencies in reporting quality, is that it impedes an investor's ability to correctly assess a company's past performance, to accurately forecast future performance, and thus to appropriately value the company.

- (e)
- (i) Explain the implications of taking a more aggressive financial reporting approach.
 - (ii) Explain three changes specific to BJA's current financial reporting that would make its accounting approach more aggressive.
 - (iii) Assess whether BJA management should favor a conservative bias or an aggressive bias.
 - (iv) Propose financial reporting changes, if any, to the approach you supported in (iii) that might be appropriate in a pandemic scenario. Justify your response.

4. Continued

Commentary on Question:

Candidates scored well in part i), ii) and iii). Candidates are expected to provide answers specific to BJA. For answers that are reasonable but are not related to BJA, only some credits were granted. Candidates struggled with iv), only some candidates were able to propose reasonable financial changes to the approach selected in iii). Many candidates described the challenges BJA may face in a pandemic scenario but didn't recommend reasonable financial changes.

- (i) An aggressive accounting choice increases a company's reported performance and financial position in the period under review.
Aggressive choices may lead to a reduction in the company's reported performance and in its financial position in later periods.
An aggressive change related to BJA that would increase the revenue/earnings/operating cash flow reported for the period, or decrease expenses/debt.
An aggressive choice may create a sustainability issue, because it increases the company's reported performance and financial position immediately and decrease them in later periods.
- (ii) Overstate operating income (e.g. through recognizing airline ticket revenue before flights) or understating expenses (e.g. capitalizing aircraft maint.)
Classify ordinary expenses as non-recurring or non-operating (e.g. "Capacity Purchase Agreements")
Report gains through net income and losses through other comprehensive income (e.g. financial instruments used for hedging)
Switch to more aggressive choice of models and model inputs to measure fair value
Overstate identifiable assets (e.g. not recognizing when "spare parts and supplies inventory" becomes obsolete)
Classify cashflows to positively affect cashflow from operations (e.g. recognizing sales of assets in operating CFs)
- (iii) Given asymmetrical information, conservatism may protect the contracting parties with less information and greater risk.
This protection is necessary because the contracting party may be at a disadvantage.
Conservatism reduces the possibility of litigation and, by extension, litigation costs.
Rarely, if ever, is a company sued because it understated good news or overstated bad news.
Conservative rules may protect the interests of regulators and politicians by reducing the possibility that fault will be found with them if companies overstate earnings or assets.

4. Continued

In many tax jurisdictions, financial and tax reporting rules are linked. Hence, companies may reduce the present value of their tax payments by electing conservative accounting policies for certain types of events.

As an airline company, BJA potentially would realize the tax, regulatory and legal advantages of conservatism listed above.

As an independent company, BJA might be concerned about the information asymmetry issue.

- (iv) BJA has Goodwill on its book that may be worth waiting for more clarity before writing off in a pandemic.

The DTA on BJA's Balance Sheet may also be recoverable, even if revenues temporarily drop significantly.

BJA management could add footnotes describing how items like "prepaid ticket sales" have changed.

Certain portions of "Aircraft Maintenance" related to enhancing safe travel could be capitalized.

5. Learning Objectives:

2. The candidate will understand how to gauge a company's performance through an evaluation of its financial reports.

Learning Outcomes:

- (2a) Analyze the interrelationships between the income statement, cash flow statement, and balance sheet, in order to measure a corporation's financial performance.
- (2b) Identify and analyze the impact of unusual accounting practices on the quality of earnings and assets of a corporation, including analyzing the signs of questionable accounting.
- (2c) Analyze the impact of tax accounting and policies, local regulations, and foreign exchange rates.

Sources:

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 15 Multinational Operations

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 6 Financial Analysis Techniques

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 9 Income Taxes

Commentary on Question:

Candidates generally did well in part a, d and e. Most candidates performed poorly in part b which is a question about the financial reporting, including the inflation and cross country currency conversion within the GAAP/IFRS contents. The graders noticed most candidates did not apply the inflation adjusted financial statements; and some not even converted the local currency into Euro currency.

Part b calculation is straightforward. However the candidates either missed the accounting concepts of converting local currency to the currency which the financial reporting is accepted; or they applied the wrong conversion factors. For example, the conversion factors should be as the reporting date instead of the average; while the inflation factors should be the average of the reporting year.

Part c is to test the candidates' understanding of the tax reporting due to the different depreciation methods. Some candidates were generally not able to recognize the self correction nature of the deferred tax asset/liability over time. Also some candidates misunderstood the question which was asking for the DTA/DTL as of 12/31/2020.

5. Continued

Solution:

- (a) Explain why there are special translation procedures for countries with high inflation.

Commentary on Question:

See General comments

US GAAP forces use of the "temporal method", while IFRS requires everything to be re-stated for inflation before translation, which both effectively cause translation gains/losses to flow through income.

- (b)
- (i) Translate Ishmael's income statement for use by Frenz.
- (ii) Critique Kitty's response regarding Ishmael's recent performance.

Commentary on Question:

See general comments

b(i)

Ishmael Income Statement Information	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
	2020	2020	2020	2020	2019	2019	2019	2019
	Mobucks	Restatement Factor	Exchange Rate	Euros (A)*(B)*(C)	Mobucks	Restatement Factor	Exchange Rate	Euros (E)*(F)*(G)
(1) Cost of Sales	5,000	225/150	0.5	3,750	1,500	100/60	1.0	2,500
(2) Gross Profit	23,800	225/150	0.5	17,850	12,200	100/60	1.0	20,333
(3) Operating Income	5,000	225/150	0.5	3,750	1,800	100/60	1.0	3,000
(4) Interest Expense	500	225/150	0.5	375	300	100/60	1.0	500
(5) Net Income	3,600	225/150	0.5	2,700	1,200	100/60	1.0	2,000
(6) Sales: (1) + (2)	28,800			21,600	13,700			22,833
(7) Operating Expenses = (2) - (3)	18,800			14,100	10,400			17,333
(8) Gross Margin = (2)/(6)				82.6%				89.1%
(9) Operating Profit Margin = (3)/(6)				17.4%				13.1%
(10) Pretax Margin = [(3)-(4)]/(6)				15.6%				10.9%
(11) Net Margin = (5)/(6)				12.5%				8.8%
(12) Revenue Growth (Euros) = (D6)/(H6)				-5.4%				
(13) Operating Income Growth (Euros) = (D9)/(H9)				25.0%				
(14) Net Income Growth (Euros) = (D11)/(H11)				35.0%				
(15) Revenue Growth (Mobucks) = (A6)/(E6)				110.2%				
(16) Operating Income Growth (Mobucks) = (A9)/(E9)				177.8%				
(17) Net Income Growth (Mobucks) = (A11)/(E11)				200.0%				

b(ii)

Ishmael's income statement should be translated into Frenz's Presentation Currency (Euros) for proper financial analysis. Since Mobia is a High Inflation country, all Mobucks amounts should be inflation-adjusted (i.e. restated) and translated at the current exchange rate.

To properly assess financial performance, Income statement ratio analysis must be performed on inflation and exchange-translated amounts, reviewing multiple profitability (Gross margin, Operating Profit Margin, Pretax Margin, and Net Margin) and growth metrics (Revenue Growth, Operating Income Growth, and Net Income Growth).

5. Continued

After translation and financial analysis, the candidate should observe that, in Euros, revenue growth is down, contrary to Kitty's statement. As well, though most profitability metrics are up (demonstrating increased efficiency of Ishmael in the second year of operation), Gross margin is down (dropping from 89.1% to 82.6%). This may be due to several factors, but given the context provided in the problem, it is likely due to the cost of procuring ingredients (i.e. coffee) within high-inflation Mobia. This requires additional research and should be deemed a risk (headwind) to future revenue growth and profitability.

- (c)
- (i) Calculate the associated deferred tax asset/liability as of December 31, 2020. Show your work.
 - (ii) Explain the implications of a change in the deferred tax asset/liability for a company.

Commentary on Question:

See general comments

c(i)

Accounting Depreciation: $\$250,000/10 \text{ years} = \$25,000$

Tax Depreciation: $\$250,000/7 \text{ years} = \$35,714$

Carrying Amount at EOY 2020 = $\$200,000$

Tax Base at EOY 2020 = $\$178,571$

Since the Asset Tax Base is less than its Carrying Amount under Financial Accounting principles, the result is a deferred tax liability.

Deferred Tax Liability in 2020 = (Difference between tax base and carrying amount)X Tax Rate

$(200,000 - 178,571)*20\%$

$\$4,285.71$

c(ii)

The DTL in this case is a non-cash balance sheet item that represents a timing difference in taxes paid that will eventually reverse (or self-correct) when Ishmael's equipment is disposed of (or becomes obsolete).

5. Continued

- (d)
- (i) Calculate Ishmael's profitability. Show your work.
 - (ii) Assess the implications on Ishmael's financial condition and cash flow.

Commentary on Question:

See general comments

d(i)

Accounting Depreciation: $\$250,000/10 \text{ years} = \$25,000$

Tax Depreciation: $\$250,000/7 \text{ years} = \$35,714$

Carrying Amount at EOY 2020 = $\$200,000$

Tax Base at EOY 2020 = $\$178,571$

Since the Asset Tax Base is less than its Carrying Amount under Financial Accounting principles, the result is a deferred tax liability.

Deferred Tax Liability in 2020 (New Tax Rate) = (Difference between tax base and carrying amount) X New Tax Rate
 $(200,000 - 178,571) * 35\%$
 $\$7,500.00$

Increase in Deferred Tax Liability = $\$3,214.29$

d(ii)

Financial Condition Existing deferred tax assets and liabilities are measured based on current tax law. Deferred Tax Liabilities (and Assets) would increase, impacting equity position of the company

Profitability Since the change in tax rate is applicable in Fiscal Year 2020, accounting profit is impacted (reduced) by an increase in income tax expense, but also by the changes in deferred tax asset and liability carrying values.

Cash Flow Income Tax Paid in a period is the actual amount paid for income taxes (not the provision, but the actual cash flow). The change in income tax rate may not have impacted Mobia's cash flow in Fiscal Year 2020.

- (e) Evaluate whether any of the information provided in part b, item 1 through 6, seems unlikely to be accurate.

5. Continued

Commentary on Question:

See general comments

No purchasing power gain or loss seems unlikely since Ishmael's non-monetary assets would have to be exactly equal to non-monetary liabilities.

6. Learning Objectives:

4. The candidate will understand how to apply and recommend appropriate ERM frameworks, principles and strategies to manage, evaluate, analyze and mitigate risk exposures faced by an entity and to ensure operational excellence in any industry.

Learning Outcomes:

- (4b) Evaluate risk measurement, modeling, and management of financial and non-financial risks.
- (4c) Develop and evaluate an appropriate risk mitigation or risk transfer strategy for any given situation.
- (4d) Design, analyze and develop ERM strategies for financial and non-financial companies.
- (4e) Recommend best practices in business and ERM processes to achieve operational excellence.

Sources:

Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 5: The ERM Project (excl. appendices)

Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 9: Role of the Board

Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 16: Risk-Based Performance Management

Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 17: Integration of KPIs and KRIs

Commentary on Question:

This question was assessing candidates' ability to evaluate RAROC (gross and ceded) in relation to cost of equity capital, understanding the three lines of defense and how a board uses the levers of Policy and Assurance, as well as identifying effective KRIs. The most successful candidates applied the case study to their answers instead of answering generically.

Solution:

- (a) Identify the departments at Darwin responsible for the three lines of defense in considering the risk profile of this rider.

First Line of Defense is the pricing department and Life Insurance Division (headed by Anne Kofsky).

6. Continued

Second Line of Defense is the CRO, Aaliyah Jackson, the chief risk management actuary, John Clark, and the risk management team.

Third Line of Defense is the Board (1 point) and Internal Audit.

- (b) Explain how each of the following levers of ERM board oversight can be applied to the LTC rider:
- (i) Policy
 - (ii) Assurance

Commentary on Question:

To receive full credit, a candidate needed to answer specifically to the chronic care line in the case study rather than generic answers. Acceptable answers are not limited to the list below.

- (i) Risk tolerance levels must be established for the new product based on key risks and estimated impact of quantified risks on statutory capital.

ERM and tolerance levels for other products may need to be adjusted to stay within stated probabilities of having negative GAAP earnings or 15% loss in statutory equity.

- (ii) Investment committee of board must ensure that duration is rebalanced given the now-shorter duration of policies with the chronic care rider. (Assurance that duration rebalancing occurs in timely manner relative to introduction of rider and at more regular intervals than semiannually until the rider is more established).

Because of Darwin's lack of experience with LTC, the Board should bring in independent consultants to assess ERM components specifically related to the chronic care rider.

- (c)
- (i) Calculate the Market Value (MV) of the LTC rider. Show your work.
 - (ii) Determine if the rider creates shareholder value.

6. Continued

(i)
$$\begin{aligned}\text{RAROC} &= \text{Risk Adjusted Return} / \text{Economic Capital} \\ &= 100,000 / 625,000 \\ &= 16\%\end{aligned}$$

$$\begin{aligned}M/B &= (\text{RAROC} - g) / (\text{Ke} - g) \\ M &= B * (\text{RAROC} - g) / (\text{Ke} - g) \\ &= 10M * (16\% - 13\%) / (15\% - 13\%) \\ &= 15M\end{aligned}$$

The market value of the LTC rider is 15M.

(ii) Since RAROC exceeds cost of capital ($16\% > 15\%$), the rider creates shareholder value.

(d)

(i) Calculate the ceded RAROC. Show your work.

(ii) Explain to the Board the implications of the ceded RAROC calculation in part (i).

Commentary on Question:

Candidates generally did poorly on this question. Some candidates did not use the change in risk adjusted return and economic capital in their formulas for ceded RAROC for part (i). Most candidates did not know the correct relationship between ceded RAROC and shareholder value for part (ii).

(i)
$$\text{Ceded RAROC} = \text{Change in Risk Adj Return} / \text{Change in Econ Capital}$$

$$\begin{aligned}\text{Change in Risk Adj Return} &= 100,000 - 50,000 \\ &= 50,000\end{aligned}$$

$$\begin{aligned}\text{Change in Econ Capital} &= 625,000 - 300,000 \\ &= 325,000\end{aligned}$$

$$\begin{aligned}\text{Ceded RAROC} &= 50,000 / 325,000 \\ &= 15.4\%\end{aligned}$$

The ceded RAROC is 15.4%.

(ii) Ceded RAROC is greater than Ke (cost of equity capital) ($15.4\% > 15\%$). This means that entering into the proposed reinsurance arrangement would destroy shareholder value. The portion of the business being ceded has a risk adjusted return greater than Darwin's cost of capital so retaining it would increase shareholder value on a risk-adjusted basis.

6. Continued

Therefore, Darwin should not enter into the modeled reinsurance agreement based on the Ceded RAROC calculation since reinsurance destroys shareholder value.

- (e)
- (i) Recommend two key risk indicators Darwin's Board may want to see for this LTC rider, based on information in the case study.
 - (ii) Identify the characteristics of effective KRIs that justify your recommendation for each of your key risk indicators from part (i).

Commentary on Question:

To receive full credit, KRIs must be pertinent to Darwin's rider in the case study rather than generic answers. Acceptable answers are not limited to the lists below. Candidates did not need to include everything on these lists to receive full credit.

- (i) RAROC – Darwin specifically mentioned this metric in the case study.

Number of manual adjustments required to administer the rider on a monthly/quarterly basis – the case study notes that Darwin's current systems can only handle traditional death benefits.

Duration of liabilities – to address the change in investment risk due to policyholders potentially accessing benefits starting 10 years after issuance of the rider.

- (ii) Characteristics of effective KRIs:
- Rely on consistent methodologies or standards
 - Incorporate one or more of the 4 risk drivers: exposure, probability, severity, correlation
 - Quantify by dollar amount, percentage, or number
 - Track in time series against standards or limits
 - Tie to objectives, risk owners, and standard risk categories
 - Balance leading and lagging indicators
 - Support business decisions and actions
 - Benchmark internally and externally
 - Timely and cost effective
 - Simplify risk without being simplistic
 - Quantifiable (objectively measurable)
 - Relevant (tied directly to business objectives)
 - Critical (directly impact the company's bottom line)
 - Timely (can be measured quickly)

6. Continued

RAROC:

- Rely on consistent methodology/standards (consistent methodology across company, validated models would be used)
- Quantifiable by percentage
- Track in time series against standards or limits (against cost of capital in this case)
- Supports business decisions and actions (can be used to determine whether creating shareholder value or not)
- Benchmark internally and externally (consistent standard across business units)

Number of manual adjustments:

- Quantifiable by amount
- Tie to objectives, risk owners, and standard risk categories (tied to operational risk and risk owners would be IT)
- Balance leading/lagging indicators (this would be a leading indicator - the more the manual adjustment count increases, the more the likelihood of mistakes that could impact valuation of liabilities or proper determination of benefits)
- Timely and cost effective (number of manual adjustments likely could be a report generated by the system at whatever frequency deemed necessary or there similarly would be some sort of ticket system for requesting the manual adjustments that could be tallied)
- Track in time series against standards or limits

Duration:

- Quantifiable by amount
- Track in time series against standards or limits
- Tied to objectives, risk owners, and standard risk categories (market risk, investment department)
- Supports business decisions and actions
- Benchmark internally and externally

7. Learning Objectives:

4. The candidate will understand how to apply and recommend appropriate ERM frameworks, principles and strategies to manage, evaluate, analyze and mitigate risk exposures faced by an entity and to ensure operational excellence in any industry.

Learning Outcomes:

- (4a) Assess the potential impact of risks faced by an entity in any industry, including the extent to which risks are hedgeable or non-hedgeable.
- (4c) Develop and evaluate an appropriate risk mitigation or risk transfer strategy for any given situation.

Sources:

F-142-19: An Analysis of Delta Air Lines' Oil Refinery Acquisition

F-151-20: Foundations of Airline Finance: Methodology and Practice, Ch 11 (p482-510)

F-150-20: Bohme et al., A Fundamental Approach to Cyber Risk Analysis

Case Study

Commentary on Question:

The objective is to understand if the candidates can apply concepts of risk identification and mitigation in a given industry and understand factors that should be considered when designing suitable risk management strategies

Solution:

- (a) Describe the three key roles that enable cyber risk management within an organization and the function performed by each role.

Commentary on Question:

The three key roles are (1) the senior management, approving an organization's security policy, (2) the Chief Information Security Officer (CISO) and (3) Security Specialists embedded in IT operations carrying out security-related tasks

- (b)
 - (i) Describe three classes of cyber risk factors.
 - (ii) Identify examples for each of these classes in (i) within BJA.

Commentary on Question:

Any three of the five below are sufficient

7. Continued

Threats:

Threats are accidental physical or logical and intentional action by malicious attackers

Blue Jay Air has identified unpredictable and malicious acts as one of the risks they face. These include cyber incidents and insider threats (physical security compromise, sabotage, terrorism, physical property theft)

Vulnerabilities:

Could arise from common programming mistakes or social engineering attempts

Blue Jay Air could be exposed to both symptomatic and systemic vulnerabilities (industry-wide). Blue Jay Air is expanding the WiFi networks they are providing inflight and in lounges, which could introduce additional vulnerabilities. Blue Jay Air is also considering revamping the booking system which could again introduce additional vulnerabilities

Controls:

Measures that would identify, mitigate cyber attacks

These could be non-technical controls such as training programs, and technical controls that will detect or prevent attacks

Blue Jay Air has cut down on information technology expenditure which could mean the software needs upgrades. Therefore, their detective and preventive controls may not be adequate. Blue Jay Air has also cut down on training for employees, which could mean increase potential for phishing attacks. Therefore, their non-technical controls may also not be adequate

Assets:

Attacks can hit critical assets within Blue Jay, both physical and non-physical. The risk can be significant, even if the asset is not destroyed or damaged.

Blue Jay Air faces significant losses if a customer database is leaked for example. Blue Jay Air's reputation is also at risk if a data breach occurs. This could be in some other airline, which could affect the entire industry

Impacts:

Value and criticality of affected assets determine the impact

Blue Jay Air has identified reputation as one of the key factors driving business success. Therefore, any breach or event that harms their reputation could have a major impact on the business

7. Continued

- (c) Describe two advantages and two disadvantages of hedging fuel costs with forwards.

Advantages:

No upfront premium

Forwards are customizable, so can be structured based on an underlying commodity closely related to airline fuel in order to minimize basis risk

Disadvantages:

Not standardized and traded on an exchange, so less widely available

Subject to default risk

- (d)
- (i) Calculate BJA's net position after three months if hedge strategy I was implemented. Show your work.
- (ii) Calculate BJA's net position after three months if hedge strategy II was implemented. Show your work.
- (iii) Evaluate hedge strategies I and II relative to BJA's risk appetite.

Commentary on Question:

Many students had difficulty with the definition of net position, which is equal to the hedging gain minus the market price increase

(i) Hedge 50% with Forwards

Spot price at maturity = \$1.98 per gallon

Forward price = \$1.85 per gallon

Gain on forwards = \$0.13 per gallon

Hedging gain = 0.13×150 million = \$19.50 million

Net position = Hedging gain - Market price increase = $19.50 - (0.13 \times 300)$
= -\$19.5 million

(ii) 3-way collar:

- short put with strike price at \$1.50 (premium = 0.23)

- long call with strike price at \$1.85 (premium = 0.49)

- short call with strike price at \$3.00 (premium = 0.22)

Cost of the collar = $0.49 - (0.23 + 0.22)$ per gallon =

\$0.04 per gallon

At maturity, only the long call is in-the-money

Therefore, the net gain on the hedge = $1.98 - 1.85 - 0.04$ per gallon =

\$0.09 per gallon = \$27.00 million

7. Continued

Net position = Hedging gain - Market price increase = 27 - (0.13 x 300)
= -\$12 million

Evaluate the hedging strategies I and II relative to BJA's risk appetite:
The company policy is to eliminate as far as possible any market price variability through hedging. The maximum acceptable unexpected earnings volatility from any related fuel pricing hedging activities has been set at \$5 million. The forward strategy lends itself well to targeting some fixed level of unacceptable volatility. The 3-way collar will likely be more volatile (gains when market prices increase, as seen here, and losses when they decline).

- (e) Assess whether or not BJA should pursue Susan's idea. Justify your answer.

Commentary on Question:

Full credit can also be obtained if a candidate provides valid arguments (TCE argument applied strongly to Blue Jay Air, RDT), and recommends the purchase of the oil refinery.

Ruth should NOT recommend purchasing an oil refinery

Transaction cost economics (TCE) suggests that arms-length contracts impose costs that can be saved through ownership. However, it could lead to increased overhead to manage the vertically integrated firm, which Blue Jay Air currently cannot manage. It can also create excess capacity due to unbalanced economies of scale. Vertical integration makes sense when the industry is stable (low competition, low exit barriers, low rate of technological changes), which is not the case for Blue Jay Air. Resource Based View (RBV) argues that a firm should focus on what they do best. Managing an oil refinery should not be the focus of Blue Jay Air at this time

- (f)
- (i) Explain two other significant financial risks that are not fully hedged at BJA.
 - (ii) Recommend a suitable strategy to manage BJA's risk exposure for each risk identified in part (i). Justify your response.

Commentary on Question:

Some candidates discussed non-financial risks at BIA but the question asked about financial risks only. Liquidity risk would also have been appropriate as a significant financial risk, but the question only asked for two risks

7. Continued

Interest Rate Risks

Blue Jay Air is highly leveraged and need to be able to raise capital at a low cost to fund its expansion plans

Blue Jay Air could enter into interest rate swaps to meet its debt obligations. There is no up-front cost to enter into interest rate swaps

Exchange Rate Risks

Blue Jay Air is planning to expand into international operations. Therefore, they will be exposed to currency rate fluctuations

Blue Jay Air could enter into currency swaps in multiple markets to reduce this exposure. There is no up-front cost to enter into currency swaps

8. Learning Objectives:

4. The candidate will understand how to apply and recommend appropriate ERM frameworks, principles, and strategies to manage, evaluate, analyze and mitigate risk exposures faced by an entity and to ensure operational excellence in any industry.
5. The candidate will understand the application of quantitative methods and techniques with a risk management focus to business problems for financial and non-financial companies.

Learning Outcomes:

- (4a) Assess the potential impact of risks faced by an entity in any industry, including the extent to which risks are hedgeable or non-hedgeable.
- (4c) Develop and evaluate an appropriate risk mitigation or risk transfer strategy for any given situation.
- (5a) Assess and apply methods and processes for quantifying and managing hedgeable and non-hedgeable risks within any business enterprise

Sources:

F-154-20: Bravo and Díaz-Giménez, Is longevity an insurable risk? Hedging the unhedgeable

F-113-14: Trainer & Cummins, Securitization, Insurance, and Reinsurance

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Define the following two types of longevity risk.
 - I. Idiosyncratic
 - II. Aggregate

Commentary on Question:

This is a Retrieval question. Candidates did well on this part, most candidates got partial credits for this question.

Idiosyncratic Longevity Risk: uniqueness and randomness in the longevity for an individual.

Systemic/Aggregate Longevity risk: uncertainty in the overall mortality rates of the entire population

8. Continued

- (b) Critique your coworker's understanding of each longevity risk in part (a) based on his statement above.

Commentary on Question:

This is a Comprehensive question. Candidates did well on this part too, and how well candidates did on this part is highly correlated to their performance on part (a). For candidates who answered Part (a) well, they generally provided good answer for Part (b).

Partial credits were given when candidates state that (1) his statement is appropriate for idiosyncratic risks and (2) not appropriate for aggregate risk; (3) idiosyncratic risks gets diversified due to law of large numbers and convergence to the mean, and (4) aggregate longevity risk all trends in the same direction and there is no offsetting or no convergence to the mean.

For idiosyncratic mortality risk, his statement is appropriate. Law of large numbers means that if the population pool gets sufficiently bigger, risks will begin offsetting each other and the total risk of the pool will converge towards the mean.

For aggregate longevity risk, his statement is NOT appropriate. In this risk, the mortality/longevity risk of the group will all trend towards the same direction. Large the population pool, more the actual outcome will deviate from the expected. There is no offsetting of risks.

- (c) For each of I to IV,
- (i) Describe the longevity risk management strategies.
 - (ii) Describe the pros and cons.

Commentary on Question:

This is a Comprehension question. Partial credits were given when candidates provide (1) a complete description (2) pro, and (3) con.

Candidates in general has a much better understanding in Pension Buy Out comparing to the other three strategies.

Q forward: CF proportional to realized mortality rate of a population is exchanged with a CF linked to the pre-established mortality rate agreed to at inception.

Pros: linked to broad based mortality data which is publicly available for investors (increased transparency)

Cons: Basis risk since the population demographics may differ from the company's.

8. Continued

Pension buy out: assets are transferred to a third party, all risks are transferred (asset management, mortality/longevity, interest rate risk, etc) in return for a single premium payment.

Pros: all risks are transferred out so no more longevity risk as well as market risks

Cons: required upfront premium payment

Indemnity-Based Longevity Contracts: The hedge buyer exchanges fixed payments with counterparty based on a pre-determined mortality assumption and receives "floating" payments based on actual mortality experience.

Pros: does not require upfront premium payment

Cons: introduces counter party risk, if counter party cannot fulfill its payments

Longevity Bonds: Financial instruments in which the premium principal for the coupon can vary based on the longevity experience of a cohort. The premium is based on the survivorship of cohort.

Pros: provides access to capital markets directly

Cons: can introduce basis risk as choice of cohort and actual experience may differ. Low supply because there are few natural issuers.

- (d) Recommend one longevity risk management strategy from I to IV for JKL. Justify your recommendation.

Commentary on Question:

This is a Knowledge Utilization question. Partial credits were given when candidates can explain (1) why each strategy was not considered and (2) why the recommended strategy is the best option.

It's important to link the justification to the CFO's criteria in the stem.

*Instead of **only** explaining why Index-Based Longevity Contract is the best fit, it's beneficial explain why other strategies are not good fits, since partial credits were given on those statements.*

CFO does not want basis risk, which eliminates Q-forwards & Longevity Bonds. ABC's mortality is younger than competitors', so basis risk is a bigger concern for ABC.

Pension buy-out requires an upfront premium, so that eliminates that choice.

The only one left is Index-Based Longevity Contracts. This does not require an upfront premium, and since the mortality assumption is pre-determined it can reflect ABC's younger population.

8. Continued

- (e) Explain two advantages and two disadvantages of addressing JKL's longevity risk using each the following:
- (i) Reinsurance
 - (ii) Securitization.

Commentary on Question:

This is a Comprehension question. Candidates did better on describing the advantages and disadvantages for Reinsurance than they did for Securitization. There are many possible solutions, candidates provided legit answers that are not listed below and were given credits.

Reinsurance

Advantages

Broad, deep market. Easy to find a counterparty.
Possibility for more flexible terms, recapture provisions.
Recognized risk-transfer easily reflected in reserves/capital

Disadvantages

Retaining may offer natural hedge to JKL term risk.
New, growing line may not have scale for good rates
Costly / time consuming to administer

Securitization

Advantages

If done properly, little credit (counterparty insolvency) risk.
Possible to achieve regulatory arbitrage.
Generate cash-flow, attract new capital/investors

Disadvantages

Thin, immature market. Harder to find a counterparty.
Duration of the longevity risk likely too far out (e.g., > 30 years).
High collateral required.

9. Learning Objectives:

3. The candidate will understand how managerial accounting impacts performance evaluation and decision making.

Learning Outcomes:

- (3a) Assess how managerial accounting can impact decision making and organizational architecture.
- (3b) Assess and recommend methods a company may use to allocate its costs and how these methods impact the perceived performance of a company or its component lines of business.
- (3c) Assess how managerial accounting can impact behavior and performance evaluation in organizations.

Sources:

Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 7: Cost Allocation: Theory

Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 9: Absorption Cost Systems

Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 10: Criticisms of Absorption Cost Systems: Incentive to Overproduce

Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 11: Criticisms of Absorption Cost Systems: Inaccurate Product Costs

Zimmerman, Accounting for Decision Making and Control 10th Ed Ch 12: Standard Costs: Direct Labor and Materials

Case Study

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe the two major criticisms of traditional absorption costing systems.
 - Traditional absorption cost systems create incentives to overproduce. Managers have an incentive to increase reported profits by increasing production while holding sales constant. The production of extra units spreads the fixed costs over more units.

9. Continued

- Traditional absorption cost systems also produce misleading product costs. This cost allocation system does not use an allocation base that represents the cause-and-effect relationship with overhead and the product. Traditional absorption cost systems typically allocate overhead using unit-level allocation bases. However, overhead can vary with the number of batches, number of customers, or number of product lines.

(b)

- (i) Critique Kitty's cost allocation method.
- (ii) Critique Jeff's cost allocation method.

Commentary on Question:

Candidates did not receive credit for ONLY regurgitating the case material information as this does not demonstrate an understanding of cost allocation method.

(i)

- a. Incentive for profit because selling for a price above standard price does not increase the overhead. This is not a dysfunctional incentive.
- b. Total cost is not known until end of the accounting period
- c. Assumes overhead is uniformly applicable to all products
- d. No incentive for individual stores to control costs because operating expenses are included in Indirect Costs to be allocated across all stores

(ii)

- a. Using a prospective overhead method allows more timely reporting of total costs
- b. Using a prospective overhead method results in over- or under-absorbed overhead at the end of the year
- c. Overhead is independent of actual economic activity
- d. Incentive to sell high volume to cover fixed overhead
- e. There is no cause-and-effect relationship between overhead and its allocation
- f. Since all stores are allocated the same overhead, smaller/newer stores would be subsidizing larger/older stores' expenses.

9. Continued

- (c)
 - (i) Critique Larry's proposed method.
 - (ii) Explain whether Larry's proposed method addresses a shortcoming of Kitty's method.
 - (iii) Explain whether Larry's proposed method addresses a shortcoming of Jeff's method.

Commentary on Question:

A number of candidates did not receive credit for swapping Kitty's and Jeff's method.

- (i)
 - a. Provides an incentive to overproduce the non-coffee items which can be held in inventory; increasing the denominator reduces overhead allocated to stores
 - b. All stores benefit from any store increasing its inventory because a higher denominator applies to all stores
 - c. Unless all goods are sold, excess inventory will cause under absorbed costs because only a fraction will be allocated.
 - d. Allocation of overhead is not known until the end of the accounting period
- (ii)
 - a. Does not address shortcoming that 'Total cost is not known until the end of the accounting period because overhead costs are accumulated and then spread.' Proposed allocation method still requires knowing final sales from all stores until it could be allocated.
 - b. Does not address shortcoming that 'There is no incentive to control individual store costs.' Overproduction will increase the denominator, causing a smaller allocation to the store.
- (iii)
 - a. Addresses shortcoming of favoring large stores and stores in area of higher cost of living. Overhead is allocated by sales, so larger stores with higher volume would be allocated its proportion of expenses.
 - b. Addresses shortcoming that 'Stores are incentivized to not help each other'. By cooperating with other stores to increase their sales, this would lower the overhead allocated to that store. This is also in the best interest of the Corporation.

9. Continued

- (d) Recommend two changes to the current allocation method to better reflect cost drivers for the individual stores. Justify your recommendation.

Individual store operating costs should be direct costs to the individual store and not included in indirect costs to be allocated across all stores. Store operating costs are direct costs that do not have to be allocated because they can be directly traced to the cost object (individual store).

Implement separate cost drivers for the advertising budget by country/region. To capture the cause-and-effect relation in the allocation of overhead costs, advertising costs should not be aggregated with the other overhead pool but should be allocated separately. Because Frenz has operations in developed and developing countries, the advertising rate by country will vary and less developed countries should not be expected to contribute to high-cost advertising in the developed countries. (i.e., segment advertising cost drivers)

Implement separate cost drivers for the salaries of corporate roles that are dedicated to different countries/regions. To capture the cause-and-effect relation in the allocation of overhead costs, some corporate salaries should not be aggregated with the other overhead pool but should be allocated separately. Because Frenz has operations in developed and developing countries, there may be corporate roles that are dedicated to different geographic regions.

10. Learning Objectives:

1. The candidate will understand how a company optimizes its corporate finance decisions based on its business objectives.
3. The candidate will understand how managerial accounting impacts performance evaluation and decision making.

Learning Outcomes:

- (1d) Assess the impact of business strategies such as acquisitions, divestitures, and/or restructurings.
- (3a) Assess how managerial accounting can impact decision making and organizational architecture.
- (3c) Assess how managerial accounting can impact behavior and performance evaluation in organizations.

Sources:

Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 5: Responsibility Accounting and Transfer Pricing

F-134-19: Aswath Damodaran, Damodaran on Valuation, Ch 15: The Value of Synergy

Case Study

Commentary on Question:

The question is evaluating M&A concepts by linking them to case study. The candidate should demonstrate the ability to assess the financial and synergistic impacts of a potential acquisition along with the ability to effectively compare valuation methods to help drive capital budgeting decisions. The candidate should also demonstrate the ability to apply the syllabus content to a real-world situation presented in the case study.

Solution:

- (a)
 - (i) Compare and contrast Growth Synergies and Cost Synergies.
 - (ii) Describe the three types of Growth Synergies.
 - (iii) Provide an example for each type of Growth Synergy in (ii) that BJT might realize.

10. Continued

- (i) Growth Synergies are realized through higher market share after a M&A activity whereas Cost Synergies are realized through operational efficiency, cost savings and overhead reduction. Comparison between Growth Synergies and Cost Synergies are below:
 - a. Both Growth and Cost Synergies are operating synergies.
 - b. Both Growth and Cost Synergies manifest themselves as higher expected cash flows in the future
 - c. Cost Synergies are bounded - there are only so many costs to be cut. On the other hand, Growth Synergies are unbounded - They are only constrained by skepticism about being delivered.
 - d. Cost Synergies are easier to model than growth synergies

- (ii) Three types of Growth Synergies are listed below:
 - a. The combined firm can achieve higher returns on current Investments - driving a higher growth rate.
 - b. The combined firm can find more investments - driving higher reinvestment rates.
 - c. The combined firm may expand its competitive position - driving excess returns.

- (iii) Examples of Growth Synergies BJT might realize through acquisition of TNT are below:
 - a. Higher growth rate: If BJT acquires TNT, it will be expanding into production of non-road tires. BJT already has already invested in network capabilities to distribute its tires in the USA and Canada. BJT could utilize its current distribution network to distribute tires from both BJT and TNT and drive higher return on investments made in its current distribution capabilities. This synergy has the potential to drive higher growth rates under the combined company.
 - b. Higher reinvestment rates: If BJT acquires TNT, the combined firm will possess core capabilities to produce both on-road and off-road tires. The combined firm could explore more reinvestment opportunities including developing tires for hybrid use such as recreational and other all-terrain vehicles. This synergy could enable higher reinvestment rates within the combined company.
 - c. Excess returns: The combination of BJT and TNT would allow BJT to expand its purchasing power of commodities including rubber and production machinery. The combined company could leverage its increased size & market share in negotiations to purchase supplies in larger quantities with lower risk than smaller companies. The combined company could use this increase purchasing power to expand production and market share, driving excess returns.

10. Continued

- (b)
- (i) Describe the two main reasons for transfer pricing within firms.
 - (ii) Explain how each of the reasons in (i) may apply if BJT acquires TNT.
- (i) The two main reasons for transfer pricing within firms are
- a. International taxation: When products are transferred overseas, the firm's corporate tax liability in both the exporting and importing country is affected if the firm files tax returns in both jurisdictions. To the extent allowed by the tax regulations, the firm will set a transfer price that minimizes the joint tax liability in the two countries.
 - b. Performance measurement: Whenever sections of a company transfer goods or services among themselves, measuring their performance requires that a "transfer price" be established for the goods and services exchanges.
- (ii) In case of BJT's acquisition of TNT, these reasons can be realized as below
- a. International taxation: BJT will want more profits to be recognized in the country with the lowest corporate tax rate. BJT & TNT will set a transfer price that minimizes the joint tax liability in the US & Canada. If Canadian taxes are lower than US taxes, the transfer price on goods sold by TNT to BJA should be as low as possible to minimize the US tax liability.
 - b. Performance measurement: A transfer price will need to be set for any transactions in which TNT sells an intermediate product to BJA which BJA processes to make the final product. In this respect, transfer prices impact investment, purchasing, and production decisions. This will likely not be applicable since BJA does not intend to interfere with TNT operations given its successful past
- (c) Projected profitability will impact BJT's decision to acquire TNT. After reviewing TNT's projected tire production costs, the BJT CEO states: "BJT can make easy profits if TNT increases production. BJT can pay TNT the cost of increased production and sell the additional tires at a premium in the market."

Critique the CEO's statement.

10. Continued

There are both correct and incorrect aspects to the CEO's statement here. Some of the correct aspects are

- If BJT and TNT can agree on an optimal transfer price, then potentially higher production would increase profits for BJT.
- TNT has low production costs as its production resides in Eastern Asia, so CEO may be correct in saying that they could potentially leverage that and make profits by mark-up prices and sell in the US and Canada

On the other hand, some of the incorrect aspects are

- TNT has strong presence in the US & Canada selling tires. CEO should consider sales (market) price not cost as the price that TNT will sell tires to BJT.
- CEO assumes TNT has excess manufacturing capacity but that may not be the case. If TNT is operating at max capacity, additional costs might be needed to increase output. Often such knowledge only resides with local entity