CURATED PAST EXAM ITEMS
- Solutions -

CFE 201 – Corporate Finance

Important Information:

- These curated past exam items are intended to allow candidates to focus on past SOA fellowship assessments. These items are organized by topic and learning objective with relevant learning outcomes, source materials, and candidate commentary identified. We have included items that are relevant in the new course structure, and where feasible we have made updates to questions to make them relevant.
- Where an item applies to multiple learning objectives, it has been placed under each applicable learning objective.
- Candidate solutions other than those presented in this material, if appropriate for the context, could receive full marks. For interpretation items, solutions presented in these documents are not necessarily the only valid solutions.
- Learning Outcome Statements and supporting syllabus materials may have changed since each exam was administered. New assessment items are developed from the current Learning Outcome Statements and syllabus materials. The inclusion in these curated past exam questions of material that is no longer current does not bring such material into scope for current assessments.
- Thus, while we have made our best effort and conducted multiple reviews, alignment with the current system or choice of classification may not be perfect. Candidates with questions or ideas for improvement may reach out to education@soa.org. We expect to make updates annually.

Course CFE 201

Curated Past Exams Solutions

All Learning Objectives

Learning Objective 1: Corporate Finance

Learning Objective 2: Financial Statement Analysis

Learning Objective 3: Managerial Accounting and Operational Excellence

Learning Objective 4: Evolving Quantitative Methods and Technologies

The following solutions are taken from the Foundations of CFE Exams from 2020 – 2024. They have been mapped to the learning objectives and syllabus materials for the CFE 201 2025-2026 course and in some cases modified to fit the 2025-2026 curriculum.

The related questions and Excel spreadsheets are provided in separate files.

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1. Fall 2024 CFE FD Exam (LOs 1b, 1c)

Learning Objectives:

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

Learning Outcomes:

(1b) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial on capital budgeting and allocation decisions

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

Sources:

CFE201-102-25: Why private equity sees life and annuities as an enticing form of permanent capital

CFE201-100-23: Hurdle Rate Definition

Commentary on Question:

The goal is for candidates to understand that different types of businesses can look at the same opportunity differently. We expect the candidate to be able to perform a discounted cashflows profitability analysis.

In general, candidates did well on part a, which is to compare the minimum required rate and the hurdle rate (WACC).

Part b, some candidates did not use XNPV function. Therefore they missed the first year cash flow. Also, some used 8% as the discount rate.

Part c, most candidates were able to recognize the IRR > hurdle rate. A small number of candidates mentioned the NPV was a small positive number so it may not be worth to pursue the project. The graders felt such statement was a reasonable assessment; and gave credits for such answer as well.

Part d, this part was asking for the potential scaling and expense savings for a PE company. Some candidates failed to recognize from a PE's perspective.

Part e, most candidates did well on this part.

1. Fall 2024 Continued

Solution:

(a) **(LO 1b)**
Describe how a hurdle rate is used to evaluate an investment.

The minimum required rate of return or target rate that investors are expecting to receive on an investment.

Before accepting and implementing a certain investment project, its internal rate of return (IRR) should be equal to or greater than the hurdle rate. The hurdle rate is often set to the weighted average cost of capital (WACC), also known as the benchmark or cut-off rate.

(b) **(LO 1b)**
Calculate the following metrics, using the assumptions given in the Excel file. Include time zero cash flows. Show your work.

(i) NPV

(ii) IRR

Part (i)
If they use this ""=XNPV(8%,C31:M31,C16:M16)"" they should get $0.37M
If they were to use the NPV function in excel, they would need to add in the time 0 outside of the function, otherwise it will be off in discounting.
"=NPV(8%,D31:M31)+C31"

Part (ii)
They can either use the IRR function, XIRR, or use goal seek to get an NPV of 0.
If they use one of the methods listed above and get the correct result of 9.68%

(c) **(LO 1b)** Explain whether ANC's product offering is a good addition to ABC, using the results of your calculation in (b).

Before accepting and implementing a certain investment project, its internal rate of return (IRR) should be equal to or greater than the hurdle rate. The IRR of 9.68% exceeds the 8% hurdle rate so it is a good investment"

If the resulting Net Present Value (NPV) is greater than zero, the project exceeds the hurdle rate, and if the NPV is negative it does not meet it. The NPV is greater than 0 using the 8% hurdle rate so it is a good investment.

(d) **(LO 1c)** Describe two specific benefits that draw private equity companies to life and annuity business.

1. Fall 2024 Continued

The cost of servicing the liabilities is significantly lower than the potential investment return. The spread represents an attractive margin.

Second, investing these assets provides a stable base for GPs to rapidly build their alternative credit capabilities.

They can also talk about permanent capital, or quickly reaching scale in alternative credit capabilities.

(e) **(LO1c, 1b)**

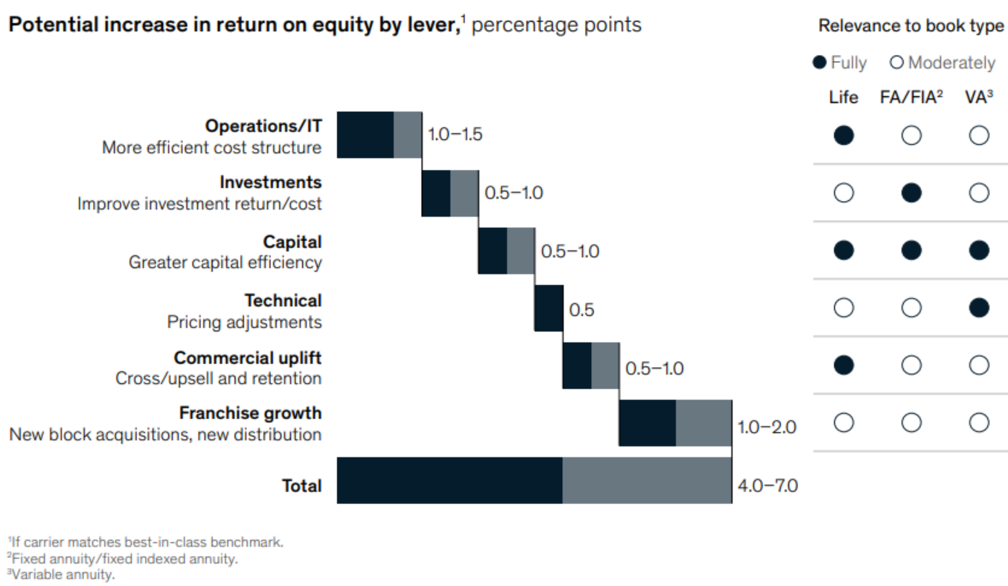
(i) Explain how two of the assumptions provided in the Excel spreadsheet might be different for a private equity firm.

(ii) Analyze the impact to the IRR (Excel tab 1_e-ii) after adjusting the two assumptions in part (i) to reflect what the private equity firm might reasonably assume. Show your work.

Part (i)

Exhibit

The value-creation playbook can lift return on equity by four to seven percentage points.



Part (ii)

For example, if they say that the investment returns would be triple for the PE firm, that is much higher than the article indicated and would lead to an IRR of 250%. That would show a lack of understanding of the article.

1. Fall 2024 Continued

If there is an error in part (b) calculating the IRR and NPV, do not penalize them for that.

Example of reasonable answers:
Higher Investment Return -> 7% increased to 7.25% increases the IRR from ~10% to 15%.
More efficient cost structure -> Could lower the expenses for maintenance from 1% to .5% , increases the IRR from ~10% to ~11%.
Increased retention -> Could decrease the lapse assumption or lapse growth, small increases to IRR.
Increased Cross sell -> Could decrease acquisition expense, drop from 6% to 5% would increase IRR from ~10% to ~14%.

2. Fall 2024 CFE FD Exam (LOs 3a, 3b, 4a, 4b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate costs and how these methods can distort perceived performance

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

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

~~CFEFD-S3-23-21 Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 17: Integration of KPIs and KRIs~~

~~CFEFD-S3-30-21 Operational Risk Management, 2nd Ed, Ch. 18 Case Studies (JP Morgan Whale and Credit Suisse Archegos Scandal sections only)~~

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 12 Case Study: Customer Churn

SOA: Peer-to-Peer Insurance: Blockchain Implications

SOA Research Institute: Decentralized Insurance Alternatives: Market Landscape, Opportunities and Challenges

Case Study – Star InsurTech (SIT)

2. Fall 2024 Continued

Commentary on Question:
Most candidates did well on this question. Overall, to earn full credit on each sub question, candidates needed to explain the underlying concept as well as relate their answer to the context of the case study and SIT.

Solution:
(a) **(LO 3a, 3b)** Explain why Karen may want to consider Economic-Value-Added as a performance measure using two reasons specific to SIT.

Commentary on Question:
Only a few candidates noted that EVA can be used as a performance incentive metric for managers.

Economic Value Added (EVA) is a good performance metric for SIT to use for two reasons:

1) Start-ups with growth mindset have lots of early, upfront costs needed to grow with profits not being realized until later years, assuming execution goes to plan. EVA considers this by amortizing these upfront costs. Accounting profits might be negative, but EVA will let you know when value has been added to the company.
2) SIT has many risks associated with its current and future expanded business. Capital will be a major consideration for SIT, for both internal and external reasons. SIT needs to consider economic capital for internal decision making. EVA considers economic capital and adjusts the value for the risks associated with generating profits.

~~(b) Recommend two key risk indicators to monitor SIT's operational risk. Justify your recommendations.~~

~~**Commentary on Question**~~:
~~*To receive full credit on this question, candidates needed to provide KRIs that specifically addressed operational risks and provide an answer relating to the context of the case study. KRIs not addressing operational risks did not receive credit.*~~

~~(1) % of fraud detected. This KRI ties to a key business objective, reducing fraud losses, is quantifiable, and is simple without being too simplistic. As mentioned in the case study, "SIT is looking to improve the performance of its underwriting and fraud detection capabilities" & "However, an audit has indicated that there are at least another 5% of fraud cases that are being missed"~~

~~(2) Number of cyber attacks. This KRI ties to a key business objective, is measurable, relevant, and critical to the success of SIT. As mentioned in the case study, "Cyber risk is high in a heavily digitalized InsurTech with high dependence on consumer data."~~

~~(c) Describe two lessons learned from the Credit Suisse Archegos Scandal that SIT should consider.~~

~~**Commentary on Question**~~:
~~*Many valid answers were accepted. To receive full credit, candidates needed to accurately describe a lesson learned from the Argos scandal and relate it to the context of the case study.*~~

~~(1) There were inadequate internal controls that were not followed, exacerbating credit Suisse's losses via taking more exposure to Archegos than their risk limits should've allowed. SIT can learn from this, and impose internal risk limits and controls on the amount of Insuracoin that they expose themselves to, thereby sitting a limit on the amount they can lose due to the volatile and unregulated nature of the cryptocurrency.~~
~~(2) Insufficient training/resources dedicated to risk management. It is noted that staffers in charge of risk management at credit Suisse were too inexperienced and too few in number, leading to insufficient management. SIT can learn from this by dedicating sufficient resources and experienced personnel to the risk management and oversight of Insuracoin on SIT's digital platform.~~

(d) **(LO 4a, 4b)** Describe potential risks to SIT from the proposed Faslite arrangement in regards to:

(i) A p2p platform claim process.

(ii) Financial considerations.

Commentary on Question:
Many valid answers were accepted with justification; however to receive full credit on this question, candidates needed relate their response to the context of the case study.

Most candidates noted Faslite's high loss ratio as a key financial consideration for SIT on (d)(ii).

2. Fall 2024 Continued

P2p platform:
SIT as the reinsurer for higher losses, once the mutual pool is exhausted, needs to cover claims. The claim process is potentially highly automated by smart contracts, and automatic payments can be done and non-reversible. Therefore, this process is highly prone to smart contract risks (cyber security, coding, etc.). Errors in smart contracts can lead to financial losses for SIT. Vulnerabilities in those smart contracts can also attract hacker's attacks.

Financial:
Faslite has a very high loss ratio, most recently 125%, which poses significant counterparty risk to SIT. Since SIT would be acting as Faslite's reinsurer in this arrangement, SIT needs to be very careful about what terms they set on reinsuring excess losses, since it is very likely given their recent history that Faslite will have losses in excess of 100% of premiums collected, which could create significant reinsurance claims for SIT.

(e) **(LO 4a, 4b)** Recommend actions SIT could take to mitigate the potential risks discussed in part (d). Justify your recommendation.

Commentary on Question:
Below are some sample answers. Valid answers were accepted with justification.

To mitigate the first risk, SIT can facilitate smart contract audit to validate the smart contracts before put into use. Additionally, they can potentially purchase insurance coverages for smart contracts if needed to mitigate the effects of hacker attacks.

To mitigate the second risk, SIT can only reinsure the better performing rental insurance and refuse to reinsure the home insurance block. As per the case study, most of the better profitability outlook is coming from the rental insurance, and home insurance profitability has not been improving.

4. Fall 2024 CFE FD Exam (LOs 2a, 2c)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

Sources:

Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 15 Multiinternational Operations, Pages 3 – 9, and 18 – 24.
Case study – Frenz

Commentary on Question:

The purpose of this question is to assess the candidates knowledge on how foreign currency transactions and foreign subsidiaries effect a parent company's financial statements.

- *Which currency translation method to use*
- *The impact to the equity when there is net asset or liability balance sheet exposure*
- *Methods can be used to mitigate balance volatility.*

Solution:

(a) **(LO 2a, 2c)**

(i) Recommend the appropriate foreign exchange translation method for the parent company, Frenz, to use when translating the financial statements of its new Japanese subsidiary into its presentation currency, Euros. Justify your recommendation.

(ii) Translate the 2023 year-end income statement and balance sheet of the Japanese subsidiary in terms of Euros using the appropriate translation method. (Excel tab 4_a-ii). Show your work.

(iii) Assess the following statement from Kitty Dunn regarding the foreign currency risk of establishing the Japanese subsidiary whose functional currency is the Japanese yen:
"The establishment of a Japanese subsidiary will result in a net liability balance sheet exposure. This means that if the Japanese yen weakens relative to the euro, the value of stockholders' equity on the parent company's balance sheet will increase due to an increase of the foreign currency translation adjustment."

4. Fall 2024 Continued

Commentary on Question:
The goals of this question are to examine candidates' ability to

- *Recommend currency translation method – current method vs. temporal method*
- *To assess the statement, the candidate should determine if the statement is valid or not based on the result from the translation of asset and liability items.*

(i) Current Rate Method is recommended because foreign entity operates in its local currency (yen) which varies from the parent company's presentation currency (euro).

(ii)

INCOME STATEMENT (¥)

Yen in thousands	2023	¥/€	Conversion method Conversion Rate
Sales	4,620,000	160	Average Full Year 2023
Cost of Sales	462,000	160	Average Full Year 2023
Store Operating Expenses	2,079,000	160	Average Full Year 2023
Depreciation	207,900	160	Average Full Year 2023
General and Administrative Expenses	600,600	160	Average Full Year 2023
Total Operating Expenses	**3,349,500**	160	Average Full Year 2023
Operating Income	**1,270,500**	160	Average Full Year 2023
Interest Expense	**92,400**	160	Average Full Year 2023
Income Tax Expense	**294,525**	160	Average Full Year 2023
Net Income	**883,575**	160	Average Full Year 2023

BALANCE SHEET (¥)

Yen in thousands	Dec. 31, 2023	¥/€	Conversion Rate
Current Assets:			
Cash	202,421	165	December 31st, 2023
Accounts Receivable	68,284	165	December 31st, 2023
Inventory	134,616	165	December 31st, 2023
Total Current Assets	**405,321**	165	December 31st, 2023
Long-term Assets:			
Long Term Investments	2,975,743	165	December 31st, 2023
TOTAL ASSETS	**3,381,064**	165	December 31st, 2023
Current Liabilities:			

Accounts Payable	85,354	165	December 31st, 2023
Current Borrowing	75,075	165	December 31st, 2023
Total Current Liabilities	**160,429**	165	December 31st, 2023
Long-term Debt	**1,924,560**	165	December 31st, 2023
Total Liabilities	**2,084,989**	165	December 31st, 2023
Equity			
Paid-in Capital	412,500	140	Average Historical
Retained Earnings, accumulated	883,575	Equal to Net Income	
		Equal to Total Equity - Paid-in Capital - Retained Earnings	
Total Equity	**1,296,075**	Equal to TOTAL ASSETS - Total Liabilities	
TOTAL LIABILITIES AND EQUITY	**3,381,064**	165	December 31st, 2023

Statements in Euro

INCOME STATEMENT (€)

Yen in thousands	**2023**
Sales	28,875
Cost of Sales	2,888
Store Operating Expenses	12,994
Depreciation	1,299
General and Administrative Expenses	3,754
Total Operating Expenses	20,934
Operating Income	7,941
Interest Expense	578
Income Tax Expense	1,841
Net Income	5,522

BALANCE SHEET (€)

Yen in thousands	**Dec. 31, 2023**
Current Assets:	
Cash	1,227
Accounts Receivable	414
Inventory	816
Total Current Assets	**2,456**
Long-term Assets:	
Long Term Investments	18,035
TOTAL ASSETS	**20,491**

Current Liabilities:	
Accounts Payable	517
Current Borrowing	455
Total Current Liabilities	**972**
Long-term Debt	**11,664**
Total Liabilities	**12,636**
Equity	
Paid-in Capital	2,500
Retained Earnings, accumulated	5,522
Cumulative Currency Adjustments	**(167)**
Total Equity	**7,855**
TOTAL LIABILITIES AND EQUITY	**20,491**

(iii) Kitty's statement is incorrect. The establishment of a Japanese subsidiary results in a net asset balance sheet exposure because Total Assets are greater than Total Liabilities. This means that if the Japanese yen weakens relative to the euro, the value of Total Equity will decrease due to a decrease of the cumulative foreign currency translation adjustment.

Frenz makes the decision to expand its super premium coffee product line. To do so, it decides to import coffee beans from Costa Rica. Frenz finds a Costa Rican coffee bean supplier and agrees to purchase coffee beans under the following terms:

- The Costa Rican Colón(₡) will be the currency used for the transaction.
- The transaction is made on November 15, 2023 with credit terms that allow for payment within 60 days.
- The transaction is settled on January 15, 2024.

(b) **(LO 2a, 2c)** Describe how this foreign currency transaction will be reflected on the quarterly balance sheet and income statement at both December 31, 2023 and March 31, 2024.

Commentary on Question:
The objectives of this question are to assess candidates' ability to:
- *Identify what should be recorded on November 15, 2023.*
- *Analyze the impact of the exchange rate change on the balance sheet and income statement as of December 31, 2023.*
- *Analyze the effects of the exchange rate on January 15, 2024, when the transaction is settled, and identify the affected accounting items on the balance sheet and income statement for the quarter end reporting.*

4. Fall 2024 Continued

Note: The sale of coffee beans is not discussed. Therefore, candidates should provide a straightforward explanation of the transaction without analyzing what

might happened to Cost of Good Sold. At November 15, 2023, a debit of Inventory with a credit of Account Payable should be recorded.

At December 31, 2023, the financial statement impact is as follows:
For foreign currency transactions whose settlement dates fall in a different accounting period than the transaction itself, both GAAP and IFRS accounting require adjustments to reflect intervening changes in currency exchange rates. Thus, Frenz needs to calculate the value of the coffee beans in euros using the exchange rate at the time of purchase less the value of the coffee beans in euros using the exchange rate at December 31, 2023. This difference is than booked as a (unrealized) foreign currency transaction gain/loss on the income statement.

At March 31, 2024, the financial statement impact is as follows:
Any change in the exchange rate between the colon and the euro between December 31, 2023 and January 15, 2024 (the settlement date) will also result in a foreign currency transaction gain or loss on the March 31, 2024 financial statements. In this case the gain/loss is calculated as the value of the coffee beans in euros using the exchange rate at December 31, 2023 less the value of the coffee beans in euros using the exchange rate at January 15, 2024. This gain/loss is booked as a foreign currency transaction gain/loss on the March 31, 2024 income statement.

(c) **(LO 2a, 2c)**

(i) Recommend a method which Frenz can use to reduce any potential volatility on the balance sheets and income statements related to the transaction in part (b). Justify your recommendation.

(ii) Describe one drawback of the method recommended in part (i).

Commentary on Question:
Most of the candidates did well in answering this question. There are more than one solution. Reasonable answers with clear recommendations were accepted.

Frenz could use derivative instruments such as forward contracts which would reduce the effect of unfavorable short-term fluctuations in the colon/euro exchange rate.

Shortening the credit terms will reduce the period over which FX accounting volatility can occur but doesn't directly address any FX changes that do occur over the shorter time span. Frenz could also just pay in Euros also. Considerations should be given for counterparty risk in derivative instruments are used.

6. Fall 2024 CFE FD Exam (LOs 2a, 2c)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

Sources:

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

Case Study - Darwin

Commentary on Question:

The candidate should understand how to analyze income statements and balance sheets (with a focus on ROE and its component parts) as well as being able to take the information, analyze statement items that impact ROE and make recommendations to company management to improve ROE. The candidate should demonstrate a basic understanding of deferred taxes, as well.

Solution:

(a) **(LO 2a)**

(i) Calculate the components of the Dupont analysis. Show your work.

(ii) Analyze the drivers of Darwin Life's ROE (Excel tab 6_a) for three of the Dupont components in part (i).

Commentary on Question:

Candidates generally did well in part (i). Full credit granted for calculating ROE, Leverage, Tax Burden, Interest Burden, EBIT Margin and Asset Turnover. Other combinations of ratios are acceptable as well. For example, if EBIT Margin is decomposed further but EBIT margin is not explicitly identified, that is acceptable. Candidates used average assets over full year for Return on Assets (or similar calculations) was also given credit.

6. **Fall 2024 Continued**

Candidates are expected to analyze three Dupont components to receive full credit. Candidates who didn't calculate the first part correctly but did reasonable analysis based on values calculated in (i) also received credit. Candidates did well in this part too.

(i)

	2021	2022	2023	2024	2025	2026
ROE		0.1951	0.1874	0.1988	0.1962	0.2120
Return on Assets		0.0101	0.0094	0.0096	0.0088	0.0085
Leverage		19.2696	19.8671	20.7247	22.4164	24.9212
Net Profit Margin		0.0703	0.0610	0.0582	0.0493	0.0430
Total Asset Turnover		0.1440	0.1546	0.1647	0.1774	0.1977
Tax Burden		0.6502	0.6500	0.6501	0.6499	0.6500
Interest Burden		0.9159	0.9140	0.9202	0.9191	0.9672
EBIT Margin		0.1180	0.1027	0.0973	0.0826	0.0684

RoE= Net Income/Statutory Equity
Return on Assets = Net Income/ Total Assets
Leverage = Total Assets/Statutory Equity
Net Profit Margin = Total Revenues/Net Income
Total Asset Turnover= Total Revenues/Total Assets
Tax Burden = Net Income/(EBIT – Interest)
Interest Burden = (EBIT – Interest)/EBIT
EBIT Margin = EBIT/Total Revenus

(ii)

1. ROE relatively stable over the period.
2. Leverage increases partially offset decline in return on assets
3. Return on assets decline due to decrease in net profit margin, as asset turnover is improving.
4. Net profit margin is declining is because EBIT margin is declining. Tax and interest burden are relatively stable.
5. Net income decline reflected in decline of EBIT margin. EBIT Margin is the cause of Net profit margin declining.
6. Tax burden and interest burden relatively stable.
7. EBIT Margin is declining because earnings are declining then increasing while revenues rising, i.e. sales are good but income is not because of expenses and spread compression.
8. ROE improvement in 2024-2026 is speculative.
9. ROE improves in the projection period due to greater leverage, while ROA decreases. This is not good because it may imply that Darwin's borrowing costs exceed the marginal rate it can earn on investing in the business.
10. Part of statement is actual and part is projection.
11. Increasing leverage with a declining ROA is a riskier and less successful path for Darwin.

6. Fall 2024 Continued

(b) **(LO 2a)** Recommend how to improve Darwin's ROE using the following. Justify your recommendations.

(i) Operations

(ii) Improving the balance sheet.

Commentary on Question:
Candidates were expected to recommend one from operations perspective and one from improving balance sheet perspective to receive full credit. Overall candidates scored well in this part of question, some candidates only recommended from operations perspective and received partial credit.

(i)
- Limit expense growth. Expenses at Darwin have or are expected to grow by 0-5%/year more than revenues over the 2021-2026 period (See Darwin Life tab).

- Improving risk adjusted investment performance, as Net Investment Income hasn't been growing as fast as reserves.

(ii)
- Undertake a review of product profitability. Take advantage of market spaces, such as IVA, where competitors aren't. Re-price products as necessary to meet IRR/ROE targets.

- Evaluate opportunities to reduce Darwin's tax burden, which is more than 30% of EBIT, or increase timing efficiency.

- Balance use of leverage to a consistent target, which has been in the 30%+ range but is expected to drop to about 10%.

(c) **(LO 2c)** Darwin has also just purchased new office furniture for the whole company. Darwin's regular accounting method depreciates the furniture over 10 years while the taxing authority depreciates the furniture over 20 years, both using the straight-line method.

Analyze qualitatively Darwin's deferred taxes related to this purchase.

Commentary on Question:
Candidates are expected to address on the DTA may only be recognized to the extent that there is a reasonable expectation of future profits to receive full credit. Most candidates only explained DTA and were granted partial credit.

6. Fall 2024 Continued

1. The carrying amount of the asset is less than the tax base as the carrying amount decreases by 10%/year while the tax base decreases by 5% per year, resulting in a deferred tax asset.

2. A deferred tax asset occurs in this situation because the depreciation expense is lower for tax purposes compared to the accounting method, resulting in an overpayment of taxes.

3. This results in a deductible temporary difference as the temporary difference results in the deduction of taxable income in a future period as the asset is recovered or settled. The DTA may only be recognized to the extent that there is a reasonable expectation of future profits against which the asset can be recovered or settled.
4. Based on Darwin's ROE pattern, there is currently a reasonable expectation, although this should be watched.

7. Fall 2024 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 12 Case Study: Customer Churn

SOA Research Institute: Decentralized Finance for Actuaries

SOA: Peer-to-Peer Insurance: Blockchain Implications

SOA Research Institute: Decentralized Insurance Alternatives: Market Landscape, Opportunities and Challenges

Case Study – Star InsurTech

Commentary on Question:

Most candidates did well on this question. They can demonstrate their understandings of blockchain technology and its application in insurance industry, also can connect to the case study and provide the answers related to SIT's situation. Some candidates only finished the first part of questions, or leave this question empty, which might be caused by running out of time.

Solution:

(a) **(LO 4a, 4b)**

(i) Compare and contrast the public blockchain and private blockchain.

(ii) Recommend which blockchain, public or private, SIT should use, based on SIT's strategic initiative to increase sales. Justify your recommendation.

7. Fall 2024 Continued

Commentary on Question:
Most candidates did well on this question. For part (i), to get full credit, candidates need to provide the similarities of public and private chains, and also the differences between public and private chains. The key difference needs to be included which is that public can be accessed by everyone while private cannot.

For part (ii), candidates would receive full credit by recommending either public or private, but they need to fully justify their recommendations.

(i) Both public and private chains are decentralized, transparency of transactions, and immutable.
Public chain can be accessed by everyone, it's permissionless.
Private chain is not open to everyone, only the authorized users can have access.

(ii) Since one of SIT's strategic initiatives is to increase sales, I would recommend going with public chain. Since public chain can be accessed by everyone, it would be much easier to attract future potential customers and would make it possible for SIT to have access to the much larger customer pool.

(b) **(LO 4a, 4b)** Describe how SIT could effectively use:

(i) Tokens

(ii) Oracles

Commentary on Question:
For both (i) and (ii), to get full credit, candidates needed to define what tokens and oracles are, and provide explanation about how they would help improve the efficiencies on the chain.

(i) Token is a digital asset that represents a specific value within a blockchain ecosystem. It can be used as premiums to be paid by the policyholders, also as claims to be received by policyholders. It can make the payments seamlessly so to improve the efficiency of the transactions on the chain.

(ii) Oracle can allow the smart contracts to access the external data from the real world. For example, retrieving the weather information, market information, real-time events, etc. It can help automate certain process within the smart contracts and improve the overall efficiencies.

(c) **(LO 4a, 4b)** Describe how this approach would help SIT achieve each of its strategic initiatives (Case Study section 9.4).

7. Fall 2024 Continued

Commentary on Question:
To get full credit, candidates need to provide answers for all 3 SIT's strategic initiatives based on the case study, with details on how it would help to achieve the goals.

For the 3 strategic initiatives:
Increase sales: entering the decentralized exchanges would provide a brand-new platform for SIT. This would allow SIT to have access to a new marketplace where it contains a large number of potential customers. This would help achieve the goal of increasing sales and be consistent with SIT's strategic initiatives.

Increase margin: by entering the decentralized exchanges, the traditional processes can be automated and replaced by the blockchain technology. It would significantly reduce the operational and administrative expenses, which can help improve the margin, and that's consistent with SIT's strategic initiatives.

Increase performance of digital assets: by entering the decentralized exchanges, SIT can take the advantage from its expertise in modern technologies. As a tech-insure, SIT has experience with those modern technologies and can benefit from the early transition. The opportunities on the decentralized exchanges can be utilized by SIT easily and this would be a nature fit for SIT to improve the performance of their digital assets.

8. Fall 2024 CFE FD Exam (LOs 1a, 1b, 1c)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial on capital budgeting and allocation decisions

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

Sources:

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 31: Mergers and Acquisitions
~~CFO Forum: Market Consistent Embedded Value Basis for Conclusions~~

Case Study - Darwin

Commentary on Question:

This question tests the Candidate's ability to ~~strategically consider acquisitions using the MCEV framework and~~ evaluate the impact such acquisitions may have on all companies involved. Candidates generally did well on this question.

Solution:

(a) **(LO 1a, 1b, 1c)** Explain how each of the following value-creating opportunities would apply to the acquisition of SIT.

I. Improve the performance of the target company.

II. Create market access for SIT's products.

III. Acquire skills or technologies more quickly or at a lower cost than building in-house expertise at Darwin.

Commentary on Question:

Although candidates generally did well on this question, few gave enough detail on the value-creating opportunities themselves and most failed to note that the first opportunity may not well apply because SIT is already highly automated and has cost-effective operations.

8. Fall 2024 Continued

1. Improve the Performance of the Target Company
    a. This strategy refers to improving the acquired company's performance using opportunities such as reducing costs or increasing revenue. This strategy may not well apply to this acquisition as SIT already has highly automated and cost effective operations. In addition, SIT products are commodity like in a very competitive market. Therefore, it is not clear how Darwin could help drive higher margins for SIT products by increasing prices, distribution relationships, or brand.
2. Create market access for SIT's products
    a. This strategy can apply when smaller companies have difficulty gain the full market exposure to their products, and the acquiring company can accelerate this access. As Darwin has increased recent growth through developing distribution relationships and product service, this strategy could apply if Darwin can leverage their distribution relationships to drive higher market access for SIT.
3. Acquire skills or technologies more quickly or at a lower cost than building in-house at Darwin
    a. This strategy can apply when the acquiring company can benefit from skills or technologies already in place in the target company. Darwin is in need of technology that can improve and reduce costs in back office systems and will likely be able to leverage the staff and technology that built a highly automated back office at SIT.

~~(b) Describe what reference interest rates should be used for this MCEV analysis.~~

~~**Commentary on Question**:~~
~~*Candidates generally did well on this question, being able to identify swap rates as the ideal reference rate for MCEV analysis, but few mentioned the CFO Forum's involvement and guidance or provided background on reference rates in general.*~~

~~Reference rates are a proxy for true risk-free rates used in valuation. The CFO Forum guidance for reference rates is that market swap rates should be used because it is believed that swap markets are more liquid and consistent with market traded options. Although the CFO Forum recognizes that swap rates have limitation in some markets for long durations, they are still the best reference rates available.~~

~~(c) Describe how the MCEV valuation methodology could be used in Darwin's evaluation of the SIT acquisition.~~

8. Fall 2024 Continued

~~**Commentary on Question**~~:
~~*Candidates were generally able to describe the MCEV approach and how it could be used by Darwin to evaluate the acquisition. Partial credit was also given to candidates who provided the MCEV formulas and discussed computational aspects of the formula components that are applicable to Darwin.*~~

~~The MCEV approach should be used to estimate the economic value added, the value of performance improvements that Darwin could achieve from acquiring Star. Additionally, the MCEV approach would best measure the entity specific value for Darwin.~~

~~It's important to note that MCEV is not the actual transaction price that Star would accept for the acquisition, especially if other companies were also bidding to acquire Star, and that the price paid is an important factor regarding the economics of the transaction.~~

1. Spring 2024 CFE FD Exam (LOs 2a, 2b)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

Sources:

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

Case Study - Frenz

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) **(LO 2b, 2a)** Explain how inventory accounting choices impact the income statement.

Commentary on Question:
Candidates scored reasonably well in this question. Quite a few candidates only provided inventory accounting choices and explained each of them. Partial credits were granted in this case. Candidates are expected to touch on the impact to income statement to receive full credits.

Management's choice among acceptable inventory assumptions and methods affects profit.

The selection of an inventory costing method is a policy decision, and the companies cannot arbitrarily switch from one method to another.

The selection does matter to profitability, it also matters to balance sheet. Inventory accounting choices can be made to create biased financial reports intentionally. Earnings can be increased by accounting choices and expenses can be deferred into the next reporting period to lower the total expenses this period intentionally.

1. Spring 2024 Continued

Inventory accounting choices can also affect the presentation of the reports and earnings, to be likeable to the investors.

Finally, inventory accounting choices can be aggressive or conservative, aggressive accounting choices may decrease the financial position in later periods.

(b) **(LO 2b, 2a)** Describe how earnings for 2021 and future years would differ based on the two inventory accounting methods.

Commentary on Question:
Candidates scored well in this question and demonstrated good understanding on different inventory account choices.

In periods of changing prices, the FIFO cost assumption will provide a more current picture of ending inventory value, because the most recent purchases will remain in inventory. Frenz's COGS will be lower hence the earnings in the statement would be higher.

Under the weighted-average cost assumption, however, it will display a blend of old and new costs.

During inflationary periods, the value of the inventory will be understated. However, the more current costs are shown in COGS, hence, Frenz's earning would be lower.

(c) **(LO 2b, 2a)**

(i) Determine the reporting quality of Frenz according to the Quality Spectrum of Financial Reporting. Justify your answer.

(ii) Recommend two ways to improve Frenz's reporting quality. Justify your recommendations.

Commentary on Question:

(i) Candidates are expected to provide the rating and justify the rating from at least three different reasonable angles (some samples listed below) to receive full credit. Most candidates received partial credit on this question.

(ii) Candidates are expected to provide two reasonable recommendations that are applicable to Frenz. No credits were granted for general recommendations that do not apply to Frenz. Candidates scored well in this part of the question.

1. Spring 2024 Continued

(i) Decision-useful, sustainable, and adequate returns

- Provide enough information for investors to assess the company performance contain relevant information.
- Provide 3-year projections to show the potential growth of the company. It embodies the characteristics of decision useful information.
- The projections indicate an adequate level of return on investment and derive from activities that a company will likely be able to sustain in the future.
- In the case study, it didn’t specify any new activities other than expansion plan, so it's assumed that the growth shown in the projection are organic.
- However, it's not providing enough explanation on items that have significant changes (i.e. cash) and some of them are oversimplified, which doesn't help with decision making process.

(ii) Examples of reasonable recommendation:

- Include footnotes for Frenzh to provide additional information on the accounting basis for items - so that any adjustments are justified and clear to public.
- Make sure Frenz's accounts payable and accounts receivable to reflect actual numbers - so to make the reports more accurate.
- Avoid over-simplified numbers to make the reports more compelling.
- Provide explanation on increasing depreciation year over year as increase depreciation seems a bit so that investor/analyst have more information other than the numbers itself.

(d) **(LO 2b, 2a)** Evaluate the impact of the planned reporting changes on the quality of Frenz’s financial statements.

Commentary on Question:
To receive full credit, candidates are expected to assess the earning quality, reporting quality, and investor impact and also describe the direct impact. Most candidates received partial credit for this part of the question.

Revenue perspective
It improves the revenue growth on the report. The revenue will increase significantly. This act can be a warning sign. CEO tries to classify one-time sales included in revenue to enhance revenue growth, CEO is motived to issue less than higher quality financial reports to boost the stock price. This is not sustainable earnings, cannot provide a sound platform for forecast.

1. Spring 2024 Continued

Expense perspective
Expense would be lower then the profit margin would be higher, it's making the operating performance look more attractive by carving out the household coffee business expense (expense would be lower then the profit margin would be higher)

This is incorrect as the household coffee business is part of Frenz business and it's still recurring until the business get sold hence, it shouldn't be excluding in the income statement.

Both acts lower the reporting quality as well as earnings quality. It doesn’t help with assessing the company's performance. It can mislead when making investment and other decisions. This can give investors a false impression of the company's sustainable revenue-generating capability.

2. Spring 2024 CFE FD Exam (LO 1b)

Learning Objectives:

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

Learning Outcomes:

(1b) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

Sources:

~~CFEFD-S1-03-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 22: Real Options~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8^{th} Edition, Ch 40: Flexibility

Commentary on Question:

Candidates generally did very well on this question.
The goal of this question is to test candidates' understanding of real options and how they might arise in a business setting. Candidates were expected to calculate the value and implications of deciding which projects to pursue when the projects have different lifetimes.

Solution:

(a) **(LO 1b)** Calculate the cost of business travel for one sales professional using the ~~equivalent annual benefit~~ discounted cash flow method under each of options I and II, assuming a sales professional averages 20,000 miles annually. Show your work.

	Buy	Reimburse
Car purchase (one time)	35,000.00	-
Reimbursement per year	-	17,000.00
Gasoline	2,000.00	-

Standalone NPV	43,658.95	73,601.10
Equivalent Annual Benefit	10,084.12	17,000.00

The Standalone NPV is the present value of each scenario, with the car purchase at time zero and the reimbursements and gasoline at the end of each year.

The Equivalent Annual Benefit was determined by dividing the Standalone NPV by the present value factor, which is determined as: ((1/.05)*(1-(1/(1.05))^5))

2. Spring 2024 Continued

(b) **(LO 1b)** Describe the types of real options that XYZ owns if they initially purchase the cars.

Commentary on Question:
Many candidates answered "option to wait," which is not a real option in this scenario.

XYZ has the option to abandon by selling the cars if the sales professionals aren't driving enough miles to make it worthwhile to keep owning the cars.

XYZ has the option to expand (aka growth option) and buy more cars if they hire more sales professionals.

(c) **(LO 1b)** Calculate the value of the real option to wait by reimbursing mileage for the first year, assuming a time horizon of 5 years from today (i.e., 4 years from the potential future purchase date). Show your work.

Commentary on Question:
Candidates generally did well on the calculations of each of the NPVs, although many candidates did not recognize that the value of the real option is the difference between the lesser of the value of the options to Buy Now and Reimburse Now, and Wait. Many candidates calculated the value as the difference between the average of the Buy Now and Reimburse Now values, and Wait.

5 Year NPVs:
Wait-Reimburse (5,000 miles): $18,400.28
Wait-Buy (25,000 miles): $64,871.31
Reimburse Now (5,000 miles): $18,400.28
Reimburse Now (25,000 miles): $92,001.38
Buy Now (5,000 miles): $37,164.74
Buy Now (25,000 miles): $45,823.69

	5-year NPV
Wait	41,635.79
Buy Now	41,494.22
Reimburse Now	55,200.83

Value of real option	(141.58)

2. Spring 2024 Continued

The 5-year NPV of each option is calculated as the weighted probability of each decision (50% probability of 5,000 miles, 50% probability of 25,000 miles).

The value of real option is the difference between the minimum of the Buy Now and the Reimburse Now values, and the value of the option to Wait.

(d) **(LO 1b)** Describe two shortcomings associated with the calculations you performed in part (c).

Commentary on Question:
Two examples are listed below, but other examples were accepted for full credit.

1. The calculations assume a single time horizon (EAB would have a different value of the option)
2. There is uncertainty in the assumptions (e.g., there is uncertainty in the price of cars and gasoline in the future, or mileage driven by the sales professionals might continue to be unknown at the end of the year or might vary over time)

3. Spring 2024 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

~~CFEFD-S4-33-21 Dowd, Measuring Market Risk 2nd ed, Ch 15 Back Testing Market Risk Models~~

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 14 The Art of Machine Learning for Predictive Data Analytics

Commentary on Question:

The candidates mostly did well on part a and b~~; but many failed to complete part c, such as the normal PDF calculation and recognizing the hypothesis~~. ~~The graders understood that part c had good amount of calculations; and awarded partial credit for many candidates.~~

For part a, some candidates did not understand the P/L calculation.

Solution:

(a) **(LO 4a, ab)**

(i) Assess Emily's suggestion to use the investment department data.

(ii) Recommend two methods to address the issue with data accuracy.

3. Spring 2024 Continued

(i) Her suggestion is correct
As this task is for risk management purpose, P/L data reflecting underlying volatility rather than accounting prudence is more important.

(ii) Clean the P/L data to reflect end-of-day market positions.
Use hypothetical P/L data obtained by revaluing trading position from one day to next.

(b) **(LO 4a, 4b)**
~~(i) Describe the purpose of back-testing in this context.~~

(ii) Explain which CRISP-DM stage the back testing procedure belongs to.

~~(i) The risk prediction model must be validated before being used to predict return in the future. This involves applying a quantitative method to judge whether the actual investment P/L data are consistent with the proposed model assumption.~~
(ii) Modelling phase.
It involves validating the model assumption and parameter of the predictive model.

~~(c)~~
~~(i) Perform the Rosenblatt Transformation on the data provided in Excel tab Q3_c. Show your work.~~

~~(ii) Determine if the null hypothesis can be accepted. Justify your answer.~~

~~See attached spreadsheet for model solutions.~~

4. Spring 2024 CFE FD Exam (LO 3c)

Learning Objectives:
3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3c) Recommend best practices in business processes to achieve operational excellence.

Sources:
Managing Business Process Flows, Ch 1: Products, Processes, and Performance

Managing Business Process Flows, Ch 2: Operations Strategy and Management

CFE201-106-25: Procurement, early warning systems, and the next disruption

Case Study - Frenz

Commentary on Question:
Commentary listed underneath question component.

Solution:

(a) **(LO 3c)** Explain two ways Frenz is attempting to achieve a sustained competitive advantage.

Examples of activities (choose 2) include:
1) Having operations and coffee shops in most major cities
2) Offering high-end specialty coffee; dominating that market
3) Expanding into other countries (Asian market)
4) Product innovator - exploring coffee made from exotic coffee beans and special tea leaves
5) Exploring vertical integrations to improve operational efficiencies and reduce cost.

The best candidates noted that the combination was stronger than the individual components

4. Spring 2024 Continued

(b) **(LO 3c)** The consultant makes the following statements:

I. Frenz's current offerings give flexibility in determining the company's strategic positioning. There is room for Frenz to position itself in area C, offering customers a moderate variety of products with only a short wait time.

II. Moving to area C would require Frenz to make strategic tradeoffs.

III. The operational frontier is fixed, making it easier for Frenz to achieve area C.

Evaluate each of the consultant's statements, I-III, based on the operational frontier above.

1) the consultant's statements are accurate. By definition, strategic positioning is the direction the firm wants to move from their current position. Frenz can move from point A in any number of directions towards the operational frontier, that is flexibilty with regards to strategic positioning.
2) The consultant's statement is not correct. The operational frontier is concave and Frenz is not on the frontier, therefore they do not need to make tradeoffs. Tradeoffs only apply to companies on the operational frontier.
3) The consultant's statement is not correct. The operational frontier can be pushed out by improvements in technology or management practices.

(c) **(LO 3c)** For each supplier:

(i) Assign a risk priority from 1 to 3 for each risk A and B in the Excel chart in tab Q4_c.

(ii) Justify your prioritizations in (i) using information from Section 4.3 from the Case Study.

(i)

Supplier	Absolute Shortage	Supplier Default
XYZ Coffee Grower	2	3
QRS Tea	3	3
Why Paper Cups?	1	2
Big Straw	3	3
Small Dairy	2	1

4. Spring 2024 Continued

ii) QRS Tea and Big Straw are low risk because tea and straws have plenty of supply (no shortage risk) and Frenz has multiple sources (no risk of supplier going out of business).
XYZ Coffee Grower has a moderate risk of an absolute coffee bean shortage, but a low risk of supplier default.
Espresso sales represent the largest revenue stream for Frenz stores.
External events such as extreme weather, political and economic conditions could impact Frenz's ability to obtain enough coffee to supply their stores.
Frenz works with several major growers and distributors, so not dependent on one source.
XYZ's low risk of supplier default prevents XYZ from being a level 1 priority.

Why Paper Cups? has significant short-term absolute shortage risks for Frenz's custom paper cups, as well as a moderate risk of company default.
If the absolute shortage risk were higher, WPC would be a level 1 risk.
However, individual stores were able to adapt and get through the prior cup shortage,

Small Dairy: an absolute shortage (moderate risk locally) or supplier default would affect significant revenues for Frenz. The risk of Small Dairy going under are surprisingly high despite a long term partnership with Frenz

(d) **(LO 3c)** Recommend an appropriate mitigation strategy for Frenz to consider for each supplier.

QRS Tea and Big Straw require no mitigation efforts at this time because they are low risk in both categories.
XYZ Coffee Grower: Since coffee is a storable good, Frenz should build up inventory of stored coffee while supply is more bountiful, ideally in a centralized area to keep costs down or more locally in each store.
Why Paper Cups?: Frenz should consider partnering with a second source for paper cups to spread the
risk of supplier default. Similar to storing coffee, Frenz could consider storing extra paper cups at each store
Small Dairy: Frenz could work with Small Dairy to pre-pay or otherwise provide liquidity in the short-term to help it avoid default. Consider more suppliers.

5. Spring 2024 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

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

Commentary on Question:

This question tests candidates' knowledge of evaluation techniques for predictive analytics. For full points, the candidates need to be able to calculate the metrics as well as explain the different concepts and the implications of the results.

Solution:

(a) **(LO 4a, 4b)**

(i) Explain the false negatives and true positives in the confusion matrix above.

(ii) Explain how recall and precision have been calculated above.

Commentary on Question:

Most candidates got most of the answer. Many did not discuss the multinomial aspect of the confusion matrix.

(i) True positives are on the diagonal. This is where the model correctly predicted a risk classification. Horizontal row elements (excluding the diagonal) reflect the distribution of the false negatives (i.e. they are positive target features for that target level but the model has put them in a different category). This is where for a given risk classification, there are data points that should have been given that risk classification but were categorized elsewhere.

(ii) The recall is calculated across the row for each target level, showing the # of times the model picked the true positive targets for the row's target level. This measures for each risk classification, how often the model was able to pick out the data points that belong to that classification.

5. Spring 2024 Continued

The precision is calculated for each column reflecting a target level and measures for each target level, how often the prediction of a positive target level is correct. This measures, for each risk classification, how often the model is correct when it predicts that the data point belongs to that classification.

(b) **(LO 4a, 4b)**

(i) Calculate the accuracy and average class accuracy. Show your work.

(ii) Evaluate each of the performance measures in (i) vs a 79% ROC index.

Commentary on Question:
While there were candidates that got full points, there were several candidates that mistook full underwriting as part of the accelerated underwriting platform. Some credit was given for the arithmetic form of average class accuracy where harmonic mean would have been a better metric given the imbalance in the data. Many candidates did not explain well how to interpret the results vs the ROC.

accuracy = 83% average class accuracy = 88% using harmonic mean

The ROC index is the better measure as it is robust to class imbalance or skew in the data set. Most (80%) of the datapoints in the AUW platform is in the first 2 rate classification. The ROC index measures the ability to distinguish between classes (vs detecting the positive class). You can see this with the average class accuracy at 88%, which is high given that most data points are in rate classifications with lower recall. This is because each rate classification is given equal weight. Accuracy is closer to the ROC index as it captures all the misclassifications but only when there is one threshold where ROC index measures accuracy across different thresholds.

(c) **(LO 4a, 4b)** Using the mortality slippage cost table provided in the Excel tab Q5_c:

(i) Construct the gain/loss matrix of the misclassifications. Show your work.

(ii) Analyze the components of the gain/loss.

(iii) Evaluate the overall performance of the revised AUW platform.

5. Spring 2024 Continued

Commentary on Question:
Except for a very small number of candidates, most did not fully arrive at the gain/loss matrix of misclassifications. However, most did get some credit for getting one or more elements of the calculation: (a) mortality slippage (b) gain of the policy (c) retention impact of misclass to lower rate class (30% one class, 0% if more than 1 class) and (d) loss due to some policies going to competition. About half of the candidates did not understand that the mortality slippage matrix is a matrix of losses. In analyzing the components of gain/loss, many candidates also just described the matrix, vs analyze where most of the impact of gain/loss were. Taking into account the numeric result the candidate got, credit was given where the evaluation is reasonable and took into account the accuracy of the platform and the gain/loss result.

c-(i)

Gain/loss matrix		Prediction using revised AUW platform						
		NT Risk	NT Risk	NT Risk	Tob Risk	Tob Risk		
Profit matrix	('000)	Class 1	Class 2	Class 3	Class 1	Class 2		
	NT Risk Class 1		148	-45				
	NT Risk Class 2	-326		67				
Target=	NT Risk Class 3		-18					
Original AUW	Tob Risk Class 1							
Platform	Tob Risk Class 2							
	Rated		-24	-46	-36	-62	-168	
	Decline			-35	-63	-53	-151	-319
		-325.606	107.0465	-59.4816	-99.2706	-114.8	-492.111	

c-(ii)
Most of the loss is coming from 2 sources:

(1) the false positive of an NT Risk Class 2 being classified instead as NT Risk Class 1, resulting in mortality loss. This is offset but not fully by the false negative of an NT Risk Class 1 being classified as an NT Risk Class 2, resulting in a gain for those applicants who stayed, but a loss of profit on those who went to the competition.
(2) there will be a loss when an application that was rated or declined end up being issued at a better risk class, i.e false negatives. The sum of those losses, even when the number of false negatives is small, can accumulate to a large loss number, in this case $319,000, about 65% of the total loss

c-(iii) This model would be considered a strong model with an ROC index of 79%. However, the profit/loss evaluation would indicate that the cost is too high where there are performance gaps. That is, the precision and recall of the classification of NT Risk Class 1 and Risk Class 2 needs to be better and the classification of rated and declines into other classifications need to be minimized.

6. Spring 2024 CFE FD Exam (LOs 2a, 2c)

Learning Objectives:
2. The candidate will understand how to gauge an organization's performance through an evaluation of its financial reports.

Learning Outcomes:
(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

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

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

Case Study – Blue Jay Air (BJA)

Commentary on Question:
The goals of this question are to examine candidates' ability to
- *Interpret the financial statement deferred tax disclosure related disclosure and utilize new information to update the disclosure*
- *Determine if deferred tax assets or liabilities should be established*
- *Select the most appropriate financial statement analysis formula to analyze the company's performance and recommend if there are any areas to look into further*

Solution:
(a) **(LO 2c)**
   (i) Explain why the amounts of the deferred tax assets and liabilities displayed in the balance sheet are different from Note 7.

   (ii) Calculate the TBD elements in the table in Excel. Show your work.

   Commentary on Question:
   The question is to make candidates understand the composition of financial statement note related to deferred tax assets and liabilities. Be aware of if there is an update of accounting standard related to deferred tax disclosure. The note may be modified.

6. Spring 2024 Continued

(i) According to the accounting standards, the deferred tax assets and liabilities of foreign owned entities should be net out in the balance sheet display. Meanwhile, the deferred tax assets and liabilities from all entities are shown in full in the Note 7.

(ii) The computations are as follows:

- Step 1: Calculated the net change of deferred tax assets and liabilities between 2023F and 2022A
  Deferred Income Tax = (deferred tax assets 2023F - deferred tax assets 2022A) - (deferred tax liabilities 2023F - deferred tax liabilities 2022A)
  Deferred Income Tax = (160 - 175) - (360 - 290) = -85 or (85)
- Step 2: Derive income tax (expense) recovery
  Income Tax (Expense) Recovery = current income tax 2023F + deferred income tax 2023F
  Income Tax (Expense) Recovery = 60 + (85) = (25)
- Step 3: Compute adjustment
  Adjustment = income tax (expense) recovery 2023F - income taxes before the adjustment to tax basis 2023F
  Adjustment = (25) - (31.5) = 6.5
- Step 4: Derive income tax (expense) recovery
  Income Tax (Expense) Recovery = Income Taxes before the adjustment to tax Basis + Adjustment = (31.5) + 6.5 = (25)
- Step 5: Compute effective tax rate
  Effective tax rate = income tax (expense) recovery / income before taxes
  Effective tax rate = (25) / 150 = -16.67%

[See Excel worksheet for more detailed]

(b) **(LO 2c)** Analyze the impact to the deferred taxes/liabilities for each of these items.

Commentary on Question:
The candidates should determinate if there is a temporary or permanent difference for tax purpose. If there is a temporary difference, then the impact is increase (or decrease) of deferred tax assets or deferred tax liabilities. If there is a permanent difference, then there is no impact to deferred tax assets or liabilities. In addition, a recoverability for deferred tax assets has to be conducted on a regular basis. The answers are based on the accounting principles as of the exam date.

6. Spring 2024 Continued

(i) There is no impact to deferred tax assets. If the valuation allowance is "more than likely or not" (US GAAP) or "Probably" (IFRS), then deferred tax assets would be reduced.

(ii) It is a temporary difference with asset carrying amount larger than tax based carrying amount. It results in an increase of deferred tax liability of (10 - 2) * 21% = 1.68 million.

(iii) There are two possible answers:
- If the assets are classified as going through P&L: There is a temporary difference. The carrying amount is smaller than tax-basis, deferred tax assets will be increased by 14 * 21% = 2.94 million.
- If the change is not going through P&L: There is a permanent difference, thus no impact to deferred tax impacts.

(iv) Change of accounting policy only affect equity (net of tax). There is a permanent difference. Thus, there is no impact to deferred tax assets or liabilities.

(v) Write-down of goodwill will not be considered as a tax event. Thus, it is a permanent difference so, no change of deferred tax assets

(c) **(LO 2a)**

(i) Recommend a quantifiable financial ratio for each of I-II above. Justify your recommendation.

(ii) Calculate each ratio you recommended in (i) for each of 2021, 2022 and 2023. Show your work.

(iii) Interpret the results in (ii).

Commentary on Question:
For activity ratio, using inventory turnover or receivable turnover or numbers related to receivable/inventory is a preferred choice. For liquidity ratio, using quick ratio, current ratio, or cash ratio is a preferred choice. Other than that only reduced points would be given.

[See Excel worksheet for more detailed]

6. Spring 2024 Continued

(d) **(LO 2a)** Describe two potential follow-up items for the 2023 forecast that should be examined further based on your recommendations in part (c).

Commentary on Question:
For each ratio, factors of the affecting the ratio should be asked. In addition, change of macro environment and competitors' intelligence should be look into also. One of the sampled solutions is listed in the model solution

(i) Aircraft fuel turnover (AFT) increased significantly in 2023 requires further analysis into the following areas:
- Sale increase resulted in significant increase on cost of aircraft fuel sold increase.
- Company expects fuel price to drop in the future. Thus, holding the inventory at the low level.
- Company experienced larger than expected profit, thus, keep the ending inventory low to lower the profit

Meanwhile, turnover ratio for other competitors for better comparison

(ii) Cash Ratio (CR) decreased significantly in 2023 requires further analysis into the following areas:
- Cash level may be due to significant increase in property & equipment, BJA can review the cash purchase of the property & equipment.
- Account receivable also increased, BJA should look into the collection process if there are any potential delay.

Meanwhile, CR of competitors should be collected for better

7. Spring 2024 CFE FD Exam (LOs 1a, 1b, 1c)

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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial on capital budgeting and allocation decisions

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

Sources:

CFE201-100-23: CFI: Hurdle Rate – Definition ~~and Example~~

CFE201-102-25: Why private equity sees life and annuities as an enticing form of permanent capital

~~Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 28: Mergers and Acquisitions~~
Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 31: Mergers and Acquisitions

Commentary on Question:

In general, question 7 seemed difficult for candidates. In part (b), many candidates were able to calculate the acquisition price, but did not evaluate the proposed acquisition price. In part(d), most candidates failed to comment on Epoch's life and annuity business lines.

Solution:

(a) **(LO 1a, 1b, 1c)** Describe how BGPEF would view an acquisition of Epoch with regards to each of the following:

(i) Capital

(ii) Economies of scale

(iii) Vertical integration

Commentary on Question:

7. Spring 2024 Continued

Candidates did not answer well for the economies of scale and vertical integration. Most candidates failed to recognize that vertical integration is not applicable here.

(i) The life and annuity-heavy balance sheet of Epoch is a form of Permanent capital. Permanent capital allows investors/managers to save time on fundraising and offers the flexibility to invest in times when other forms of capital are scarce.

(ii) BGPEF can leverage Epoch's balance sheet of long-term investment horizon to achieve the investment proficiency.

(iii) Vertical integration is not relevant in this scenario since BGPEG has no insurance presence and is not a supplier or customer of Epoch.

(b) **(LO 1a, 1b, 1c)** Assess the proposed acquisition price. Show your work.

Commentary on Question:
To receive full mark, candidate must evaluate the proposed price and note that the premium paid is advantageous for BGPEF. Some candidates incorrectly assumed cashflow occur at the end of year.

Premium = 24m = (1350m - 1110m) * 0.1
PV synergies = 27.2m = 9.5m + 9.5m/1.05 + 9.5m/(1.05^2), since cash flow occur at the beginning of the year

The valuation does not match the value of the synergies for BGPEF. Present value of synergies is higher than premium paid. The deal as structured is advantageous for BGPEF.

(c) **(LO 1a, 1b, 1c)**
(i) Explain which opportunities BGPEF would pursue given its criteria.

(ii) Critique BGPEF's criteria.

Commentary on Question:
Most candidates did well on part (i). For part (ii), many candidates noted IRR ignores the amount of value added but failed to comment on other flaws.

(i) BGPEF would accept opportunities 2 and 3 and decline opportunity 1 because the former have 10yr IRR > 15% and the latter does not meet this threshold.

7. Spring 2024 Continued

(ii) Using a hurdle rate is an appropriate and objective method to assess whether a project provides adequate returns for the company.

However, using IRR only as the hurdle rate for investments may favor short term investments over long-term ones.
Not having different hurdle rates for different projects, or assigning a risk premium, can lead to taking on riskier investments.
The 10-year time horizon for cash flows may be too short as it ignores impacts of longer-term projects/investments (which may be positive or negative).

(d) **(LO 1a, 1b, 1c)** Rank each opportunity, ignoring BGPEF's specific criteria and considering the application to Epoch. Justify your ranking.

Commentary on Question:
Many candidates did not link the ranking to Epoch's business lines and focused solely on IRR and/or NPV, which resulted in partial marks.

Project 1 should be the first project to fund (if BGPEF has the budget to do so). It is fully relevant to all product lines of Epoch and will add value to its insurance operations. Even though it does not meet BGPEF's hurdle rate requirement, it has the highest NPV by far of the 3 projects, and the 30-year IRR is very high as well.

Project 2 should be the second project. It is fully relevant to the Life insurance business of Epoch and exceeds BGPEF's hurdle rate requirements. It also generates the second highest NPV.

Project 3 should only be undertaken if there is additional budget for it. The investment performance project is not as relevant to the core product lines of Epoch (life and variable annuities). While it has the highest IRR by far, it also has much smaller cash flows than the other 2 projects.

2. Fall 2023 CFE FD Exam (LOs 1a, 1b)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions.

Sources:

~~CFEFD-S1-02-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 18: Capital Budgeting and Valuation with Leverage~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 10: Framework for Valuation (excluding "Problematic Modifications to Discounted Cash Flow" and "Alternatives to Discounted Cash Flow" sections)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 35: Capital Structure, Dividends, and Share Repurchases, "Setting a Target Capital Structure only (pp 679-688)

Case Study – Blue Jay Air (BJA)

Commentary on Question:

The goal of the question is to bring candidates to think critically about capital budgeting in the context of Blue Jay Air.

The candidate is expected to understand the source material and draw insights from the case study.

Solution:

(a) **(LO 1a, 1b)**

(i) Calculate BJA's net debt-to-value ratio over the last three years. Show your work.

(ii) Describe the evolution of BJA's capital structure over the last three years. Support your answer by referring to the financial statements.

2. Fall 2023 Continued

Commentary on Question:

(i) Most candidates received partial credits on this question. Many candidates didn't take out cash when calculating the net debt and lost partial credits.

Full credits were granted to candidates if D/V formula is correct, and any of the three cash definitions below are considered:
(1) Subtracting only "Cash and cash equivalents"
(2) Subtracting "Cash and Short Term Investments"
(3) Subtracting "Cash and Short Term Investments" and "Restricted Cash"

	31-Dec-22	31-Dec-21	31-Dec-20
Net Debt (= Long - term debt and finance leases + current portion of long-term debt & finance leases - total cash &ST investments)	349	469	538
Total shareholders' equity	199	77	22
Debt/Value = (Net Debt/(Net Debt+ Total shareholder's equity)	**64%**	**86%**	**96%**

(ii) To receive full credits, candidates are expected to:
1) *describe that, over the last 3 years, the leverage has decreased.*
2) *Referencing the question and mentioning that the debt-to-equity ratio has decreased below the airline industry median.*
3) *Reference to the financial statements that support the answer*

Partial credits were granted for each expectation item on the list. Most candidates received partial credits on this part of the question.

We can see in the financial statements that 100% of the net income over the last 3 years went to reducing the deficit (i.e. the negative retained earnings), thus increasing the equity value.

In addition, the "Total cash & Short-term investments" have significantly increased over the last 3 years, mainly driven by favorable "Net cash flow from operating activities", thus decreasing the Net Debt.

As a result, BJA's decisions have allowed to reduce the company's leverage and bring down the D/E ratio from 24.45 in 2020 to 1.75 in 2022

2. Fall 2023 Continued

With the reduced leverage, the D/E ratio is now below the airline industry median (of 5.5x) and BJA is in a better financial position to take on debt to support expansion projects.

(b) **(LO 1a, 1b)** Critique the Finance Team's capital budgeting model, assuming that the expected free cash flows are accurately forecasted.

Commentary on Question:
Candidates are expected to address both negative and position items to receive full credits. Many candidates only addressed negative items or provided very generic answers not specific to model shown, therefore received partial credits.

Negative: The WACC model was last updated when BJA was part of RPPC. RPPC was assuming a fixed D/V ratio, but the airline is more capital intensive and BJA D/V is expected to fluctuate over the duration of the project.
Negative: BJA is still using RPPC's assumptions for the expected cost of debt and equity
Negative: the model does not allow to vary the expected cost of debt between the two alternatives
Positive: BJA updated the D/V ratio and periodically validates that it aligns with its financial statements
Positive: The model was updated to reflect BJA's expectation of the future tax rate
Positive: the model correctly calculates the NPV using the WACC and FCF

(c) **(LO 1a, 1b)** In a recent meeting with the Finance team, Elmer Saunders, the Corporate Treasurer, argued:

"I don't think it's worth exploring other capital budgeting methods. We have worked hard to develop a state-of-the-art model to forecast projected free cash flow… anyway, any capital budgeting method should ultimately produce the same estimate of the project's value… there's no point in spending more time with other methods just to get back to the same results, purchasing a new fleet for international flights has the highest NPV, it is the way to go!"

(i) Evaluate Elmer's argument.

(ii) Recommend a capital budgeting method for the international expansion strategy. Justify your recommendation.

2. Fall 2023 Continued

Commentary on Question:
For part (i), candidates are expected to mention

1) *All methods won't produce the same results in this context*

2) *The D/V ratio is the main reason why the statement is incorrect.*

For part (ii), to receive full credit, candidates are expected to

1) *Selecting the correct method*

2) *Justify the selection with the fact that it is a fixed debt financing agreement*
3) *Justify with the fact the tax shield can be valued on a standalone basis.*

Most candidates received partial credits on this part of the question.

(i) In this case, the APV and CFE methods won't produce the same results as the WACC method because the D/V ratio is expected to vary over time. His argument would only hold true if the key assumptions (see below) were respected, but in this case, the D/E ratio is expected to not stay constant
-project has similar risk as the firm
-ignore market imperfections
-assume constant D/E ratio

(ii) BJA should use APV method with Predetermined Debt Levels
BJA is looking to secure a fixed debt financing agreement so the debt levels would be predetermined.
BJA should expect a significant gain from the tax shield (i.e. high tax rate and high leverage) and the APV method will allow to calculate its impact on a standalone basis

3. Fall 2023 CFE FD Exam (LO 2a)

Learning Objectives:
2. The candidate will understand how to gauge an organization's performance through an evaluation of its financial reports.

Learning Outcomes:
(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance.

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

CFE201-103-25: Bank Profitability

Case Study – Big Ben Bank

Commentary on Question:
The primary goal of this question was to assess candidates understanding of the pros and cons of banks using leverage as described in ThisMatter: Bank Profitability. A secondary goal of this question was to assess candidates' knowledge of financial ratio analysis.

Candidates generally did very well on parts (a) and (b) with most candidates earning full or nearly full credit. On part (c), only the most prepared were able to provide strong enough answers to obtain full credit, but many candidates provided sufficient answers to obtain substantial partial credit.

Solution:
(a) **(LO 2a)** List four insights financial ratio analysis can provide about a company.

Commentary on Question:
Candidates did very well on part (a). Full credit was granted for candidates who were able to list four valid insights financial ratio can provide about a company. The model solution does not contain all the insights that were granted credit.

- Economic relationships within a company that help analysts project earnings and free cash flow.
- A company's financial flexibility, or ability to obtain the cash required to grow and meet its obligations, even if unexpected circumstances develop.
- Management's ability
- Changes in the company and/or industry over time
- Comparability with peer companies or the relevant industry(ies).

3. **Fall 2023** Continued

(b) **(LO 2a)** Calculate the following financial ratios for Big Ben Bank for the years 2021 and 2022. Show your work.

(i) ROA

(ii) Leverage Ratio

(iii) ROE

Commentary on Question:
Candidates generally did very well on part (b). If mistakes were made on this part, it was most often in the calculation of leverage ratio. No points were taken off for candidates who did not use the average of BOY and EOY for balance sheet items.

(i)

Formulas:
1) ROA = Net Income/Average Total Assets
2) Average Total Assets = (Total Assets BOY + Total Assets EOY)/2

Answers:
ROA (2021) = 17/((35,072+35,818)/2) = **0.05%**
ROA (2022) = 68/((35,818+35,784)/2) = **0.19%**

(ii)

Formulas:
1) Leverage Ratio = Average Total Assets/Average Total Capital
2) Average Total Assets = (Total Assets BOY + Total Assets EOY)/2
3) Average Total Capital = (Total Capital BOY + Total Capital EOY)/2

Answers:
Leverage Ratio (2021) = ((35,072 + 35,818)/2)/((1,680 + 1,681)/2) = **21.09**
Leverage Ratio (2022) = ((35,818 + 35,784)/2)/((1,681 + 1,839)/2) = **20.34**

(iii)

Formulas:
1) ROE = ROA*Leverage Ratio
Note: Use ROA and Leverage Ratio calculated above.

3. **Fall 2023** Continued

Answers:
ROE (2021) = 0.05% * 21.09 = **1.01%**
ROE (2022) = 0.19% * 20.34 = **3.86%**

(c) **(LO 2a)** Recommend a leverage ratio range for Big Ben Bank to target in the future, assuming no change in the current economic environment. Justify your recommendation.

Commentary on Question:
Candidates did not do as well on this part of the question as parts (a) and (b). To obtain full credit, candidates needed to recommend that Big Ben reduce leverage while displaying strong knowledge of the Bank Profitability reading (CFEFD-S2-16-21) and the Case Study in their justification.

Most candidates did not provide sufficient detail in the justification of their recommended range for a four-point question.

Many candidates used the ROE target range (10%-15%) from Big Ben's Risk Appetite Dashboard and backed into a target leverage ratio range that would produce an ROE in that range. This answer received strong partial credit, but points were taken off for not recognizing that the level of leverage needed to reach this ROE range would be too risky for a Bank and that improving its ROA would be a better way for Big Ben to achieve its target ROE.

I recommend that Big Ben targets lowers its leverage ratio in the future and targets a range of 10-12.

All of the following factors support the recommendation that Big Ben should reduce its leverage ratio:

- A leverage ratio as high as Big Bens Bank's is very risky. It would only take a ~5% drop in the value of Big Ben Bank's assets to completely wipe out its capital.
- The amount of leverage used by Big Ben is far above the leverage used by most other banks (most banks shoot for a range of 10-12).
- There may be regulatory concerns with a leverage ratio this high. If Big Ben was an American company, they would be subject to limits on their use of leverage by the Federal Reserve.
- Big Ben's Risk Appetite Dashboard states that its risk tolerance for significant legal, ethical, and reputational events is 0. Reducing leverage will help achieve this goal of 0 events.
- Big Ben's Risk Appetite Dashboard states that its risk tolerance for significant compliance issues is 0. Reducing leverage will be viewed favorably by regulators and help Big Ben avoid any compliance events.

3. Fall 2023 Continued

It is also noteworthy that Big Ben is currently falling short of its ROE target (from Risk Appetite Dashboard) of 10-15%. Since ROE = ROA*Leverage Ratio, one route Big Ben could take to increase its ROE is increasing its leverage ratio. However, this would be too risky for all the reasons stated above, so Big Ben should instead focus on increasing its ROA to help reach its target ROE range.

4. Fall 2023 CFE FD Exam (LOs 3a, 3b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate costs and how these methods can distort perceived performance

Sources:

CFE201-104-25: Activity-Based Costing (ABC) and the Life Insurance Industry
~~Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 17: Integration of KPIs and KRIs~~
~~Lam, Implementing Enterprise Risk Management from Methods to Applications, Ch 18: ERM Dashboard Reporting~~

Case Study – Star InsurTech (SIT)

Commentary on Question:

This question tests the candidate's ability to recommend ~~best ERM practices~~ and evaluate cost allocation methods. In order to perform well, candidates needed to apply ~~ERM and~~ cost allocation concepts to the SIT case study. Candidates generally did well on this question.

Solution:

~~(a)~~

> ~~(i) Describe three key questions applicable to SIT that the ERM dashboard should address. Justify your response using the Case Study.~~
>
> ~~(ii) Recommend three Key Risk Indicators (KRIs) that are specific to SIT. Justify your answer.~~
>
> ~~**Commentary on Question**:~~
>
> ~~*Candidates generally did well on this question. In order to receive full marks, candidates needed to provide justifications specific to the SIT case study.*~~

4. Fall 2023 Continued

~~(i) *Below are 5 possible answers.*~~

~~Key question: Which if any of our business objectives are at risk?~~
~~Justification: Tracking the progress of SIT's objectives, such as improving the performance of its underwriting and fraud detection capabilities, can be done with indicators to signal if each objective is on track, threatened, or off track.~~

~~Key question: Are we in compliance with laws, regulations, and policies?~~
~~Justification: InsurTech marketplaces have significant regulatory and compliance risks.~~

~~Key question: What risk incidents have been escalated?~~
~~Justification: If risk incidents occur, the ERM dashboard should be able to escalate critical risk incidents to the appropriate person. For example, major risk incidents involving compliance should be escalated to MaryAnn Seer (CCO) in real time.~~

~~Key question: What key indicators require attention?~~
~~Justification: The ERM dashboard should indicate potential problems before they arise. For example, KPIs/KRIs related to SIT's product risks should explain "how are we doing?" and "where are we heading?".~~

~~Key question: What risk assessments need review?~~
~~Justification: There should be a summary of qualitative risk assessments on the ERM dashboard, such as an assessment of the operational risk from their administration system.~~

~~(ii) *Below are 4 possible answers.*~~

~~KRI: Inflation~~
~~Justification:~~

- ~~See the following in the case study:~~
    - ~~"Inflation has hit the loss ratio of auto insurance. There is a lag in the pricing of unexpected costs, such as when inflation jumps up very quickly."~~
- ~~Characteristics of this KRI: external benchmark, simplify risk without being simplistic, quantifiable~~

4. Fall 2023 Continued

~~KRI: Number of manual data transfers / technology hand-offs~~
~~Justification:~~

- ~~See the following in the case study:~~
  - ~~"There still needs to be data transfer with the insurer for the exposure it is taking on. Generally, this data transfer is done manually through a secure portal, largely due to the lack of technology capability of the insurance partner."~~
  - ~~"SIT believes there is less operational risk if there are fewer hand-offs with its insurance partners given the legacy technology of the traditional insurance industry."~~
- ~~Characteristics of this KRI: quantifiable, timely, incorporates a risk driver (exposure)~~

~~KRI: % of fraud cases missed~~
~~Justification:~~

- ~~See the following in the case study:~~
  - ~~"SIT uses machine learning to identify fraud potential, using consumer retail, social media, and insurance data. However, an audit has indicated that there are at least another 5% of fraud cases that are being missed."~~
- ~~Characteristics of this KRI: quantifiable, incorporates a risk driver (probability), simplify risk without being simplistic~~

~~KRI: Number of cyber attacks~~
~~Justification:~~

- ~~See the following in the case study:~~
  - ~~"Cyber risk is high in a heavily digitalized InsurTech with high dependence on consumer data. SIT has a Chief Information Security Officer (CISO), responsible for managing this risk. SIT has built a cybersecurity framework following industry best practices and meeting regulatory requirements."~~
- ~~Characteristics of this KRI: quantifiable, incorporates a risk driver (probability)~~

(b) **(LO 3a, 3b)**

(i) Describe the three key stages in the implementation of an ABC system.

(ii) Explain, using two specific examples from the Case Study, how ABC implementation considerations for the Life Insurance partner differ from those for the P&C partner.

4. Fall 2023 Continued

Commentary on Question:
Candidates generally did well on this question. In order to receive full marks, candidates needed to use specific examples from the case study in part (ii).

(i) Stage 1 - Identify the key activity groups for each of its major business operations and underlying processes.

Stage 2 - Cost those activities according to the resources which they consume.

Stage 3 - Attribute the overheads for each activity group to cost objects (such as products or cost centres) using the key cost drivers.

(ii) *Below are 3 possible answers.*

Example: sales activities
Explanation: The sales activities are different between Life and P&C. Life has chatbox + live assistance while P&C is all digital.

Example: marketing activities
Explanation: The marketing activities are different between Life and P&C. Life has a partner with access to online platforms of wirehouses and brokerage firms while P&C relies on data analytics for targeting consumers.

Example: emergency and roadside assistance
Explanation: P&C has emergency and roadside assistance which doesn't apply to Life.

(c) (**LO 3a, 3b)**

(i) Calculate the overhead allocation to each business unit (Life and P&C) using the traditional costing method. Show your work.

(ii) Calculate the overhead allocation to each business unit (Life and P&C)) using the ABC method. Show your work.

(iii) Recommend which overhead allocation method SIT should use. Justify your answer using the results from (i) and (ii) above.

Commentary on Question:
Candidates generally did well on this question. Nearly all candidates were able to see the benefits of ABC in part (iii).

Please refer to the spreadsheet model solution.

5. Fall 2023 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

~~CFEFD-S4-43-21 St. Louis Fed: Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets~~
~~CFEFD-S4-44-21 Runhuan Feng, Decentralized Insurance~~
~~CFEFD-S4-34-21 Dowd, Measuring Market Risk 2nd ed, Ch 16 Model Risk~~

SOA: Peer-to-Peer Insurance: Blockchain Implications

SOA Research Institute: Decentralized Finance for Actuaries

SOA Research Institute: Decentralized Insurance Alternatives: Market Landscape, Opportunities and Challenges

Commentary on Question:

The goal of the question is to explore the benefits and risks of using blockchain in insurance, whether that's adding cryptocurrencies to an investment portfolio or utilizing the technology within insurance functions. To receive maximum points, answers must be clear and well-supported. In general, candidates did well identifying and explaining the benefits of blockchain technology. However, candidates were not as clear with outlining the risks.

Solution:

(a) **(LO 4a, 4b)** Critique the following statements that the member of the task force makes.

(i) A Dai stablecoin is a safe investment because it is “stable.”

(ii) A centralized exchange is more user-friendly than a decentralized exchange.

(iii) A centralized exchange does not use custodial trading, and, therefore, there is less trust required.

5. Fall 2023 Continued

Commentary on Question:
Full credit was given to answers with clear language ("True" or "False") and supporting explanation. Partial credit was given in part for mentioning cryptocurrency risks or for showing an understanding of centralized and decentralized exchanges without a direct answer.

(i) False. A Dai stablecoin is not a safe investment, because it is not stable. The issuer of Dai tokens~~, MakerDAO,~~ must lock ~~Ether as~~ an underlying collateral~~, and the USD/Ether exchange rate is not fixed. MakerDAO~~ Dai maintains its pegs through a combination of over-collateralization and economic incentives. Liquidation could happen if the value of the collateral falls below a pre-set threshold. During liquidation, the collateral is sold at a discount and used to maintain the peg. This causes volatility and liquidity risks. ~~150% of Ether the underlying collateral to be collateralized in order to mitigate the risk of falling prices, but the stability fee or maximum interest rate has continued to fluctuate wildly over the past few years.~~
(ii) True. A centralized exchange is more user-friendly than a decentralized exchange. For investors, especially beginner investors that are familiar with banks but not crypto, they have a better user experience.
(iii) False. A centralized exchange does use custodial trading. Traders are required to deposit assets with the exchange. This trading occurs in the database of the exchange and is not recorded on chain. Therefore, more trust is required.

(b) **(LO 4a, 4b)** Describe two ways a smart contract supports the ideals of decentralized insurance.

Commentary on Question:
Full credit was given to answers that included mentions of cost & speed efficiency, transparency, security, lack of intermediary, automatic payments, and anonymous consensus mechanisms. Additionally, the answers must have supporting explanation.

1) One ideal of decentralized insurance is a lack of intermediary. Smart contracts support this by permitting trusted transactions to be carried out among anonymous participants without a central authority, unlike centralized systems.
2) Another ideal of decentralized insurance is transparency. Smart contracts support the ideals of decentralized insurance by enabling direct peer-to-peer contingent payments that are fully auditable and public, unlike an insurer's opaque underling risk sharing mechanism.

5. Fall 2023 Continued

(c) **(LO 4a, 4b)** The task force is considering implementing blockchain technology in two operational areas, underwriting and claims processing. It develops a proposal for doing so, as follows:

- Term insurance policies are written as smart contracts.
- The smart contract instruction set determines underwriting and pricing for a potential policyholder.
- Once approved, the smart contract creates an unchangeable policyholder record that can immediately pay out legitimate claims based on a death certificate verification.
- If a claim is deemed false, the smart contract dissolves.

Describe two benefits and two risks of the proposal.

Commentary on Question:
Acceptable benefits and risks included a wide variety of answers if related to blockchain technology and/or term insurance. Benefits include lower expenses, faster processes, less counterparty risk, security, transparency, and lower bias but not access to insurance or risk/claim assessors unless tied to aforementioned benefits. Risks include coding errors, cyber security, external data reliance, environmental cost, and confusing claims processes but not fraudulent claims unless tied to aforementioned risks. All answers must have supporting explanation for full credit.

Benefits:
1) A benefit of this proposal is lower expenses. Less involvement in the day-to-day underwriting & claims process tasks may lead to fewer employees needed and lower expenses.
2) A benefit of this proposal is efficiency. The underwriting & claims process will be faster and no counterparties need be involved to introduce counterparty risk.

Risks:
1) A risk of this proposal is coding errors. Coding errors may potentially create vulnerabilities that allow an attacker to drain the smart contract's funds, cause chaos, or render the protocol unusable.
2) A risk of this proposal is security. Holders of admin keys at the company may not store keys securely and be vulnerable to cyberattacks, or they may be corrupted by perverse incentives.

6. Fall 2023 CFE FD Exam (LO 2c)

Learning Objectives:
2. The candidate will understand how to gauge an organization's performance through an evaluation of its financial reports.

Learning Outcomes:
(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

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

Solution:
(a) **(LO 2c)**
(i) Describe the method Conglomerate Holdings should adopt to translate the company's financial statements into $US.

(ii) Prepare the 2022 balance sheet under US GAAP according to the method described in (i). Show your work.

Part i:
1. US GAAP prescribes temporal method for translation when foreign subsidiary operates in a hyperinflationary economy
2. Translation gain/loss will be reported through income statement

Part ii: See excel

(b) **(LO 2c)**
(i) Describe Sunshine Sprockets' net monetary exposure.

(ii) Explain the impact of the net monetary exposure during this period of hyperinflation to Sunshine Sprockets.

Part i:
Monetary exposure is dependent on the level of assets exposed to the current exchange rate vs. the amount of liabilities exposed to the current exchange rate.

Given Sunshine Sprockets has only accounts payable as a liability, and most of its assets (cash & short-term investments and accounts receivable) are monetary assets, and that it's monetary assets are greater in value vs. monetary liabilities, this creates a net asset balance sheet exposure.
Monetary Assets = 'Cash / Short Term Investments' + 'Accounts Receivable'
= 3,000 + 4,000 = 7,000

Monetary Liabilities = 'Accounts Payable' = 2,000

Part ii:
As Sunshine Sprockets has a net asset balance sheet exposure, hyperinflation will likely create a negative translation adjustment on the balance sheet with the temporal method and reduce the amount of equity that is translated onto Conglomerate Holdings' balance sheet.

(c) **(LO 2c)** Analyze how using Shinee-denominated long-term debt to fund the purchase of Sunshine Sprockets' plant and equipment would have impacted the translation of the company's equity at the end of the year, assuming no depreciation. Show your work.

See excel for calculation

As debt is a monetary liability (translated at the current exchange rate under the temporal method) and property is a non-monetary asset translated at the historical exchange rate, by taking out debt to purchase property and equipment Sunshine Sprockets would then have a large net liability exposure. A large net liability exposure will create a positive translation adjustment to equity and increase the value of Sunshine Sprockets to Conglomerate Holdings

(d) **(LO 2c)** Recommend two actions, in addition to having borrowed to purchase plant and equipment, that Sunshine Sprockets could have taken to reduce the negative impact of hyperinflation on Sunshine Sprockets' value to Conglomerate Holdings. Justify your recommendation.

-Reducing the amount of assets translated at current rates or increasing the amount of liabilities at current cates are both ways to make Sunshine Sprockets have less of a net asset exposure.

-Ideas for doing this are:
1. Issuing Debt: Increases the total liability amount translated at current rates.

2. Reducing the amount of cash and short term assets / repositioning them into property: Non-Monetary assets are translated at Historic Rates.

3. Provide less favorable credit terms for purchasers of sprockets, thus creating a lower accounts receivable balance. Reducing the amount of accounts receivable will reduce Sunshine Sprockets' net asset exposure.

4. Increasing other non-monetary liabilities (e.g. borrow via accounts payable): Increases the total liability amount translated at current rates.

5. Hold assets in USD

7. Fall 2023 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

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

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 12 Case Study: Customer Churn

~~CFEFD-S4-40-21 Heavy Models, Light Models, and Proxy Models, sections 1-5, 7 (excl appendices)~~

Commentary on Question:

In general, most candidates did well on this question. Most candidates can define the terminologies, perform the calculation, and provide evaluation correctly. Some candidates didn't perform the calculation correctly due to the incorrect formula been used.

Solution:

(a) **(LO 4a, 4b)** Define the following terms:

I. Descriptive features

II. Prediction subject

Commentary on Question:

Candidates did well on this question. Most candidates would be able to provide definitions of descriptive features and prediction subject correctly.

Descriptive features refer to variables or characteristics of a system or data set that can be used to make accurate predictions or forecasts about future outcomes.

7. Fall 2023 Continued

The prediction subject refers to the specific target or outcome that a predictive model aims to predict. It is the variable or attribute of interest for which the predictive model is designed to make predictions or forecasts.

(b) **(LO 4a, 4b)**

(i) Calculate the precision and recall based on the table provided. Show your work.

(ii) Evaluate the model performance. Justify your answers.

Commentary on Question:
Candidates did well on this question. Most candidates would be able to calculate the precision and recall correctly, and evaluate the model with the calculated results. Candidates need to use the precision and recall calculated from part i to evaluate the model, and explain the meaning of precision and recall in order to get full credits.

The sample answer will be provided in the excel workbook separately.

(c) **(LO 4a, 4b)**

(i) Assess the reliability of a predictive model over time.

(ii) Propose two ways to address the concern from senior management.

Commentary on Question:
Candidates did well on this question. Most candidates would be able to point out that predictive models would go stale over time, and explain why this is happening. Most candidates could provide 2 valid methods for monitoring. Some candidates got partial credits if only 1 method was provided.

Predictive models are based on the assumption that the patterns learned in the training data will be relevant to unseen instances that are presented to the model in the future. However, the data is not constant as time passed by. In that case, ongoing validation is need after a model is deployed.

Following are some methods can be used to monitor the model:

1. Monitoring changes in performance measures
2. Monitoring model output distribution changes
3. Monitoring descriptive feature distribution changes

8. Fall 2023 CFE FD Exam (LOs 1a, 1c)

Learning Objectives:

1. The candidate will understand how an organization 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.

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

Sources:

CFE201-101-25: A Brief Primer on Financial Reinsurance

SOA Reinsurance News: Return on Capital Enhancement Opportunities for the Life Insurance Industry

Case Study: Darwin

Commentary on Question:

This question tested candidate's understanding of different capital components and risk management techniques. The most successful candidates were able to demonstrate a robust understanding of source material through reasonable explanations and sound justification.

Solution:

(a) **(LO 1a, 1c)**

(i) Define redundant reserves.

(ii) Explain why some of Darwin's products may have redundant reserves.

Commentary on Question:

Candidates generally performed well on parts (i) & (ii). Either of the two explanations provided below were sufficient for full credit.

8. Fall 2023 Continued

Redundant reserves are statutory reserves minus economic reserves, where economic reserves are calculated using best-estimate assumptions.

Statutory reserves tend to use conservative assumptions as regulators are conserved about policyholder protection. This results in higher reserve levels than what would result from using best-estimate assumptions.

Statutory reserves may be redundant due to prescribed assumptions of high mortality, low interest rates, high lapse, and otherwise conservative methodologies.

(b) **(LO 1a, 1c)** Explain two pros and two cons associated with using a captive reinsurer.

Commentary on Question:
Additional answers not listed below were sufficient to earn full credit if relevant and correctly explained.

Pros:
- Increased returns on the block are achieved as lower cost of capital is obtained through direct access to wholesale reinsurance markets and/or alternative funding sources.
- Reinsurance coverage through captives is flexible and can be specially tailored to meet specific underwriting and financing needs of the company.
- Captives can be established in locations with favorable tax codes, reducing total cost of reinsurance.

Cons:
- Captives can result in increased regulatory scrutiny as regulators may be concerned with funding liabilities offshore.
- Captives can be costly to set up and require additional administrative burden.
- Captives can introduce significant complexity to the insurer.

(c) **(LO 1a, 1c)**

(i) Describe how you would calculate the value of each capital tranche of Darwin's term business.

(ii) Describe two different ways that a reinsurer might be willing to provide capital support.

8. Fall 2023 Continued

Commentary on Question:
Candidates generally had a difficult time communicating appropriate steps to value capital tranches. Successful papers identified and explained relationships between key capital components per the source material. Full credit answers for VIF should mention that it is the result of projecting or modeling future cash flows of the business. Bifurcation of Conservative & Optimistic VIF was not necessary for full credit.

Tranche valuation should add together economic capital, redundant capital, and VIF. Redundant capital is equal to statutory reserves & capital minus economic reserves & capital. Although not officially represented on the balance sheet, Value-in-Force reflects the present value of future profits of in force business. VIF has two primary components:

Conservative Value in Force = Conservative estimate of PV of future cash flows associated with in force business under conservative assumptions.

Optimistic Value in Force = Estimate of PV of future profits above conservative VIF, reflecting potential upside on conservative assumptions.

Reinsurers can offer capital support in two primary ways:
1) Statutory Capital Relief: Deal structured to directly reduce the statutory reserve by reinsuring risks related to solvency margins.
2) VIF Financing: Allows a company to increase its statutory surplus by monetizing a portion of its value-in-force.

(d) **(LO 1a, 1c)**

(i) Compare and contrast the following two approaches from Alexis's message:

I. Traditional reinsurance

II. Financial reinsurance

(ii) Recommend the best approach given Alexis's view of the company. Justify your recommendation.

Commentary on Question:
To receive full credit, candidates needed to include at least one comparison item in part (i). Well explained items not listed below were also awarded credit as appropriate. In part (ii) a maximum of half credit was awarded if Traditional Reinsurance was recommended with reasonable justification.

8. Fall 2023 Continued

Both Traditional and Financial Reinsurance involve transfer of statutory reserves from cedant to reinsurer and provide reserve credit.

Traditional reinsurance involves the reinsurer taking on insurance risks such as mortality exposure. As such, the reinsurer stands to earn profits if the insurance experience performs better than expected.

Financial reinsurance involves very little insurance risk transfer is used only for "remote" types of risks and/or capital structuring. The reinsurer's profits are generally only tied to fees.

For Darwin, Financial reinsurance is recommended. The company currently does not need to reduce its risk exposure as its business blocks are secure and stable. Financial Reinsurance would help free up capital to invest in other high growth business opportunities.

1. Spring 2023 CFE FD Exam (LOs 1a, 1b, 1c)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions.

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

Sources:

~~CFEFD-S1-02-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 18: Capital Budgeting and Valuation with Leverage~~
~~CFEFD-S1-03-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 22: Real Options~~
Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 10: Framework for Valuation (excluding "Problematic Modifications to Discounted Cash Flow" and "Alternatives to Discounted Cash Flow" sections)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 35: Capital Structure, Dividends, and Share Repurchases, "Setting a Target Capital Structure only (pp 679-688)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 40: Flexibility

Case study - Darwin

Commentary on Question:

The primary goal is to understand how a company optimizes its corporate finance decisions based on its business objectives, and compares methods to determine the value of a business or project, including the impact on investment options.

The secondary goal is to examine how the weighted average cost of capital (WACC) is determined and other elements affecting the value of a project.

1. Spring 2023 Continued

Solution:

(a) **(LO 1a, 1b, 1c)** Critique the use of RPPC's WACC for both alternatives.

Commentary on Question:

This question was looking for the candidates' ability to display an understanding of things that may influence what WACC is most appropriate to use, such as debt-to-equity differences and underlying risk differences of projects.

When considering the WACC to use for these alternatives, the following should be considered:

- *Will the leverage of this project or similar projects in the same industry differ from that of RPPC?*
- *The two alternatives' risks will be different from RPPC's risk. Both alternatives are entering a new segment of the market which Darwin/RPPC has no experience. Additionally, ~~Additionally~~, one of the options has a very low chance of success.*

Each project and line of business can bring with it different risks. By using the WACC of RPPC, we are assuming that the risk and leverage of Acquiring TL Life Company (Alternative I) and Project Amplify match those of the firm. An issue with this approach is that the positive earnings results on Project Amplify (Alternative II) are less likely than on the Alternative 1. The amount of debt financing to support the risk profile of these two products should not be identical.

One might consider calculating the WACC by comparing the unlevered cost of capital of a single-division firm that has similar business risks, such as Snappy.

Depending on other factors, the WACC may not be the ideal method. For example APV would be preferred if the debt-equity ratio is not constant over time.

(b) **(LO 1a, 1b, 1c)**

(i) Calculate the NPV for each of the two alternatives using RPPC's WACC. Show your work.

(ii) Recommend which alternative Darwin should choose based on NPV. Justify your recommendation.

Commentary on Question:

This question evaluated the candidates' ability to properly calculate the WACC and NPV. Candidates generally did well in calculating the WACC, but there were often timing errors in calculating the NPV. Years 6+ presented a challenge to candidates.

1. Spring 2023 Continued

(i) WACC = (60% * 14%) + (40% * 8%) * (1-20%) = 10.96%

Alternative I NPV: -80m + 2m / (1.1096) + 4m / (1.1096)^2 + 6m / (1.1096)^3 + 8m / (1.1096)^4 + 10m/(1.1096)^5 + 10m/.1096/(1.1096)^5 = -5.089m

Alternative II NPV: -20m + .3*2m / (1.1096) + .3*4m / (1.1096)^2 + .3*6m / (1.1096)^3 + .3*8m / (1.1096)^4 + .3*10m/(1.1096)^5 + .3*10m/.1096/(1.1096)^5 = 2.473m

(ii) Based on the NPV result, Alternative II should be chosen.

(c) **(LO 1a, 1b)**

(i) Calculate the value of the option, using a decision tree. Show your work.

(ii) Describe two factors that could affect the value of the option you have calculated in (i).

Commentary on Question:

Part C proved to be challenging for candidates. The additional calculations led to several errors such as: incorrect signs on the tree, missing expenses in year 2, negative values of the option being calculated, issues with discounting, and not comparing the value with the option to the value without the option.

The second part of the question attempted to understand if the candidate could identify items that influenced the value of the option. Often the candidates supplied answers that would improve the value of the project, but it didn't improve the value of the option (value with option minus value without option).

(i) Project NPV = .3*NPV Success + .7*NPV Failure

NPV Failure = -10m + 0m (no investment in the second year if failure)

NPV Success = -10m + (2m-10m)/ 1.1096 + 4m/1.1096^2 + 6m / (1.1096)^3 + *8m / (1.1096)^4 + *10m/(1.1096)^5 + *10m/.1096/(1.1096)^5 = 55.898m

Project NPV = .3*55.898 + .7*-10m = 9.769m
Value of option = 9.769m – 2.473m [from (b) (i)] = 7.296m

1. Spring 2023 Continued

(ii) If the success rate of the project goes up, the value of the option decreases. If the success rate of the project goes down, the option becomes more valuable. The additional information is worth more when there is less certainty.

The value of waiting can influence the value of the option. If the decision point were an extra year out for example, there would be more information on the success rate and projected stream of profits.

Others include: The amount of volatility in the projected earnings; The WACC used to determine the NPV of the option; Are there other options in the future if they make this investment? If Project Amplify is successful, is there an option to expand by deploying more capital later? Increase the marketing spend and headcount to accommodate additional sales; Is it imperative that the pilot has 10m of investment? Or can you learn the same information (likelihood for success or failure) with a smaller pilot that is less expensive? The amount being paid up from vs. deferred will impact the value of the option.

(d) **(LO 1a, 1b, 1c)** Explain four important factors (other than NPV) that could influence Darwin's decision to move forward with either TP Life or Project Amplify, or neither.

Commentary on Question:
For the most part, candidates scored well on section d and were able to identify other factors that could influence the decision. Some candidates lost points for listing and not explaining the factors. Other candidates lost points for being hyper-focused on particular items that were redundant.

Synergies: Will the acquisition have any synergies that improve the overall financial picture of the combined company? Does the acquisition bring new talent and knowledge to the table that could help Darwin in other places?

Leverage Capacity: Can Darwin acquire additional funding? If not, Project Amplify (Alternative II) has a much cheaper entry cost.

Risk Tolerance: There are several risk items to consider such as will the addition of this online channel increase the risks that must be accounted for such as cyber? Is Darwin comfortable in deploying so much capital with a low probability of success?

Corporate Strategy: Either of these projects will take a great deal of organizational bandwidth. Does this align with the company's long-term strategy? Would they be better off investing in a product line like the new IUL they have been considering?

2. Spring 2023 CFE FD Exam (LOs 2a, 2b)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

Sources:

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

Case Study - SEA

Commentary on Question:

Most candidates did demonstrate some basic understanding of financial reporting vs earnings quality in part (a). However overall performance in part (b) and (c) were poor. Partial credit was awarded to sound answers applicable to SEA and with justifications.

Solution:

(a) **(LO 2a, 2b)**

(i) Contrast high-quality financial reporting and high-quality earnings.

(ii) Explain how financial reporting quality and earnings quality are related.

Commentary on Question:

Most candidates were able to score some marks on this question. Many candidates mixed up their answers in part (i) vs (ii), however credits were still awarded if their statements are correct. In part (i), the question was asking about the differences between high-quality financial reporting vs earnings (i.e., how are they different from definition). Part (ii) was specifically asking about their relationships (i.e,. how do they interact with each other).

(i) Financial reporting quality and the quality of reported results are related.

High-quality financial reporting conforms to the GAAP of the jurisdiction, as well as provides decision-useful information which is 1) relevant and 2) fairly/faithfully represents the economic reality of the company's activities during the reporting period and financial condition at the end of the period.

On the other hand, high-quality earnings result from activities the company will likely be able to sustain and provide sufficient return on the company's investment.

(ii) The relationship between financial reporting quality and earnings quality can be viewed as a matrix or as 4 cases. Financial reporting quality can be high or low. Earnings quality can also be high or low.

High reporting quality is a prerequisite for analyzing earnings quality and valuation.

High reporting quality enables assessment. High earnings quality increases company value, whereas low earnings quality decreases company value.

Low reporting quality impedes assessment of earnings quality and impedes valuation. If reporting quality is low, the information provided is of little use in assessing company performance, or making investment and other decisions.

(b) **(LO 2a, 2b)**

(i) Determine where on the quality spectrum SEA's financial reports fall, based only on the financial statements in the case study. Justify your response.

(ii) Determine where on the quality spectrum SEA's financial reports fall, using the new exhibit and disclosure. Justify your response.

(iii) Critique management's decision to include this new exhibit.

Commentary on Question:
Most candidates did poorly on this question. Many did not understand what the "quality spectrum" exactly refers to; specifically, not basing their answers off the key elements of financial reporting and earnings quality. There were also a fair number of candidates who thought "more is better" in part (ii)(iii) without solid justifications, who received few marks.

(i) As reported SEA's financial statements fall on the quality spectrum either in the first or second spot.

They appear to be decision-useful and prepared faithfully under GAAP of the jurisdiction. No Notes or statement of cash-flows are presented. Earnings quality has declined the last two years. There do not appear to be any biased choices, but we also do not have any notes or financial disclosure to analyze.

2. Spring 2023 Continued

The key question is whether the results are sustainable. The following factors call into question the sustainability of SEA's results: 1) non-passenger (other) revenue has declined 1% per year; 2) net income and operating income have decreased 49% and 41% respectively over the last two years; 3) over the last two years, passenger revenue has ticked up 6%, but aircraft maintenance only increased 1.5% suggesting there may be some deferred maintenance accumulating.

Absent additional information, we can conclude SEA's financial reporting is decision-useful, but don't know if it is sustainable.

(ii) The new exhibit is a non-GAAP exhibit, with little additional disclosure. It appears to be presented as prominently as GAAP compliant exhibit, which suggests the exhibit could reflect biased choices. The new exhibit restates fuel costs, reducing 2020 fuel costs by 3% and 2021 fuel costs by 15%. The new exhibit also restates other operating expenses, reducing them 1% per year, rather than showing the true 3% per year increase. Both of these reduce expenses and increase net income (aggressive choices).

Since the old exhibit is left unchanged, there doesn't appear to be earnings management, either real or in the accounting choices, but the new presentation does appear to show aggressive results.

Non-GAAP exhibits limit comparability across companies and time periods. The adjustments companies make to prepare non-GAAP exhibits are ad hoc and can differ significantly.

(iii) As mentioned in (ii), the new exhibit reflects aggressive choices. In the future, fuel costs may not increase as much as they have in the last two years, but to reduce them to appear to grow with general inflation misrepresents actual financial performance in the reporting period. The adjustment to other expenses appears to decrease those expenses to make them consistent with the change in non-passenger revenue. Similar to fuel costs, this change misrepresents expenses, overstating financial performance in the reporting period. It would have been more appropriate for SEA's management to publish pro forma projected financial results showing more moderate increases in fuel prices and to "right size" other expenses if they truly are expected to increase proportionately with non-passenger revenue.

2. Spring 2023 Continued

(c) **(LO 2a, 2b)**

(i) Explain four possible motivations that might lead SEA management to issue low-quality financial reports.

(ii) Propose, for each motivation in (i), additional disclosures that would help the user of financial statements to assess whether SEA's management acted on that motivation.

Commentary on Question:
Full marks were only awarded only if explanations were tied to SEA circumstances from the case study. The motivations that do not apply to SEA, (for example, beating analyst forecasts is not applicable since SEA is a privately held company), received no credit.

(i) Possible motivations that are applicable to SEA include:

1. Managers might manipulate financial reports to increase the firms value prior to being purchased by another firm. From the case study, we are told that SEA might be an acquisition target or strategic partner for one of the RPPC companies.

2. Managers may be motivated to issue low quality financial reports to mask poor performance. SEA's financial performance has been in decline, so masking poor or worsening behavior is a possible motivation.

3. Managers frequently have incentives to meet or beat market expectations, e.g. as in manager forecasts. This is especially true if manager compensation is linked to increases in SEA reported earnings/performance.

4. Managers might be concerned that working for a company that performs poorly will limit their future career opportunities. SEA's financial performance has been in decline, therefore managers' future career opportunities could have been impacted.

5. Whether out of concerns for career opportunities or to influence compensation (like hitting a bonus trigger), managers might make accounting choices to delay revenue (in periods of strong performance) or inflate revenue (in periods of marginal performance).

6. Managers might inflate earnings or other metrics to avoid debt covenants. SEA has long-term debt on their books, so avoiding debt covenants is a reasonable motivation.

2. Spring 2023 Continued

(ii) Additional disclosures include:

1. A statement of cash flows would help us value the company and better ascertain financial performance based on cash flows.

2. Notes that include information related to manager compensation and financial incentives.

3. Notes that discuss any material debt covenants.

4. Notes sharing information about senior leaders, e.g. bios might shed light on which managers would be more or less concerned about the implication for future career opportunities.

(d) **(LO 2a, 2b)** Describe the two conditions in addition to motivation that typically exist when companies issue low-quality financial reports.

Commentary on Question:
This question was done quite well. Partial credits were awarded to other reasonable answers as well.

The two conditions that typically exist when low-quality financial results are issued are:

1. Opportunity can result from weak internal controls, an ineffective board of directors, or accounting standards that allow for divergent choices or have minimal consequences for inappropriate choices.

2. Rationalization is a reflection of company culture and the ability of the individuals making choices to justify the choice to him- or herself.

3. Spring 2023 CFE FD Exam (LO 3c)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3c) Recommend best practices in business processes to achieve operational excellence

Sources:

Anupindi and Deshmukh, Managing Business Process Flows, Ch 2: Operations Strategy and Management

Case Study – Blue Jay Tire (BJT)

Commentary on Question:

This question tests the candidate's ability to evaluate strategies and make effective business process decisions. In order to perform well, candidates needed to understand the various types of graphs in the source material and be able to apply them to the BJT case study.

Solution:

(a) **(LO 3c)** Identify the type of strategic fit approach BJT is pursuing with its expansion into non-road tires. Justify your response.

Commentary on Question:

Candidates struggled with this question. Most candidates did not recognize that strategic fit can be achieved using either a market-driven strategy or process-driven strategy.

The type of strategic fit approach BJT is pursuing is a market-driven strategy.

A market-driven strategy is when a firm starts with key competitive priorities and then develops processes to support them. BJT is starting with their key competitive priorities (increasing product variety), and it is now evaluating 2 possible approaches (developing its own capabilities or buying a company that is already in the market) to support this competitive priority.

(b) **(LO 3c)**

(i) Explain what the current position 0 and all three potential positions 1-3 represent on the product-process matrix.

(ii) Recommend which position(s) on the product-process matrix would be best for BJT. Justify your recommendation.

3. Spring 2023 Continued

Commentary on Question:
To receive full credit for part (i), candidates needed to explain why positions 1 and 2 result in high costs.

(i) The current position (0) and position 3 are on the diagonal of the product-process matrix. Any position on the diagonal of the product-process matrix represents an effective match between the desired process flexibility and product variety.

Any off-diagonal positions represent a mismatch that can result in unnecessarily high costs. The position above the diagonal (1) represents a mismatch that causes opportunity costs. The position below the diagonal (2) represents a mismatch that causes out-of-pocket costs.

(ii) Either of the positions on the diagonal are best since they both represent an effective product-process match between the desired process flexibility and product variety.

(c) **(LO 3c)** Describe the information that this graph provides for the following in relationship to the two possible approaches to expansion:

(i) Positions 1 and 2.

(ii) The dotted line.

(iii) The arrows between positions 0 and 1, and 0 and 2

Commentary on Question:
For part (i), many candidates did not identify that position 1 represents acquiring TNT and position 2 represents building its own plant.

(i) Position 1 is buying a company that is already in the market and position 2 is developing its own capability. Position 2 must be developing its own capability since the case study mentions that this plant would be more efficient to run, resulting in higher profits per year.

(ii) The dotted line represents the operations frontier. This is the smallest curve that contains all current industry positions, and thus represents the current best practices of world-class firms. Firms on the operations frontier have superior performance along the desired product attributes (highest operational effectiveness).

3. Spring 2023 Continued

(iii) The arrows represent strategic positioning, which is the direction of improvement in operational effectiveness from the current position. Reducing the distance of the current position to the current operations frontier along the direction of improvement means that the operational effectiveness has been improved.

(d) **(LO 3c)**

(i) Evaluate BJT's capacity to become more operationally efficient by reaching position 3.

(ii) Explain BJT's ability to reach position 4.

Commentary on Question:
For part (ii), many candidates did not explain that the operations frontier can shift outward in the future.

(i) A position on the operations frontier (position 3) represents the highest operational effectiveness in the industry, meaning that this is the ideal position to be in. The firm's current position (position 0) does not represent the highest operational effectiveness. It is theoretically possible for BJT to reach position 3.

At BJT's current position, they do not face any trade-offs - they can improve along multiple dimensions (in this case, process flexibility and cost efficiency) simultaneously. Since the operations frontier is concave, any point on the frontier represents a trade-off - to increase performance along one product dimension, one must give up some performance along the other.

(ii) Since the operations frontier (position 3) represents the highest possible performance (operational effectiveness), it is not possible for the firm to currently be outside of the operations frontier (position 4).

It is only possible to reach position 4 in the future if the operations frontier shifts outward. The operation frontier can shift outward due to technology and management practice advancements.

4. Spring 2023 CFE FD Exam (LOs 3a, 3b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact performance evaluation and decision making.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate its costs and how these methods can distort perceived performance

Sources:

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

CFE201-104-25: Activity-Based Costing (ABC) and the Life Insurance Industry

Case Study – Snappy Life

Commentary on Question:

This question is testing the understanding of cost allocation and its implication on Life Insurance companies. This is a case study-based question, so it is important to apply cost allocation theory to this specific case. It is important to look at the specific verbs of the questions ("Describe," "Explain" etc.).

Solution:

(a) **(LO 3a, 3b)**

(i) Describe the three primary reasons companies allocate fixed costs to individual cost centers.

(ii) Explain which reason is most relevant to Snappy.

(i) The three primary reasons companies allocate fixed costs to individual cost centers are:

a. External Reporting/Taxes: Accounting rules require that inventory be stated at cost, including indirect manufacturing costs.
b. Cost Based Reimbursement: Depending upon the type of contract, reimbursements require cost-based allocation.
c. Decision Making and Control: Cost allocations are an important part of an organization's budget system, product pricing and performance evaluation processes.

4. Spring 2023 Continued

(ii) As a domestic life insurance company, among the three reasons, the decision making, and control is most relevant for allocating fixed costs.

(b) **(LO 3a, 3b)**

(i) Assess if each of the approaches, I-IV, is an insulating or noninsulating allocation method. Justify your response.

(ii) Describe one advantage and one disadvantage of noninsulating allocation systems with regards to management behavior and performance.

Commentary on Question:
It is important to look at the verbs the question is using. It is not enough to simply state whether the approaches are insulating or non-insulating.

(i) The different cost allocation approaches and the types are below:

a. Even allocation across lines of business is an insulating allocation approach. The business performance of any line of business would not affect the cost allocated to other lines of business.
b. Allocation by employee count can be either insulating or non-insulating allocation depending upon the nature of businesses. If the number of employees tends to scale up with sales, this would be a non-insulating allocation. If the number of employees is relatively fixed, independent of business performance, this would be an insulating allocation.
c. Allocation by policy count is a non-insulating cost allocation approach. The number of policies sold by individual lines of businesses affects total costs generated and the costs allocated to other lines of businesses.
d. Allocation by face amount is a non-insulating cost allocation approach. The face amount of policies sold by individual lines of businesses affects total costs generated and the costs allocated to other lines of businesses.

(ii) The primary disadvantage of a non-insulating cost allocation method is that it distorts the performance measure of one division by tying it to another division's performance. For Snappy Life, for example, if sales for the Whole Life group are down, this would increase the amount of costs that are allocated to the other two divisions, lowering their total profitability.

4. Spring 2023 Continued

The primary advantage of non-insulating methods is that the overall volatility in cost is absorbed by the individual lines of business. Non-insulating methods act like shock absorbers to the new or growing lines of businesses. For example, if a company wants to move into the SPWL line of business it will require upfront capital costs. But under the non-insulating method this cost will automatically shift to the other lines of business to avoid punishing a growing line of business that is strategically important to the company.

(c) **(LO 3a, 3b)**

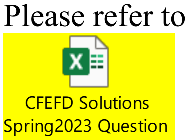
(i) Determine the profitability percentage for each line of business before allocation of fixed costs. Show your work.

(ii) Determine which line of business benefits most from each of the four proposed allocation approaches, I-IV. Justify your response.

(iii) Determine which allocation Veltro would prefer. Justify your response.

Commentary on Question:
This is a spreadsheet calculation question. Setting up the solution steps is important to respond to all parts correctly.

Please refer to the spreadsheet model solution.



(d) **(LO 3a, 3b)** Identify a shared cost from Snappy that Corrie has not identified for cost allocation. Justify your response.

Commentary on Question:
There can be multiple answers to this question. Candidate should clearly identify a shared cost and not a cost that are or can be attributable to a specific line.

A shared cost that is missing from the CFO's analysis would be related to marketing/advertising expenses. Since the marketing/advertising is done at a company level, we need to allocate this overhead expense to specific lines.

(e) **(LO 3a, 3b)** After reviewing the ABC alternatives proposed by Corrie, Veltro states "ABC is all too complicated for just allocating costs. Use face amount to allocate the fixed costs instead! At the end of the year, the product line with the highest profitability percentage will receive an additional year-end bonus, which will be excluded from the profitability percentage calculation."

Critique Veltro's statement.

4. Spring 2023 Continued

Commentary on Question:
"Critique" is the keyword here. The candidates should identify both pros and cons of a statement if applicable.

The specific critique on Veltro's each statement are shown below:

a. "ABC is all too complicated for just allocating costs."
   It is true that Activity Based Costing requires many data input and tracking. Implementation of ABC can be complicated and expensive exercise.
   But for life insurance companies, ABC is an appropriate costing mechanism for understanding cost tracking, profitability management, product design and budgeting.

b. "Use face amount to allocate the fixed costs instead!"
   Using face amount to allocate fixed costs is a non-insulating cost allocation approach. This is not the right approach for cost allocation as it will incentivize the managers of lines of businesses to sell smaller sell smaller face amount policies, which ultimately lowers total gross premiums and total net income.

c. "At the end of the year, the product line with the highest profitability percentage will receive an additional year-end bonus, which will be excluded from the profitability percentage calculation."

   Adding a bonus to the product line with the highest profitability percentage may not be the right approach. The business lines which require less capital will automatically see highest profitability and there will be unhealthy competition among talent pool to get into the business line. Instead, each business line should have different targets and the LOB that beats the target by highest percentage point can get an additional bonus.
   Also excluding the additional bonus from profitability calculation is not appropriate. It should be part of the cost of the specific business line.

7. Spring 2023 CFE FD Exam (LO 2c)

Learning Objectives:

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

Learning Outcomes:

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

Sources:

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

Commentary on Question:

The question is to test candidate's understanding of translating Income Statements / Balance Sheets under different methods and the implications of accounting choices with respect to company's foreign operations.

Solution:

(a) **(LO 2c)**

i. Describe three appropriate disclosures related to statement translation.

ii. Identify three considerations for Conglomerate Holdings as it prepares Sunshine Spot Insurance's translated statements.

Commentary on Question:

For a-i, most candidates were able to name one or two appropriate disclosures. To earn maximum scores, the disclosure must be related to translation not company in general.

For a-ii, only a handful of candidates mentioned the accounting method (IFRS vs GAAP).

(i) Any three out of the following list

- Disclose methodology used and reasons for choice where not clear
- In general functional currency is clear, but if not IFRS provides factors to be considered
- Note that current rate method includes currency adjustment that impacts stockholder equity
- Under temporal method translation adjustment impacts net income
- Disclose amount of differences recognized in net income
- Disclose translation adjustments

7. **Spring 2023 Continued**

(ii) Any three out of the following list
- Parent's method of accounting: IFRS or US GAAP
- Foreign company books must be translated into parent's currency
- Possible methods are current rate method and monetary/non-monetary (Temporal) method
- What is functional currency (currency of primary economic environment)

(b) **(LO 2c)** Provide the income statement and balance sheet (including dividend impact) for Sunshine Spot Insurance for 2020, ignoring taxes, as it will appear in the parent's consolidated financial statements under:

(i) The current rate method.

(ii) The temporal method.

Commentary on Question:
Part b-i was done well though a fair number of candidates didn't get capital stock right. Part b-ii was difficult for candidates. Very few candidates correctly calculated translation gain/loss under temporal method.

See Excel attached

(c) **(LO 2c)** Your manager wants to choose the current rate method to reduce volatility.

Critique your manager's suggestion.

Commentary on Question:
Candidates didn't score well. Several candidates argued current rate method created more volatility due to the use of current exchange rates, which received no mark. Partial credit was given to candidates stating that the choice of the translation methodology is dependent on the functional currency of the foreign entity rather than management discretion.

- Methodology is prescribed and should not be a matter for company discretion.
- External audiences need to know that methodology is consistent and transparent.
- There are better ways to reduce volatility than trying to define a method.

8. Spring 2023 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

~~CFEFD-S5-46-21 Dowd, Measuring Market Risk 2nd ed, Ch 9 Applications of Stochastic Risk Measurement Methods~~

CFEFD-S5-53-21 Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 12 Case Study: Customer Churn

~~CFEFD-S5-47-21 Dowd, Measuring Market Risk 2nd ed, Ch 13 Stress Testing~~
~~CFEFD-S5-48-21 Dowd, Measuring Market Risk 2nd ed, Ch 15 Back Testing Market Risk Models~~
~~CFEFD-S5-57-21 Bolle-Reddat, Bernard (et al.), Modeling in Life Insurance - A Management Perspective, Chapter 11~~

Commentary on Question:

Commentary listed underneath question component.

Solution:

~~(a) Identify two distinctive features that need to be considered in selecting a suitable stochastic process to model interest rates.~~

~~**Commentary on Question**~~:

~~*Candidates are expected to touch on both stylized factors and term structure to receive full credits. Many candidates answered two of the stylized factors and received half credit.*~~

~~The types of processes should ideally cover the following stylized factors:~~
~~Interest rates are random / stochastic~~
~~Interest rates should be non-negative~~
~~Interest rates are mean reverting~~

~~Additionally, the term structure has to be considered, as most fixed income instruments have payments that occur at regular intervals~~

8. Spring 2023 Continued

(b) **(LO 4a, 4b)** Identify two data quality issues indicated by the data summary report provided in Excel.

Commentary on Question:
In general, Candidates did well in this part of the question. Missing values is easy to identify in the ABT provided, irregular cardinality and outliers may not be that obvious. However, candidates are expected to look for these issues therefore should be able to at least discuss that there is a possibility of the data containing outliers and irregular cardinality.

Missing Values:
There are missing values in 3 of the features selected: Competitor rates average, Credited rate not considering GMIR and Remaining time to annuitization.
Out of these, the % of missing values in competitor rates average and remaining time to annuitization are reasonably low. Further investigations in to the distribution of values would be needed to understand whether there are underlying issues with the data in these fields, but the % of missing values do not appear to be a problem.
The % of missing values in credited rate (not considering GMIR) is high. However, the rule of thumb as a threshold for missing values to be problematic is 60%, and the % of missing values in this feature is less than 60%. Further analysis on the distribution of data and undertsanding the reason behind missing values would be needed before determining the usability of this data.

Irregular Cardinality:
Cardinality refers to the number of distinct values present for a feature. A data quality issue arises if the cardinality for a feature is ""irregular"". i.e. does not match what we would expect.
From the ABT, it appears that the cardinality for credited rate is very low. The cardinality of this feature is 67 when the market data (10yr UST rates and S&P Index) to which the credited rate is tied has a cardinality of 120. It may be due to the missing values. Further investigations in to the underlying data is required to confirm whether this would be potential problem and whether this feature would be usable.

Outliers:
Outliers are values that lie far away from the central tendency of a feature.
From the ABT, it appears that the Benefit Base feature may have outliers. The gap between the maximum and the third quartile is much higher than the gaps between the other quartiles. The data appears to be valid, as there are no invalid values as outliers (e.g.: negative values) that show up in the ABT. However further analysis of the underlying data would be required to identify the outliers and investigate the reasons for outliers.

8. Spring 2023 Continued

~~(c) Describe two pros and two cons of using stress testing for this model.~~

~~**Commentary on Question**:~~
~~*Candidates are expected to describe two pros and two cons in the list below to receive full credit. Most candidates received partial credits on this part.*~~

~~Stress Testing:~~
~~Pros~~
~~- Since stress tests are usually unlikely, the data used to estimate VaR will not reveal much information about them. If the stress events are rare, they are likely to fall in the VaR tail region and VaR does not provide any information about the region beyond the value.~~
~~- Assumptions that help value non-linear positions in normal times might not be appropriate in stress situations, so a stress test could reveal more than a second-order approximation VaR.~~
~~- Stress tests are useful in identifying the consequences of volatility~~
~~- Can highlight dependence on correlation assumptions~~

~~Cons~~
~~- Not straightforward~~
~~- Dependent on chosen scenarios and hence on the judgment and experience of the people carrying out the test~~
~~- Difficulties in working through scenarios in a consistent and sensible way~~
~~- Can run into computational problems~~
~~- If risk tolerance is 90% VaR, then you need to make sure that your stress test is sufficient to move the more extreme tail results (likely, but not a given)~~

~~(d)~~
~~(i) Compare the two models based on backtesting results.~~

~~(ii) Recommend the best model to use. Justify your recommendation.~~

~~**Commentary on Question**:~~
~~*Candidates did poorly on this past of the question. Partial credits were granted to candidates attempted to calculate p-value and use that to derive a conclusion instead of QPS.*~~

~~(i) For the company model:~~

~~n = 1,000~~
~~p = (1-α) = 0.10~~
~~Expected number of losses = 100~~
~~x (number of exceedances) = 122~~
~~QPS = 0.2152~~

8. Spring 2023 Continued

~~QPS with expected number of losses =0.1800~~

~~The model performs worse than a model that generates expected number of exceedances.~~

~~For the industry model:~~

~~n = 500~~
~~p = (1-α) = 0.10~~
~~Expected number of losses = 50~~
~~x (number of exceedances) = 54~~
~~QPS = 0.2128~~
~~QPS with expected number of losses =0.2000~~

(ii) ~~The industry model performs worse than a model that generates expected number of exceedances but is still better than the company model as the QPS is less than the company model QPS. Therefore, it is recommended that the industry model be used.~~

(e) **(LO 4a, 4b)** Summarize the key points that you should highlight to the Risk Committee to help them think more broadly about using model results to make decisions.

Commentary on Question:
Candidates did okay in the last part of the exam. Only partial points were granted for general acknowledgement of the risk of letting the model be the decision-maker. Additional points were granted if candidates related to qualitative considerations, assumptions, outcomes/objectives, completeness of the model.

Is the Decision What the Model Says? No.

-Indeed, there are good reasons to challenge the outputs of the model. Collective debates around the model inputs and outputs are absolutely a must, first at the technical level and then at the political decisional level. These discussions often lead to a decision which is different from a simple reading of the direct output of the model
-'Models' outputs do not always have the same weight in decision-making. Is the model capturing the right metrics at the right level of detail?

-In strategic decisions, such as whether or not to buy a Company or an insurance portfolio, a model's outputs feed the battery of quantitative indicators under review, which are looked at in conjunction with qualitative considerations:

8. Spring 2023 Continued

-The assumptions used by the model should represent decision-makers' (Risk Committee) views on the future. Do they? Committee should discuss that.

- The models do one thing: they are telling a story, a simple story, understandable, with explicit shortcuts. The decision-maker's responsibility is then to pick the outcome they feels best fit what they are foreseeing vs. what the objectives are.

1. Fall 2022 CFE FD Exam (LOs 2a, 2b)

Learning Objectives:
2. The candidate will understand how to gauge an organization's performance through an evaluation of its financial reports.

Learning Outcomes:
(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

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

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

Case Study – Blue Jay Tire (BJT)

Commentary on Question:
Candidates should understand the ways companies can manipulate financial statements, use financial statement analysis techniques to identify the signs of questionable accounting, and understand the implications of accounting choices to financial statements.

Solution:
(a) **(LO 2a, 2b)** List three accounting techniques companies can use to improve their financial position in the current reporting period.

Commentary on Question:
The following are examples of acceptable answers. The first three the candidate wrote were accepted.

1. Fall 2022 Continued

Choose 3 of:

- Use non-recurring transactions to increase profits
- Defer expenses to a later period,
- Recognize revenue prematurely
- Measure and report assets at higher values
- Measure and report liabilities at lower values

(b) **(LO 2a, 2b)**

(i) Calculate each metric from 2017-2021. Show your work.

(ii) Assess what the results may mean as they pertain to financial warning signs.

Commentary on Question:
While part (i) was a straight calculation, part (ii) allowed the candidate to interpret and justify their findings. Candidates who could interpret the results of their calculations were given credit.

Part (i)

	2021	**2020**	**2019**	**2018**	**2017**	2016
Net income versus cash flow from operations: **=Cash from Operations/Net Income**	82%	44%	355%	231%	226%	
NI	29	16	16	35	50	50
CF from operations	24	7	57	81	113	86
Inventory turnover ratio: **=-Total Cost of Sales/Avg Inventory**	78%	100%	140%	120%	112%	
Cost of sales	(216)	(226)	(272)	(228)	(209)	-201
inventory	300	256	196	192	187	187
Receivables turnover ratio: **=Net revenue/avg accounts receivable**	153%	132%	179%	197%	191%	
revenue	170	140	186	200	191	179
accounts receivable	113	108	105	103	100	100

1. Fall 2022 Continued

Part (ii)
Cash from Operations vs Net Income: As the ratio declined there may be problems with the company's accrual accounts

Inventory Turnover Ratio: Declining inventory turnover ratio could suggest obsolescence problems that require recognition for example by marking down to realizable value.

Receivables turnover: Receivables are increasing as a percentage of net revenue (turnover ratio is decreasing). Could indicate issues with channel stuffing or fictitious sales.

(c) **(LO 2a, 2b)** Recommend three appropriate questions to ask BJT as part of the audit based on your observations in part (b). Justify your recommendations.

Commentary on Question:
Several examples of acceptable answers are listed below. Candidates should always justify their answers.

- Does the company use reserves for obsolescence in its inventory valuation? Justification: inventory turnover declined.
- Have there been any changes in depreciable lives for long-lived assets? Justification: cash from ops vs. net income indicates something changed with accruals
- Has the company changed sales practices by offering unusual discounts or threatening price increases? Justification: receivables turnover declined.
- Does the company engage in bill-and-hold transactions? Justification: receivables turnover declined.

(d) **(LO 2a, 2b)**
(i) Describe the three methods that can be used for depreciating long-lived assets.

(ii) Evaluate your manager's statement based on BJT's financial statements.

Part (i)
1. Straight line depreciation: Depreciate evenly over asset's life.
2. Units of production: Depreciate based on units produced vs expected number capable of being produced.
3. Double declining balance: depreciation is a fixed percentage applied to declining/outstanding balance

1. **Fall 2022 Continued**

Part (ii)
The statement may be true but there is insufficient information to be sure
If it were true, as production decreased so would depreciation expense
Production decreased in 2021, but depreciation expenses did not
Increase in depreciation expenses may be a result of depreciation of increased inventory. This may be offset but reduced depreciation of longer-lived assets
Audit team should review depreciation methods.

2. Fall 2022 CFE FD Exam (LOs 2a, 3a, 3b)

Learning Objectives:

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

3. The candidate will understand how managerial accounting and operational processes impact performance evaluation and decision making.

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate its costs and how these methods can distort perceived performance

Sources:

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

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

Case Study - Frenz

Commentary on Question:

This question is to test students on understanding of operational efficiency and evaluation based on historical data and industrial benchmarks. In order to receive full credit, candidates must show that they understand the implications of the ratios and movements.

Solution:

(a) **(LO 2a)**

(i) Calculate the Days of inventory On Hand (DOH), Days of Sales Outstanding (DSO), and Total Asset Turnover for the past 5 years. Show your work.

	2021	2020	2019	2018	2017
DOH	94.79	69.73	87.93	84.99	81.83
DSO	4.03	4.22	4.44	4.66	4.89
Total Asset Turnover	1.45	1.56	1.65	1.77	1.78

2. Fall 2022 Continued

Commentary on Question:
Most candidates received full credit. Candidates using average numbers to calculate the ratios also received full credit.

(ii) Evaluate Frenz's operational performance based solely on your calculations in part (i).

DOH: inventory turnover has been stable for 2017-2019 and reached the highest point in 2020. Higher inventory turnover ratio implies a shorter period that inventory is held. Due to the possible delay of deliveries of ingredients due to global pandemic, the inventory is held shorter in 2020. To avoid this happening again, inventory is higher in 2021 which causes inventory period is longer.

DSO: it has been steadily decreased in the past five years. Receivable has been the same for the past five years regardless of the growth of the revenue indicating highly efficient credit and collection

Total Asset turnover: Total asset turnover has been decreased indicating the inefficiency of capital usage.

Commentary on Question:
Most candidates received full credit for describing the movement but fewer candidates were able to provide reasons for the movement as well as the implication of the movement.

(b) **(LO 2a)** Explain the implications of Frenz's operating efficiency based on the industry ratios above.

DOH: Frenz inventory has been stored longer than what industry usually does. Its inventory on average store for around 2-3 months which is relatively long as a food/coffee industry. It may affect coffee's quality and freshness which is Frenz competitive advantage.

DSO: Frenz DSO is shorter than Industry. It's lower compared to industry indicating that Frenz's credit or collection policies are too stringent, could loosen a bit to boost sales.

Commentary on Question:
Candidates generally did well on this question. Most candidates demonstrated good understanding on the movements and their implications.

(c) **(LO 3a, 3b)** Explain how a change in overhead expense allocation may impact a company's current and future operational results.

2. Fall 2022 Continued

An overhead allocation assigns common costs to cost objects using an allocation base that approximates how the cost objects consume the common resources. Changing the allocation basis to allocate historical costs will not impact total company results.

Cost allocation can impact future results because cost allocations change how decision rights are assigned within the company and hence managers' incentives and behaviors. An allocation of more costs to one department and less to another transfers decision rights over the amount of discretionary spending, and could change the mix of factor inputs, etc

Commentary on Question:
Most candidates failed to answer how the current results would impact and only received partial credit.

(d) **(LO 2a)** Recommend two actions that Frenz should take regarding operating efficiency. Justify your recommendations.

1. loosen Frenz's collection policies -- as the current DSO is a bit too short compared to industry level. Looser collection policies can build a better relationship with customers and boost sales
2. lower inventory level - this can shorter the days inventory was held to make sure the quality and freshness of Frenz's products. However, this can increase the supplier risk
3. increase account receivable level - since the sales increased a lot in the past few years, account receivable should not be fixed ($5000 every year)
4. impose inventory charge

Commentary on Question:
Points were awarded for other reasonable actions. Any action that isn't related to operating efficiency was not awarded any credit.

(e) **(LO 2a)**

(i) Calculate Frenz's debt-to-equity ratio over the last 5 years. Show your work.

Year	2021	2020	2019	2018	2017
Debt to Equity	89.93%	100.96%	110.33%	124.75%	119.32%

(ii) Evaluate Frenz's debt-to-equity ratio in part (i) considering the company's expansion plan.

Frenz's debt-to-equity ratio has been decreasing due to higher retention ratio.
Lower debt-to-equity ratio may provide more ability to pursue expansion.

2. Fall 2022 Continued

(iii) Propose two approaches to reduce the company's internal debt burden.

Possible answers:
1. Lower the cash dividend payout as in the past years, dividend payout ratio is extremely high - its 100% in 2017.
2. Increase account receivable as sales increase year over year
3. Increase paid in capital such as looking for investors.
4. Renegotiate the debt covenants to propose convertible debt to equity

Commentary on Question:
Candidates generally didn't not do well in part (i) and (ii). Several candidates included account payable in the total debt calculation in part (i), which is incorrect. Most candidates didn't include the reason of lower debt-equity ratio in part (ii). In part (iii), answers like increase equity/cash, lower debts only received partial credit.

3. Fall 2022 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 9 and Ch. 12

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) **(LO 4a, 4b)** List two key data considerations when designing features of an Analytics Base Table (ABT).

1. Availability of the data
2. Format(s) of the data

(b) **(LO 4a, 4b)** Create a confusion matrix for Model 1 and for Model 2. Show your work.

Commentary on Question:

Because the question did not specify which category was positive and which was negative, full credit was given where Default was chosen as positive, rather than No Default. Strong candidates, however, recognized that with 100 scenarios, having Default as positive required partial scenarios to obtain precision and recall as given, which is not reasonable.

Candidates generally did well on this question. Candidates who did not receive full points did not incorporate all given information, such as Target Default being 25% of total, or did not recall the formulas for Precision and Recall.

Model 1	
Precision	0.933
Recall	0.933
Model 2	
Precision	0.97
Recall	0.867
Total No Default	75
Total Default	25

Model 1

		Prediction No Default	Default
Target	No Default	70	5
	Default	5	20

Model 2

		Prediction No Default	Default
Target	No Default	65	10
	Default	2	23

(c) **(LO 4a, 4b)**

(i) Evaluate your coworker's recommendation.

(ii) Calculate the profit and loss for Model 1 and for Model 2 using the confusion matrices created in part (b). Show your work.

Commentary on Question:

Most candidates did not evaluate their coworker's recommendation in part (i), but rather critiqued management's preference, which was not what the question asked them to do.

Candidates generally did not understand all profit and loss implications in the profit matrix, and few received full credit. Common mistakes include assigning a loss to a correct prediction of No Default, where no loss would be incurred. Another common mistake was applying the 25% Target Default to the 60% no recovery rate in the profit matrix, rather than recognizing that the 25% Target Default is already incorporated in the confusion matrix.

3. Fall 2022 Continued

(i) Management prefers models with categorical target features to be based on expected value. These models use categorical target features, and profit and loss is an expect value measurement, so this is a reasonable approach. Profit and loss is an effective performance measure to use. Cost of default on the loans is the primary risk, so understanding expected value of loss is useful.

(ii) The profit matrix is multiplied by the confusion matrices to determine the profit and loss for each model:

Loan Face Value	100,000
Interest	10%
Recovery	40%

Prediction No Default, Target No Default = Profit of 100,000 * 10% = **10,000**

Prediction of Default, Target No Default = Loss of interest on loan, since no loan is issued = -100,000 * 10% = **-10,000**

Prediction of No Default, Target Default = Loss of interest on loan + Loss of face value defaulted = - (100,000 * 10% + 100,000 * (1 - 40%)) = -(10,000 + 60,000) = **-70,000**

Prediction of Default, Target Default = No loan issued, and no interest lost, so no profit or loss = **0**

3. Fall 2022 Continued

Profit Matrix		Prediction	
		No Default	Default
Target	No Default	10,000	(10,000)
	Default	(70,000)	0

Profit - Model 1		Prediction	
		No Default	Default
Target	No Default	700,000	(50,000)
	Default	(350,000)	0
	Profit - Model 1		300,000

Profit - Model 2		Prediction	
		No Default	Default
Target	No Default	650,000	(100,000)
	Default	(140,000)	0
	Profit - Model 2		410,000

(d) **(LO 4a, 4b)** Recommend whether Model 1 or Model 2 should be adopted by ABC Company. Justify your response, using results from parts (b) and (c).

Recommendation: Model 2 should be adopted by ABC Company

Justification: Model 2 has a higher expected profit at 410,000, compared to Model 1 at 300,000, which aligns with management's preferences. Additionally, Model 1 misclassifies Default as No Default more often than Model 2, and this mistake is the most costly, resulting in lower profits.

(e) **(LO 4a, 4b)** Determine the annual effective loan interest rate at which the models would produce the same expected profit and loss. Show your work.

Commentary on Question:
Candidates generally performed well on this question. Full credit was given for answers utilizing goal seek, so long as the candidate demonstrated an understanding of how to set up the problem.

3. **Fall 2022 Continued**

The profit matrices need to be set equal to each other.

Model 1 Profit: (70 * 100,000 * i) - (5 * 100,000 * i) - 5 * [(100,000 * i) + 100,000 * (1 - 40%)]

Model 2 Profit: (65 * 100,000 * i) - (10 * 100,000 * i) - 2 * [(100,000 * i) + 100,000 * (1 - 40%)]

- (70 * 100,000 * i) - (5 * 100,000 * i) - 5 * [(100,000 * i) + 100,000 * (1 - 40%)] = (65 * 100,000 * i) - (10 * 100,000 * i) - 2 * [(100,000 * i) + 100,000 * (1 - 40%)]
- (5 * 100,000 * i) + (5 * 100,000 * i) - 3 * [(100,000 * i) + 100,000 * (1 - 40%)] = 0
- (500,000 * i) + (500,000 * i) - (300,000 * i) - (300,000 * 60%) = 0
- (700,000 * i) - 180,000 = 0
- 700,000 * i = 180,000

i = 25.7143%

At an interest rate of 25.7143%, ABC Company would be indifferent between Model 1 and Model 2

(f) **(LO 4a, 4b)** Recommend one additional performance measure for evaluating the performance of models with categorical target features that management may not have considered. Justify your recommendation.

Recommendation: F1 measure

Justification: F1 measure works well with prediction problems with binary target features; can collapse precision and recall into this simpler misclassification rate

4. Fall 2022 CFE FD Exam (LOs 3a, 3b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate costs and how these methods can distort perceived performance

Sources:

Zimmerman, Accounting for Decision Making and Control 10th Ed

- ~~Chapter 4: Organizational Architecture~~
- Chapter 5: Responsibility Accounting and Transfer Pricing
- Chapter 7: Cost Allocation: Theory
- Chapter 9: Absorption Cost Systems
- ~~Chapter 10: Criticisms of Absorption Cost Systems: Incentive to Overproduce~~
- ~~Chapter 11: Criticisms of Absorption Cost Systems: Inaccurate Product Costs~~

CFE201-105-25: Product Costing In Service Organizations

CFE201-104-25: Activity-Based Costing (ABC) and the Life Insurance Industry

Case study - Frenz

Commentary on Question:

Candidates should

- *Assess how managerial accounting can impact decision-making ~~and organizational architecture~~.*
- *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.*
- *Assess how managerial accounting can impact behavior and performance evaluation in organizations*
- *Apply Frenz case in answering the questions*

4. Fall 2022 Continued

Solution:

(a) **(LO 3a, 3b)**

(i) Describe the agency problem at Frenz, as observed in the email exchange.

~~(ii) Describe how Frenz's organizational architecture may reduce agency problems.~~

Commentary on Question:
Candidate should show an understanding of the 'agency problem' and the explanation of how Jeff is acting in his self-interest~~, and the discussion on the separation of duties and incentive compensation structure~~

(i) Jeff is focused on how he can maximize his bonus. Jeff is acting in his self-interest to maximize his utility. Agents' pursuit of their self-interest instead of the principal's is called the agency problem. The agent would prefer to see firm resources directed into activities that improve the agent's welfare even if these activities do not benefit the company to the same degree.

~~(ii) Separation of duties: Jeff cannot change the cost allocation. He can influence it, but he does not have authority to change it. Bonuses are linked to profits. Incentive compensation plans better align the interests of senior managers and the company: Several specific accounting procedures, such as standard costs, budgeting, and cost allocations, help reduce agency problems. Financial measures are not under the control of the operating managers.~~

(b) **(LO 3a, 3b)** Describe how each of the four types of overhead costs listed in Kitty's email may be allocated to each of the four cost codes to more accurately reflect how the cost codes consume the overhead resources.

Commentary on Question:
Candidates should discuss the cause-and-effect relationship for overhead items mentioned in Exhibit B - corporate advertising, executive salaries, store operating expenses, and the rent on our home office building.

Corporate advertising – Advertising benefits all products sold. Frenz should find a common base (e.g., sales, cost of sales, etc.) to allocate these expenses to all four cost codes.

Executive salaries – Executive decisions affect all products sold. Frenz should find a common base (e.g., sales, cost of sales, or time spent, etc.) to allocate these expenses to all four cost codes.

4. Fall 2022 Continued

Store operating expenses – Store related expenses should not affect cost codes of COTS and NCOTS. Using controllability principle, any expenses related to Frenz stores should be allocated to products of Frenz stores.

Rent on home office building – It is not easy to find a common base to allocate rent on home office building. Frenz can either not to allocate such expense or find a common base to allocate the expenses.

(c) **(LO 3a, 3b)**

(i) Calculate Operating Income using an overhead allocation to the four cost codes based on 'Sales'. Show your work.

(ii) Calculate Operating Income using an overhead allocation to the four cost codes based on 'Cost of Sales'. Show your work.

Commentary on Question:

(i)

2020 Financial Data by Cost Code

	Cost Code				
	CS	COTS	NCS	NCOTS	Total
Sales	260,145	110,403	40,211	20,724	431,483
Cost of Sales	26,702	20,141	6,012	3,540	56,395
Overhead	176,812	75,037	27,330	14,085	293,265
Operating Income	56,631	15,225	6,869	3,099	81,823

(ii)

2020 Financial Data by Cost Code

	Cost Code				
	CS	COTS	NCS	NCOTS	Total
Sales	260,145	110,403	40,211	20,724	431,483
Cost of Sales	26,702	20,141	6,012	3,540	56,395
Overhead	138,856	104,737	31,264	18,409	293,265
Operating Income	94,587	(14,475)	2,935	(1,225)	81,823

(d) **(LO 3a, 3b)**

(i) Describe how Jeff's bonus will change if the overhead allocation base is changed from 'Sales' to 'Cost of Sales'.

(ii) Critique Jeff's statement regarding the true profitability of the non-coffee items.

(iii) Recommend a change to Frenz's product mix based on Kitty's overhead allocation analysis. Justify your recommendation.

Commentary on Question:
Candidate should demonstrate the ability using financial statement information to analyze allocation on difference basis and the implication to the bottom line.

4. Fall 2022 Continued

(i) Jeff is responsible for the non-coffee (NC) items which are cost codes NCS and NCOTS.

- When the allocation base is 'Sales', operating earnings for the NC items is 10,608 (= 10,965 - 356).
- When the allocation base is 'Cost of Sales', operating earnings for the NC items is -7418 (= 20,109 - 27,527).
- Since operating earnings for the NC items is negative and significantly lower when the allocation base is 'Cost of Sales', Jeff's bonus will be much lower if the allocation base is 'Cost of Sales' than if the allocation base is 'Sales'.

(ii) Jeff says that the allocation method for corporate overhead penalizes the non-coffee products and disguises the true profitability of this part of the operation. Kitty states that accumulated corporate overhead is spread over all sales.

- The non-coffee items make up only 11% ((10,965-356)/99,668) of Operating Earnings when the overhead cost allocation is based on Sales
- When the cost allocation is based on Cost of Sales, Operating Earnings by 7,418 (20,109-27,527)
- Current allocation method does not seem to be penalizing the non-coffee products because the non-coffee products seem to have a high Cost of Sales amount relative to their Sales amount.

(iii) Knowing the cost of different products can be useful for making judgements about their relative profitability and performance, which may lead to decisions about resource allocation, shifting money away from unrewarding activities to those which offer the greatest benefit, or to moves to improve a product's cost performance. Also, for motivating and controlling managers, incentive schemes, pricing decisions.

- When the cost allocation base is 'Cost of Sales', Operating Income for the products sold in non-Frenz stores (COTS and NCOTS) is negative.
- Given this unfavorable result, Frenz may want to consider discontinuing sales of their products in other than Frenz stores and just focus on selling in Frenz stores. The Cost of Sales for these products are much higher for these products.

(e) **(LO 3a, 3b)**

(i) Contrast ABC and VCA.

(ii) Explain why VCA would be suitable for Frenz.

4. Fall 2022 Continued

Commentary on Question:
Candidates should demonstrate the understanding that ABC & VCA are complementary approaches with different cost drivers and

- *Frenz's strategy is product differentiation and*
- *Frenz is in the service industry with products that have intangible aspects for which it is often difficult to trace costs,*

(i) ABC and VCA are complementary because their cost drivers are different.

- ABC focuses on resource consumption to reflect the economics underlying the production function and trace the cost of resources consumed to products. ABC focuses on what is driving overhead cost. ABC systems collect costs to functional activity pools and then allocate to products using individual ABC drivers.
- VCA looks at the costs of the core activities that make up the value chain. The value chain is how the firm adds value in each of the core activities through the processes of designing, producing, and delivering a service that customers will pay for. Differences in the way competitors perform these activities are sources of competitive success or failure, so the study of costs in each of the activities is of vital importance.

(ii) Frenz strategy is product/service differentiation. Frenz's competitive advantage is its brand/product awareness.

- Frenz is dominant in the high-end specialty coffee market. Frenz's mission statement focuses on the objective to be the most recognizable coffee brand in the world.
- Product costing issues are compounded in service organizations by the difficulty in defining the service 'product' because of the intangible aspects of many services. A closer alignment of Frenz's responsibility centers with its value chain might be a source of competitive advantage.
- Companies using a differentiation strategy concentrate on the costs of differentiating themselves in the marketplace: transaction costs with suppliers and customers, linkages with other Strategic Business Units, and inter-relationships of costs among the value activities.

4. **Fall 2022 Continued**

Frenz would benefit from VCA by focusing on the costs that differentiate its products:

- Frenz has to manage relationships with the coffee/tea producers, outside trading companies, suppliers and exporters to manage delivery risks and the quality of ingredients. Frenz may want to negotiate trade credit agreements with its suppliers for a value-add to its products.
- Customer loyalty is pertinent to Frenz's business. Frenz continues to expand its popular loyalty card program, which has been effective in preventing other companies from stealing its customers.
- Economic conditions impact the value chain, so Frenz needs to consider.
- Health effects of consuming product is another areas in the value chain that Frenz needs to consider.

8. Fall 2022 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

~~CFEFD-S5-47-21 Dowd, Measuring Market Risk 2nd ed, Ch 13 Stress Testing~~

~~CFEFD-S5-56-21 Gersl and Seidler, How to Improve the Quality of Stress Tests through Backtesting (excl appendices)~~

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

Commentary on Question:

Commentary listed underneath question component.

Solution:

~~(a) Describe two benefits and two challenges of performing stress testing.~~

~~**Commentary on Question**~~:

~~*Acceptable answers include the following. The candidate only needed to write two benefits and two challenges for full credit.*~~

~~Benefits:~~

- ~~Stress Testing is ideal for showing up the vulnerability of a portfolio (and of our VaR calculations) to otherwise hidden risks or sources of error.~~
- ~~Since stress events are usually unlikely, the chances are that the data used to estimate VaR (or ES) will not reveal much about them~~
- ~~The short holding period often used for VaR will often be too short to reveal the full impact of a stress event, so it is important to carry out stress events on loner holding periods~~
- ~~If stress events are rare, they are likely to fall in the VaR tail region, and VaR will tell us nothing about them~~

~~8. Fall 2022 Continued~~

- ~~Assumptions that help to value non-linear positions in normal times might be wide of the mark in a stress situation, so a stress test with full revaluation could reveal considerably more than a second-order approximation VaR~~
- ~~A stress test could take account of the unusual features of a stress scenario and so help reveal exposures that a VaR procedure would often overlook~~
- ~~Stress Testing highlights exposures that other probabilistic or other approaches to risk measurement might easily overlook~~
- ~~Stress Testing can identify situations that would force the institution into insolvency much more explicitly than other methods~~
- ~~Stress Testing is good for identifying and quantifying liquidity exposures~~
- ~~Stress Testing can be useful in identifying the consequences of large market moves~~
- ~~Stress Testing is good for examining the consequences of changes in volatility~~
- ~~Stress Testing can be used to highlight dependences on correlation assumptions~~
- ~~Stress Testing can be useful for highlighting other weaknesses in the risk management set-up~~

~~Challenges:~~

- ~~Stress Testing is generally not as straightforward as it looks.~~
- ~~Stress Testing are based on large numbers of decisions about the choice of scenarios and/or risk factors to stress, how risk factors should be combined, the range of values to be considered, the choice of time frame, etc.~~
- ~~Stress Testing is dependent on the chosen scenarios and thus on the judgment and experience of the people who carry out the tests~~
- ~~Difficult to work through scenarios in a consistent, sensible way without being overwhelmed by a mass of different possibilities.~~
- ~~Need to be able to follow through scenarios, and the consequences of some scenarios can be complex. A trigger event can rapidly lead to many possibilities, which can become unmanageable and want to take account of the interactions of different risks~~
- ~~Must recognize that there are often situations where prices cannot move independently of each other because of violating zero-arbitrage conditions. Need to eliminate all co-movements that are inconsistent with zero arbitrage~~
- ~~Stress Testing can run into computational problems~~
- ~~Stress Testing does not give any indication of likelihood~~

~~8. Fall 2022 Continued~~

(b) ~~Propose a better method for developing stress scenarios than was suggested by your manager. Justify your answer.~~

~~**Commentary on Question**~~:
~~*Acceptable answers include the following answers. The candidate needed to provide one of the answers along with the justification.*~~

~~*Scenario Analysis Options:*~~

~~***Stylized scenarios***~~
~~- Simulated movement in one or more major interest rates, exchange rates, stock prices or commodity prices~~
~~- Can range from moderate changes to extreme~~
~~- Have been used for a long time in ALM~~

~~***Hypothetical one-off events***~~
~~- Plausible hypothetical scenarios with no direct historical precedents~~
~~- Not replays of past historical events, although they would have some similarity with past events~~
~~- Events can be natural, political, legal, economic or financial, credit or liquidity related~~
~~- Can use history of a guidance for what a hypothetical event~~

~~*Mechanical Stress Testing Options:*~~

~~***Factor Push Analysis***~~
~~- Push the price of each individual security or relevant underlying risk factor in the most disadvantageous direction~~
~~- Work out the combined effect of all such changes on the value of the portfolio~~
~~- Relatively easy to program, good for showing up where and how the institution is most vulnerable~~
~~- Does not require restrictive assumptions~~
~~- Can tell us about the likelihood of losses concerned~~
~~- Best for portfolios with straightforward positions~~

~~***Maximum Loss Optimization***~~
~~- Similar to Factor Push, except also searches over intermediate and extreme values of the risk variables~~
~~- Requires more computation and time than Factor Push Analysis~~
~~-Best for portfolios with less straightforward payoff characteristics~~
~~- Can help pick up interactions between different risks that might have been overlooked otherwise~~

~~8. Fall 2022 Continued~~

~~***CrashMetrics***~~
~~- Form of Maximum Loss Optimization designed to estimate worst-case losses~~
~~- Estimate plausible worst-case outcome using some reasonable ad hoc method~~
~~- Approach can be extended to deal with many Greek factors, changes in bid-offer spreads, etc.~~
~~- Application is open to criticism as it relies heavily on ad hoc Greek approximations in situations where those approximations are not likely to be good~~
~~- Is transparent~~

~~(c)~~

~~(i) Estimate the worst-case scenario result using the information provided. Show your work.~~

~~(ii) Explain the estimation method you used in part (i) in the context of scenario analysis.~~

~~Part (i)~~
~~Maximum loss formula under delta-gamma approximation:~~
This means that the maximum loss is equal to

$$Loss^{\max} = -\Pi^{\min} = \frac{\delta^2}{2\gamma}$$

~~delta = 0.5M~~
~~gamma = 4.4M~~

~~Answer:~~
~~(0.5M)^2 / (2 * 4.4M) = 0.25M / 8.8M~~

~~Maximum Loss = 0.03M~~

~~Part (ii)~~
~~Maximum losses under delta-gamma approximation are used in mechanical stress testing, and specifically CrashMetrics, which is a form of Maximum Loss Optimization that is designed to estimate worst-case losses. The approach can be extended to deal with the other Greek factors, changes in bid-offer spreads, etc.~~

~~(d) Evaluate the stress testing results using the information provided.~~

~~**Commentary on Question**:~~
~~*The actual result should compare to the baseline scenario. It indicates the original stress testing does not have enough adverser buffer for the baseline set up. Also, the original stress testing does not include the case where more than one risk factors are shocked, which is what happening in the real case scenario.*~~

~~8. Fall 2022 Continued~~

~~Possible Observations:~~

- ~~The actual result of $6M, where interest rate was 4%, is between the baseline estimate where interest rate was 5% and the stress test result where the rate was 3%.~~
- ~~The actual result of $6M, where market rate was down 2%, is directionally aligned with the market index stress test result.~~
- ~~However, there are likely interactions effects (correlation) between market index and credit, which makes it hard to compare back to actual results.~~
- ~~It is impossible to judge the reasonableness of the credit or operational stress test result since the actual result is not noted.~~
- ~~The original stress testing does not have enough adverser buffer vs. the baseline (sensitivity testing vs. stress testing).~~
- ~~The original stress testing does not include the case where more than one risk factors are shocked, which is what is happening in the real case scenario.~~
- ~~There are other risk elements besides interest, market, credit, and operational that would likely have influenced actuals, too (e.g., expenses, business volume).~~
- ~~The gain/loss metric alone likely does not capture the full impact of the risks being stress tested.~~

~~(e) Design an approach to help validate the hypothesis of senior management. Justify your recommendation.~~

~~**Commentary on Question**:~~
~~*Full marks were given for a reasonably designed test.*~~

- ~~The quick test is to go back to the old stress testing model and run with two stresses or three stresses at once to determine interaction effects.~~
- ~~Because operational risk is non-hedgeable the two drivers of results, as proposed by management, are likely not themselves interacting.~~
- ~~Therefore, looking at pairwise combinations of stress testing vs. actual results and then layering on (additively) the impact of a operational event is a reasonable and quick validation exercise.~~
- ~~If the model projection included hedging, and had an effectiveness assumption, re-run the model with the actual effectiveness or without hedging.~~

~~8. Fall 2022 Continued~~

~~(f) Recommend one improvement to each of the following that accomplishes this goal going forward:~~

~~(i) the current stress testing approach~~

~~(ii) the current scenario set~~

~~Justify your recommendations.~~

~~**Commentary on Question**:~~
~~*Full marks were given for well justified answers.*~~

~~- Run stress tests pairwise every year. This would be able to provide a broader view of the risks with the cross-impact of multiple risk factors.~~
~~- Develop a set of correlation assumptions to use in connection with stress testing results. This would be able to help explain the impact of the movement of more than one risk factor.~~
~~- Segment results to more granular levels. This would help to provide more accurate information when the impact from the movement of certain risk factors is not linear.~~
~~- Identify other major drivers of results, if any, and develop similar scenarios to demonstrate directional impact on results.~~
~~- Calibrate the scenarios relative to each other (e.g., are these all 1 standard deviation shocks vs. 2)~~
~~- Expand the metrics that are captured in the analysis to develop broader insights and more data points against which to assess the reasonableness of the model.~~

(g) **(LO 4a, 4b)**
(i) Describe how predictive modeling could be used to address this challenge.

(ii) Explain why the predictive model could go stale over time.

(iii) Describe three ways to extract a signal indicating that the model might go stale.

Part (i)
In predictive modeling, feature selection can be used to reduce the number of features so that only the most important features will be included in the model inputs. This can effectively improve the performance of the predictive model, and address the runtime issue from the stress testing process.

8. Fall 2022 Continued

Part (ii)
A predictive model will go stale because of concept drift. Because of concept drift, for almost all predictive models, the relationships that they have learned between descriptive features and target features will no longer apply.

Predictive models are based on the assumption that the patterns learned in the training data will be relevant to unseen instances that are presented to the model in the future. However, data is not constant. Ongoing validation is needed after a model is deployed.

Part (iii)
1. Monitoring changes in performance measures
- Repeatedly evaluate models with the same performance measures used to evaluate them before deployment
- If the performance changes significantly, indication concept drift has occurred
- Easiest way to tell whether a model has gone stale
- However, makes the assumption that the correct target feature value for a query instance will be made available shortly after the query has been presented to a deployed model

2. Monitoring model output distribution changes
- Use changes in the distribution of model outputs as a signal for concept drift
- Measure the distribution of model outputs on the test set originally used to evaluate the model and repeat measurement on new sets of query instances collected during periods after the model was deployed
- Use an appropriate measure to calculate the difference between the original distribution and the distributions after deployment
- Common measure used is the stability index
- If stability index value is less than 0.1, the distribution of the newly collected test set is broadly similar to the distribution in the original test set
- Stability index values between 0.1 and 0.25 indicate some change has occurred and further investigation may be useful
- Stability index values greater than 0.25 indicate significant change has occurred and corrective action is required

3. Monitoring descriptive feature distribution changes
- Comparable to the distributions of model outputs between the time the model was built and after deployment, a similar comparison for the distributions of the descriptive features used by the model
- Appropriate measures to capture the difference include stability index, chi-square statistic, and the K-S statistic

2. Spring 2022 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

CFEFD-S5-52-21 Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics 2nd Ed, Ch. 9 Evaluations

~~CFEFD-S5-60-21 Bohme et al., A Fundamental Approach to Cyber Risk Analysis~~

Case Study - Snappy

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:

(a) **(LO 4a, 4b)** 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. Spring 2022 Continued

(b) **(LO 4a, 4b)**

(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 x .2 x (1-.6) = 800
TN = 10,000 x .2 x .6 = 1,200
FP = 10,000 x .45 – 800 = 3,700
TP = 10,000 – 800 – 1,200 – 3,700 = 4,300

(c) **(LO 4a, 4b)**

(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. Spring 2022 **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) **(LO 4a, 4b)** 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. Spring 2022 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. Spring 2022 CFE FD Exam (LOs 1a, 1b)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

Sources:

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

~~Corporate Finance, Fifth Edition, Chapter 27 Short-term Financial Planning – Jonathan Berk and Peter Demarzo~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8^{th} Edition, Ch 22: Leases

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8^{th} Edition, Ch 40: Flexibility

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 27: Cross Border Valuation (excluding "Using Translated Foreign-Currency Financial Statements" section)

Case Study – Frenz

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) **(LO 1a, 1b)**

(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.

3. Spring 2022 Continued

(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.

(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 preferrable.
    - 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 preferrable.

(ii) Since the present value of the difference between leasing less buying is positive, leasing is preferrable. Frenz should lease the store fronts.

3. Spring 2022 Continued

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%

Buy (Unit Euros in Millions)	Year										
	0	1	2	3	4	5	6	7	8	9	10
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)	Yr 0	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
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.

3. Spring 2022 Continued

(b) **(LO 1a, 1b)** 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.

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**~~:

~~3. Spring 2022 Continued~~

~~*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.*~~

~~(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).*~~

~~(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.~~

~~3. Spring 2022~~ ~~Continued~~

~~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.~~

2. ~~Commercial paper: Short-term, unsecured debt used by large corporations that is usually a cheaper source of funds than a short-term back 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. Spring 2022 CFE FD Exam (LOs 2a, 2b)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

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

~~CFEFD-S1-04-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 25: Leasing~~

Case Study – Blue Jay Air (BJA)

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a) **(LO 2a)**
(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. Spring 2022 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) (**LO 2a)**
(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. Spring 2022 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. Spring 2022 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 lese 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) **(LO 2a, 2b)** 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) **(LO 2a, 2b)**

(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. Spring 2022 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. Spring 2022 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 it's 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. Spring 2022 CFE FD Exam (LOs 2a, 2c)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

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

Case Study - Frenz

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 county 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. Spring 2022 Continued

Solution:

(a) **(LO 2c)** 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) **(LO 2c)**

(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) 2020 Mobucks	(B) 2020 Restatement Factor	(C) 2020 Exchange Rate	(D) 2020 Euros (A)*(B)*(C)	(E) 2019 Mobucks	(F) 2019 Restatement Factor	(G) 2019 Exchange Rate	(H) 2019 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) = (D	25.0%							
(14) Net Income Growth (Euros) = (D5)/(H5	35.0%							
(15) Revenue Growth (Mobucks) = (A6)/(E6	110.2%							
(16) Operating Income Growth (Mobucks) =	177.8%							
(17) Net Income Growth (Mobucks) = (A5)/	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. Spring 2022 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) **(LO 2c)**

(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 years = $25,000

Tax Depreciation: $250,000/7 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. Spring 2022 **Continued**

(d) **(LO 2a, 2c)**

(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 years = $25,000

Tax Depreciation: $250,000/7 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) **(LO 2a, 2c)** Evaluate whether any of the information provided in part b, item 1 through 6, seems unlikely to be accurate.

5. Spring 2022 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.

9. Spring 2022 CFE FD Exam (LOs 3a, 3b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate costs and how these methods can distort perceived performance

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

~~S3-23 Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 10: Criticisms of Absorption Cost Systems: Incentive to Overproduce~~

~~S3-24 Zimmerman, Accounting for Decision Making and Control 10th Ed, Ch 11: Criticisms of Absorption Cost Systems: Inaccurate Product Costs~~

~~S3-25 Zimmerman, Accounting for Decision Making and Control 10th Ed Ch 12: Standard Costs: Direct Labor and Materials~~

Case Study - Frenz

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. Spring 2022 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) **(LO 3a, 3b)**

(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. Spring 2022 Continued

(c) **(LO 3a, 3b)**

(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. Spring 2022 **Continued**

(d) **(LO 3a, 3b)** 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. Spring 2022 CFE FD Exam (LOs 3a, 3b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate costs and how these methods can distort perceived performance

Sources:

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

~~S1-09: CFEFD-S1-09-21 Aswath Damodaran, Damodaran on Valuation, Ch 15: The Value of Synergy~~

Case Study – Blue Jay Tire (BJT)

Commentary on Question:

The question is evaluating ~~M&A~~ transfer pricing 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. Spring 2022 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. Spring 2022 Continued

(b) **(LO 3a, 3b)**

(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) **(LO 3a, 3b)** 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. Spring 2022 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

1. Fall 2021 CFE FD Exam (LOs 1a, 1b)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

Sources:

~~CFEFD-S1-02-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 18: Capital Budgeting and Valuation with Leverage~~

~~CFEFD-S1-07-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 31 International Corporate Finance~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 10: Framework for Valuation (excluding "Problematic Modifications to Discounted Cash Flow" and "Alternatives to Discounted Cash Flow" sections)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch . 27: Cross Border Valuation (excluding "Using Translated Foreign-Currency Financial Statements" section)

~~CFEFD-S5-44-21 Hubbard, How to Measure Anything 3rd Ed, Ch 9: Sampling Reality: How Observing Some Things Tells Us About All Things~~

~~CFEFD-S5-46-21 Dowd, Measuring Market Risk 2nd ed, Ch 9 Applications of Stochastic Risk Measurement Methods~~

1. Fall 2021 Continued

Commentary on Question:

Solution:

(a) **(LO 1a, 1b)**

(i) Calculate Company X's Weighted Average Cost of Capital (WACC). Show your work.

(ii) Recommend which proposal Company X should accept using the projection information above, Company X's WACC and the current Spot exchange rate. Show your work and justify your recommendation.

(i) (300 / 500) * .12 + (200 / 500) * .05 * (1 - .21) = 8.78%

(ii) This is best done by comparing NPVs, and this is best done by looking at Free Cash Flows calculated from an income statement. Based on NPVs take proposal B

Checking the NVP for manufacture in US, Proposal A

Units are in Millions in USD

Year	0	1	2	3	4	5	6	7	8	9	10
Sales(Convert to USD)		40.00	42.00	44.10	46.31	48.62	51.05	53.60	56.28	59.10	62.05
Cost of Goods Sold		(20.00)	(21.00)	(22.05)	(23.15)	(24.31)	(25.53)	(26.80)	(28.14)	(29.55)	(31.03)
Gross Profit	-	20.00	21.00	22.05	23.15	24.31	25.53	26.80	28.14	29.55	31.03
Expenses (Operating)	-	(8.00)	(8.40)	(8.82)	(9.26)	(9.72)	(10.21)	(10.72)	(11.26)	(11.82)	(12.41)
Depreciation	-	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)	(1.60)
EBIT	-	10.40	11.00	11.63	12.29	12.99	13.72	14.48	15.29	16.13	17.02
Income Tax @ 21%	-	(2.18)	(2.31)	(2.44)	(2.58)	(2.73)	(2.88)	(3.04)	(3.21)	(3.39)	(3.57)
Unlevered Net Income	-	8.22	8.69	9.19	9.71	10.26	10.84	11.44	12.08	12.74	13.44
Free Cash Flow											
Plus Depreciation		1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Less: Capital Expenditures	(36.00)										
Less: Increases in NWC											
Free Cash Flow In USD	**(36.0)**	**9.816**	**10.290**	**10.788**	**11.310**	**11.859**	**12.435**	**13.040**	**13.675**	**14.342**	**15.043**
Discount at WACC	(36.0)	9.0	8.7	8.4	8.1	7.8	7.5	7.2	7.0	6.7	6.5
Total NPV Proposal A	**40.887**	41.08	43.45	45.94	48.55	51.29	54.18	57.20	60.38	63.71	67.21

1. Fall 2021 Continued

Check the NPV of Manufacturing in Country Y, Proposal B											
Units are in Millions in Tatl											
Year	0	1	2	3	4	5	6	7	8	9	10
Sales		200.00	210.00	220.50	231.53	243.10	255.26	268.02	281.42	295.49	310.27
Cost of Goods Sold		(60.00)	(63.00)	(66.15)	(69.46)	(72.93)	(76.58)	(80.41)	(84.43)	(88.65)	(93.08)
Gross Profit	-	140.00	147.00	154.35	162.07	170.17	178.68	187.61	196.99	206.84	217.19
Operating	-	(20.00)	(21.00)	(22.05)	(23.15)	(24.31)	(25.53)	(26.80)	(28.14)	(29.55)	(31.03)
Depreciation	-	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)	(10.00)
EBIT	-	110.00	116.00	122.30	128.92	135.86	143.15	150.81	158.85	167.29	176.16
Income Tax @ 34%	-	(37.40)	(39.44)	(41.58)	(43.83)	(46.19)	(48.67)	(51.28)	(54.01)	(56.88)	(59.89)
Unlevered Net Income	-	72.60	76.56	80.72	85.08	89.67	94.48	99.54	104.84	110.41	116.27
Free Cash Flow											
Plus Depreciation		10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Less: Capital Expenditures	(220.00)										
Less: Increases in NWC											
Free Cash Flow In Tatl	**(220.00)**	**82.60**	**86.56**	**90.72**	**95.08**	**99.67**	**104.48**	**109.54**	**114.84**	**120.41**	**126.27**
Free Cash Flow in USD	(44.00)	16.52	17.31	18.14	19.02	19.93	20.90	21.91	22.97	24.08	25.25
Discount at WACC	(44.000)	15.187	14.630	14.095	13.581	13.087	12.612	12.155	11.715	11.292	10.885
Total NPV Proposal B	**85.239**										

(b) **(LO 1a, 1b)** Assess the appropriateness of the decision made in part (a)(ii). Justify your answer.

Using the current spot rates and WACC which is the same for each country, the profit over the next 10 years is highest in proposal B, which involved making the goods in country Y. However, this is based on the current spot rates and does not consider the risk that is involved with inflation or exchange rates, and does not consider that operational risks given this will be the first time company X takes on a proposal like this of building in a foreign country. Therefore, more should be considered and analyzed before choosing proposal B based on the current projected profits.

~~(c) Explain how the 95th percentile for exchange rates will change as Company X learns more information about the Country Y exchange rate.~~

~~As more information becomes known, the exchange rate will become more stable rather than largely uncertain as it is now. This will impact the 95th percentile by making it more precise, and could move it up or down depending on the type of information learned.~~

~~(d) Explain two shortfalls of your modeling approach.~~

~~1. Fall 2021 Continued~~

1. ~~The COGS and exchange rates scenarios are independent, but in reality, we can expect there to be some correlation between them.~~
2. ~~The 95th percentile VaR is not coherent and it ignores tail risk, which may distort the results of the scenarios given the company is concerned with large losses and these may not be captured by choosing a single pointing he risk distribution.~~

~~(e)~~

~~(i) Explain how Company X could use its model to establish a stop-loss strategy for operating in Country Y.~~

~~(ii) Explain how the size of the loss limit impacts the modeled VaR.~~

~~(i) If a stop-loss strategy is in place, company X would stop operations in country Y if losses were to exceed a certain number. This would mitigate further losses by the company rather than continued operations that are not profitable.~~

~~(ii) Stop-loss reduces the tail risks in the distribution by limiting losses above a certain number. If the loss is set at a value that is below the current VaR, this would decrease the modeled VaR to be capped at the limit of the stop-loss strategy. However, if the stop-loss is set at a number that is above the current VaR, then VaR would not change as it ignores the risks in the tail beyond the chosen percentile.~~

4. Fall 2021 CFE FD Exam (LOs 1b, 1c, 2a, 2c)

Learning Objectives:

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

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

Learning Outcomes:

(1b) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

Sources:

CFEFD-S2-17-21 Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 15 Multinational Operations

~~CFEFD-S1-07-21 Jonathan Berk and Peter Demarzo, Corporate Finance, Fifth Edition, Ch 31 International Corporate Finance~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch . 27: Cross Border Valuation (excluding "Using Translated Foreign-Currency Financial Statements" section)

CFEFD-S2-14-21 Robinson et al., International Financial Statement Analysis 4th Ed, Ch. 6 Financial Analysis Techniques

Case Study - Frenz

Commentary on Question:

This question tests the general understanding of translation methods and why to choose one method over another. Understanding of the implications of high inflationary economies on the translation method.

4. Fall 2021 Continued

Solution:

(a) **(LO 2c)** State four reasons why Mobia's local currency, Mobucks, should be the functional currency for Ishmael instead of Euros.

Commentary on Question:
Candidates are expected to list four valid reasons to receive full credits. Most of candidates were able to list three to four out of the list below and received most of the credits.

- It is the currency that mainly influences sales prices for goods and services.
- It is the currency of the country whose competitive forces and regulations mainly determine the sales price of its goods and services.
- It is the currency that mainly influences labor, material, and other costs of providing goods and services.
- It is the currency in which receipts from operating activities are usually retained.
- The activities of Ishmael roasters are carried out with a significant amount of autonomy.
- Transactions with Frenz are not a large proportion of Ishmael Roasters' activities.

(b) **(LO 2c)**

(i) Identify the appropriate currency translation method.

(ii) Explain how to translate each of assets, liabilities, equity, revenue and expenses.

Commentary on Question:
Candidates are expected to correctly identify the current rate method and correctly list how to translate each item to receive full credit. Candidates scored well in this part.

(i) Foreign currency is the functional currency - this means the current rate method is appropriate.

(ii) Assets and Liabilities - translated at the current exchange rate at the balance sheet date.

Equity - translated at historical exchange rates.

Revenues and expenses - translated at the exchange rate that existed when the transactions took place. For practical reasons, a rate that approximates the exchange rates at the dates of the transactions, such as an average exchange rate, may be used.

4. Fall 2021 Continued

(c) **(LO 1b, 1c)** Explain the advantage that being a subsidiary of Frenz brings Ishmael from a funding perspective.

Commentary on Question:
Candidates are expected to answer Ishmael's advantage from a funding perspective.

Association with Frenz should lower Ishmael Roasters cost of funding relative to other firms who are less well known.

As Frenz is a well known public company that regularly provides investors and analysts information, debt and equity holders will be likely to charge less for access to capital as there is a lower likelihood of asymmetric information.

"In some cases, a country's risk-free securities are internationally integrated but markets for a specific firm's securities are not. Firms may face differential access to markets if there is any kind of asymmetry with respect to information about them.'

(d) **(LO 2c)**
(i) Describe the implications of the prior year's price index change on the translation of Ishmael's financial statements.

(ii) Explain how the translation of the financial statements will differ from part (b)(ii).

Commentary on Question:
Candidates are expected to identify Mobia as highly inflationary economy and answer based on that. Most candidates scored okay in part (i) but only some candidates were able to provide a complete explanation for part (ii)

(i) Mobia is considered a 'highly inflationary economy', which makes the 'entity's function currency irrelevant in determining how to translate its foreign currency financial statements into the parent's presentation currency'

This is known because the general price index increased by 125% in a one year period.
'IAS 29 indicates that a cumulative inflation rate approaching or exceeding 100% over three years would be an indicator of hyperinflation.'

(ii) IFRS requires the foreign entity's financial statements first be restated for local inflation' … 'then, the inflation restate foreign currency financial statements are translated into the parent's presentation currency using the current exchange rate.'

4. Fall 2021 Continued

(e) **(LO 2c)** Assess if Ishmael had a purchasing power gain or loss in 2020 from the price index change. Justify your response.

Commentary on Question:
Candidates are expected to compare the monetary liabilities and monetary assets over the year and then come up with the assessment to receive full credit. Simply stating purchasing power gain/loss due to inflation lost most credit in the part.

'A net purchasing power gain will arise when a company holds a greater amount of monetary liabilities than monetary assets, and a net purchasing power loss will result when the opposite situation exists'

Ishmael roasters had a purchasing power loss during 2020.
Monetary liabilities (accounts payable) were less than monetary assets (cash) over the year.

(f) **(LO 1b, 1c)** Explain how the above action would impact the methodology of calculating the NPV of Ishmael distributable earnings.

Commentary on Question:
Candidates are expected to touch on both converting cashflow using forward exchange rate and use the appropriate WACC to receive full credit. About half of the candidates didn't mention the cashflow conversion and only received partial credit.

Frenz will need to separate the cash flows by currency and convert using the forward exchange rate (either convert Euro based free cash flows to Mobucks or Mobucks free cash flows to Euro). Then use the appropriate WACC to discount the free cash flows.

~~Whenever a project has cash flows that depend on the values of multiple currencies, the most convenient approach is to separate the cash flows by currency.' … the reading continues with an example of how to split free cash flows and adjust using the forward exchange rate, before discounting at the WACC.~~
Conversion of future cash flows should be done only at forward exchange rates that are consistent with the interest and inflation rates used in your valuation. Otherwise, valuation results are likely to differ depending on the currency used in the cash flow projections. Do not rely on "forecast" exchange rates for your projections, as these rates could induce a bias in your valuation if they are not consistent with your assumptions on inflation and discount rates.

(g) **(LO 2a, 1b, 1c)** Calculate the impact to Frenz's 2020 current ratio and debt-to-assets ratio from incorporating Ishmael into its financials. Show your work.

4. Fall 2021 Continued

Commentary on Question:
Candidates are expected to 1)Adjust inflation 2)Apply the exchange rate and then do the ratios calculation to receive full credit. Most candidates adjusted exchange rate but very few candidates include the inflation adjustment in the calculation. Most candidates scored partial marks from correctly calculating the current ratio and D/E ratio for Frenz before incorporating Ishmael, some candidates received more credit from including fx in the after incorporating Ishmael calculation.

High Inflationary Translation Method

Mobucks in thousands	**Dec. 31, 2020**	Restatement Factor	Inflation Adjusted	Exchange Rate	Euros
Cash	1,000	1	1000	0.5	500
Inventory	500	1.5=150/100	750	0.5	375
Property	5,000	2.25=225/100	11250	0.5	5625
Accounts Payable	800	1	800	0.5	400

	General Price Index	**Euro per Mobucks**
12/31/2019	100	1
Average	150	0.7
12/31/2020	225	0.5

Frenz Current Ratio:
Current Assets = 33,888
Current Liabilities = 18,500
Current Ratio = 1.83180

Incorporating Ishmael Roasters:
Current Assets = 34,763
Current Liabilities = 19,300
Current Ratio =1.801

Current Ratio Impact: -0.031

Frenz Debt-to-Assets Ratio:
Total Assets = 311,803
Total Liabilities = 152,900
Debt-to-Assets Ratio = 0.490

4. Fall 2021 Continued

Incorporating Ishmael Roasters:

Total Assets =	318,303
Total Liabilities =	153,300
Debt-to-Assets Ratio =	0.482

Debt-to-Assets Impact: -0.009

5. Fall 2021 CFE FD Exam (LOs 2a, 2b, 2c)

Learning Objectives:
2. The candidate will understand how to gauge an organization's performance through an evaluation of its financial reports.

Learning Outcomes:
(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

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

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

Case Study – Blue Jay Air (BJA)

Commentary on Question:
Most candidates received limited credit on the calculation aspects of the question, but did well making a recommendation.

Solution:
(a) **(LO 2c)** Define the following tax related concepts:

(i) Deferred Tax Asset (DTA)

(ii) Income Tax Payable

(iii) Tax Expense

(iv) Tax Base

Commentary on Question:
Many candidates received partial credit. Most commonly, not enough detail was provided to distinguish between the income tax payable and the income tax expense.

5. Fall 2021 Continued

- **Deferred Tax Asset (DTA):** an amount on the balance sheet arising when an excess amount is paid for income taxes and the company expects to recover the difference

- **Income Tax Payable:** a balance sheet items representing taxable income times the company's current tax rate

- **Tax Expense:** an income statement item that aggregates income tax payable and includes changes to DTA/DTL
- **Tax Base:** the amount at which an asset or liability is valued under accounting principles

(b) (**LO 2c)**

(i) Critique the consultant's comment.

(ii) Calculate the change in DTA/DTL related to this project from 12/31/2021 to 12/31/2022 assuming the tax rate will change from 21% to 28% on 1/1/2022. Show your work.

Commentary on Question:
Most candidates critiqued some aspects of the consultant's comment but did not include enough detail to receive full credit.

Some candidates correctly calculated the DTA/DTL under a 21% tax rate but most did not appropriately account for both the change in tax rate and the change in time period.

(i) There was a temporary difference created instead of a permanent difference, and the difference is a tax and reporting expense, not revenue item. In addition, the carrying amount is higher than the tax base, which should create a DTA instead of a DTL. Finally, without a permanent difference, there should be no impact on the effective tax rate.

(ii) The reporting depreciation schedule is \$100M/year but the taxable depreciation is \$1750M/25 years = \$70M/year. A DTA is created.

	1/1/2021	12/31/2021	12/31/2022
Carrying Amount	\$1750M	\$1650M	\$1550M
Tax Base	\$1750M	\$1680M	\$1610M

On 12/31/2021, the DTA is \$6.3M = 21% * (\$1680M - \$1650M)
On 12/31/2022, the DTA is \$16.8M = 28% * (\$1610M - \$1550M)

So, the change in DTA is \$16.8 - \$6.3M = \$10.5M.

5. Fall 2021 Continued

(c) **(LO 2c)** Determine how this estimation will impact the DTA/DTL under both IFRS and USGAAP. Show your work.

Commentary on Question:
Many candidates did not answer this part. Those that did often made a general comment about US GAAP that received limited credit.

Based on the difference between the depreciation schedule, taxable income must exceed $30M/year to fully recognize the DTA.

	Scenario 1	**Scenario 2**	**Scenario 3**
Revenue	305	270	235
Annual Maintenance Cost	-2	-2	-2
Additional Annual Expenses	-60	-60	-60
Depreciation	-100	-100	-100
Interest Expense	-65	-65	-65
Taxable Income	78	43	8

Under IFRS, the carrying amount should be reduced because sufficient taxable profit is no longer probably to recognize the full amount of the DTA, but the reduction can be reversed if subsequent taxable profit becomes probable.

Under US GAAP, a valuation allowance should be set-up to reduce the DTA because it is more likely that the taxable income will not be sufficient to realize all the DTA.

(d) **(LO 2a, 2b)** Evaluate if the following options will achieve managements' objectives. Explain your answer.

(i) Adopt an accelerating depreciation method so that the aircraft depreciation will be $35m more for the year of 2021

(ii) Invest $35m in the Luxury Lounges

(iii) Purchase $35m of additional fuel

(iv) Invest $35m to enhance data analytic capabilities

(v) Pay out $35m in restricted stock units (RSU) with 1/4 vesting each year starting on 12/31/2022

5. Fall 2021 Continued

Commentary on Question:
Many candidates did well on this part. To receive full credit, candidates must include a statement about each of the three management's objectives on all five options. Other answers received credit as long as they were well-reasoned.

1. Accelerating depreciation
    - **Objective A:** achieves objective because it increases depreciation cost in the current year, lowering earnings
    - **Objective B:** does not achieve objective because the accounting choice is not consistent with prior periods
    - **Objective C:** achieves objective because accelerated depreciation this year will result in lower depreciation in future years and thus higher earnings in future years.

2. Luxury Loungers
    - **Objective A:** does not achieve objective because the expense would be capitalized and not impact this year's earnings
    - **Objective B:** achieves objective because financial reporting quality is not changed
    - **Objective C:** achieves objective because additional revenue will be gained in future years due to the investment in the loungers

3. Purchase additional fuel
    - **Objective A:** does not achieve objective because air fuel expense is the cost of fuel consumed
    - **Objective B:** achieves objective because financial reporting quality is not changed
    - **Objective C:** achieves objective because future expense on air fuel will be decreased

4. Invest $35m to enhance data analytic capabilities

    - **Objective A:** achieves objective if the enhancement is implemented this year because the expense would be recognized
    - **Objective B:** achieves objective because financial reporting quality is not changed
    - **Objective C:** achieves objective because future earnings could be improved by better analytics on marketing and pricing

5. Fall 2021 Continued

5. Pay out RSU
    - **Objective A:** achieves objective because the three-year vesting period will partially reduce 2022 income.
    - **Objective B:** achieves objective because financial reporting quality is not changed
    - **Objective C:** achieves objective because RSU aligns the interests of the employees with BJA which should increase future productivity and earning levels

(e) **(LO 2a, 2b)** Recommend which option from part (d) BJA should choose. Justify your recommendation.

Commentary on Question:
Most candidates received full credit on this part. Multiple answers were accepted as long as the answer was well-reasoned and consistent with the candidate's response from part (d).

Option iv is recommended because it meets all three objectives. Furthermore, the increase in earnings due to better pricing and route planning could significantly outweigh the $4M from the Luxury Loungers.

7. Fall 2021 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

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

Commentary on Question:

Candidates should understand the basic techniques for evaluating a machine learning model, create metrics (e.g. confusion matrix) to compare model candidates as well schemes to prevent concept drift after deployment. Most candidates did well on the retrieval part of the question; and scored well on the confusion matrix.

- *Quite some candidates performed poorly on the question b.2 which was asking for the precision and recall rates. The graders felt that candidates were confused about the definitions; and did precision something else instead of TP/(TP+FP); similar mistake was for the recall rate.*
- *For c.2, half candidates misunderstood the question; and failed to recognize the question was intended to test the hypothesis based on the provided data in a false positive and false negative fashion.*

For d3, this question was to test the concept drift in real application. And the model did suffer a great bias due to the underlying data changes. Many candidates failed to recognize the shift in patterns; and did not realize the number of target and predicted claims that are low, and in the new dataset, the number of target low-probability transaction have stayed about the same whereas the number of predicted low-probability transactions have increased.

7. Fall 2021 Continued

Solution:

(a) **(LO 4a, 4b)**

(i) Describe each approach I - III.

(ii) Evaluate whether each of I - III is appropriate for the data science team to use. Justify your response.

Part i

Hold-out sampling

Hold out some of the data from the training set as a test set to see if the model, as developed from the training set, works for the test set of data. Can also have a third data set as the validation set to tune particular aspects of a model.

There are no fixed recommendations for how large the different datasets should be when hold-out sampling is used, although training validation: test splits of 50:20:30 or 40:20:20 are common.

k-fold cross validation

When k-fold cross validation is used, the available data is divided into k equal-sized folds, and k separate evaluation experiments are performed.

Bootstrapping

Bootstrapping is preferred when the datasets are small. Similar to k-fold cross validation, bootstrap iteratively performs multiple evaluation experiments using slightly different training and test sets each time to evaluate the expected performance of a model. To generate these partitions for an iteration of the bootstrap, a random selection of m instances is taken from the full dataset to generate a test set, and the remaining instances are sued as the training set.

Part ii

Since we have 10,000 samples in the dataset which is sufficiently large. Hold-out sampling is most appropriate when we have very large datasets and since the data science team is given 10,000 data samples, this is an appropriate approach. This ensures that the training, validation and test set are sufficiently large to train an accurate model and fully evaluate the performance of that model.

K-fold cross validation may be better than hold-out sampling as we are supplied with sufficiently large dataset and it could avoid the 'lucky split' phenomenon which could exist using hold-out sampling.

7. **Fall 2021 Continued**

Bootstrapping would be not an appropriate approach here since we have a large dataset.

(b) **(LO 4a, 4b)** Based on the model results of 100 data samples provided in the Excel spreadsheet:

(i) Create a confusion matrix. Show your work.

(ii) Calculate the model's precision and recall. Show your work.

(iii) Evaluate the model based on your results.

Part i

		Prediction	
		Fraudulent	Legitimate
Target	Fraudulent	25	13
	Legitimate	46	16

Part ii

Precision is defined as TP/(TP+FP)	35.21%
Recall is defined as TP/(TP+FN)	65.79%

Part iii

This model is not good at all based on the confusion matrix, precision, and recall. It has very low precision and its recall isn't very high. Improvement is required.

(c) **(LO 4a, 4b)**

(i) Describe how the confusion matrix from part b) would change under these new categorizations.

(ii) Assess the thresholds given in the new sample dataset provided in the Excel spreadsheet. Justify your assessment.

7. Fall 2021 Continued

Part i
This enhancement will require the data science team to build a multinomial prediction model whereby three classification exists:
(1) High
(2) Medium
(3) Low

The updated confusion matrix will be as follows:

		Prediction		
		High	Medium	Low
Target	High			
	Medium			
	Low			

Part ii
The team can only handle 25% of claims investigation. That is, for 100 claims, they can only handle up to 25 claims.
Based on the sample dataset, we see that 35% of the claims require claim handling, therefore we need to adjust either threshold so that the total 'Maybe Fraudulent' claims predicted reduces

Total Transaction	100
Medium	36
% claims required to be handled	36%

(d) **(LO 4a, 4b)**

(i) Define concept drift.

(ii) Recommend one ongoing model validation scheme that could prevent concept drift.

(iii) Assess whether you observe concept drift in the 100 new data points (provided in the Excel spreadsheet). Justify your assessment.

Part i
Concept Drift
Predictive models are based on the assumption that the patterns learned in the training data will be relevant to unseen instances that are presented to the model in the future. Data, however, like everything else, is not constant. Concept drift means that almost all the predictive models that we build will at come point go stale, and the relationships that they have learned between descriptive features and target features will no longer apply.

7. Fall 2021 Continued

Part ii
To monitor the ongoing performance of a model, we need a signal that indicates that something has changed.
There are three sources from which we can extract such a signal:
(1) The performance of the model measured using appropriate performance measures
(2) The distributions of the outputs of a model
(3) The distributions of the descriptive features in query instances presented to the model

The simplest way to get a signal that concept drift has occurred is to repeatedly evaluate models with the same performance measures
used to evaluate them before deployment.

We can calculate performance measures for a deployed model and compare these to the performance achieved in evaluations before
the model was deployed.
If the performance changes significantly, this is a strong indication that concept drift has occurred and that the model has gone stale.

For example, if we used precision/recall and misclassification rate on a hold-out sampling set to evaluate the performance of model
FDM v1.0 before deployment, we could collect all the query instances presented to the model for a period after deployment and calculate
the performance measures.
A large change in the performance measures would flag that the model has gone stale.

Part iii
By comparing the number of target and predicted claims that are low, we notice in the new dataset, the number of target low-probability transaction have stayed about the same whereas the number of predicted low-probability transactions have increased. This is a sign that our model is suffering from concept drift.

	Target_Low	Prediction_Low
Old dataset	41	59
New dataset	39	73

7. Fall 2021 Continued

Original Confusion Matrix

		Prediction			
		High	Medium	Low	**Total**
Target	High	4	12	0	**16**
	Medium	1	23	19	**43**
	Low	0	1	40	**41**
	Total	**5**	**36**	**59**	**100**

Other Metrics

	High	Medium	Low
Recall	25%	53%	98%
Precision	80%	64%	68%
Overall Accuracy		67%	
Average Class Accuracy		44%	

New Confusion Matrix

		Prediction			
		High	Medium	Low	**Total**
Target	High	3	13	1	**17**
	Medium	0	10	34	**44**
	Low	0	1	38	**39**
	Total	**3**	**24**	**73**	**100**

Other Metrics

	High	Medium	Low
Recall	18%	23%	97%
Precision	100%	42%	52%
Overall Accuracy		51%	
Average Class Accuracy		27%	

8. Fall 2021 CFE FD Exam (LOs 2a, 2b)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

Sources:

~~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 12: Standard Costs: Direct Labor and Materials~~

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

Case Study – Blue Jay Tire (BJT)

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) **(LO 2a, 2b)**

(i) Explain why one would question BJT's 2020 financials.

~~(ii) Describe how a dysfunctional incentive created by absorption cost systems may lead to the problem discussed in i).~~

8. Fall 2021 Continued

Commentary on Question:
Candidates should always seek to tie their answers back to the Case Study when answering. The best candidates were also able to specifically call out impacts to the income statement and balance sheet.

(i) Explain why one would question BJT's 2020 financials.

BJT's Total Gross Sales and Total Costs of Sales move in the same direction in all years except 2020.

Pay attention to revenues: Look at revenue relationships; examine trends for unusual changes and seek an explanation if they exist;

BJT's Inventory increases in 2020.

Pay attention to signals from inventories. Look at inventory relationships. Because revenues involve items sold from inventory, the kind of examination one should perform on inventory is similar to that for revenues.

Cost of Raw Materials has declined, due to volume discounts from the rubber supplier;

Production Costs, which include overhead costs, have leveled off; Inventory has increased.

~~(ii) Describe how a dysfunctional incentive created by absorption cost systems may lead to the problem discussed in i).~~

~~Absorption cost systems create incentives for managers to produce more than they sell (incentive to overproduce).~~

~~Absortion cost systems spread all manufacturing costs (including fixed costs) against all units produced.~~

~~When more units are produced than sold, some fixed costs are inventoried on the Balance Sheet.~~

~~Increasing the number of units in inventory increases the fraction of fixed costs in inventory. With more fixed costs in inventory, less fixed costs are transferred to the income statement.~~

~~Increasing production while holding sales constant causes average unit costs to fall and profit per unit sold to increase.~~

~~8. Fall 2021 Continued~~

~~(b) Describe how a company may use Standard Costs for:~~

~~(i) Decision making.~~

~~(ii) Control.~~

~~**Decision Making**~~
~~Firms use standard costs to convey information about alternative uses of scarce resources.~~

~~Standard costs are useful in making decisions on product pricing, outsourcing, and resource allocation.~~

~~Standard costs are used in contract bidding and assessing alternative production technologies.~~

~~**Control**~~
~~Managers can gauge performance by comparing actual costs against standard costs.~~

~~Variances provide useful information in determining whether the production system is operating as expected.~~

~~Variances alert senior managers that something is amiss.~~

~~Variances provide information for performance evaluation.~~

~~(c)~~

~~(i) Calculate the total materials variance in terms of price variance and quantity variance. Show your work.~~

~~(ii) Calculate the total labor variance in terms of wage variance and efficiency variance. Show your work.~~

~~(iii) Interpret the results in (i) and (ii).~~

~~**Commentary on Question**:~~
~~*While the calculation was important, the interpretation is also important. Sample interpretations are included below.*~~

~~8. Fall 2021 Continued~~

~~**(i)**~~
~~Total Materials Variance = Price Variance + Quantity Variance~~

~~Price Variance = (Actual Price - Standard Price) x Actual Quantity = (23 - 25) x 2826 = -5652~~

~~Quantity Variance = (Actual Quantity - Standard Quantity) x Standard Price = (2826 - 2300) x 25 = 13150~~

~~Total Materials Variance = -5652 + 13150 = 7498~~

~~**(ii)**~~
~~Total Labor Variance = Wage Variance + Efficiency Variance~~

~~Wage Variance = (Actual Wage - Standard Wage) x Actual Hours = (15 - 20) x 3500 = -17500~~

~~Efficiency Variance = (Actual Hours - Standard Hours) x Standard Wage = (3500 - 3000) x 20 = 10000~~

~~Total Labor Variance = -17500 + 10000 = -7500~~

~~**(iii)**~~
~~The unfavorable Total Materials Variance was due to the unfavorable Quantity Variance, partially offset by the favorable Price Variance.~~

~~Quantity Variance was unfavorable because Actual Quantity exceeded Standard Quantity; Price Variance was favorable because Actual Price was less than Standard Price.~~

~~The favorable Total Labor Variance was due to the favorable Wage Variance, partially offset by the unfavorable Efficiency Variance.~~

~~Wage Variance was favorable because Actual Wage was less than Standard Wage; Efficiency Variance was unfavorable because Actual Hours exceeded Standard Hours.~~

~~8. Fall 2021 Continued~~

~~(d) Explain why BJT should be concerned about favorable variances, providing two reasons based on its risk profile.~~

~~**Commentary on Question**:~~
~~*Similar answers for favorable materials quantity variance were acceptable (e.g. skimping on the quantity of inputs may lead to the production of lower quality tires)*~~

~~**Favorable materials price variance.**~~

~~Favorable materials price variance could mean that lower quality materials were used in production, resulting in lower quality tires~~

~~BJT must constantly assure that its products are of the highest quality because one of its primary strengths is its brand name. The risk of a tire recall or litigation and the resulting damage to BJT's brand, reputation, and financials are not worth the price savings of using lower quality materials.~~

~~Lower quality materials will result in lower quality tires and increased claims under the warranty program that BJT introduced which provides free tire replacement for five years from the purchase date of every tire. Using low quality materials will significantly increase the cost of the warranty program and will not be worth the input price savings.~~

~~**Favorable wage (or labor efficiency) variance.**~~

~~Favorable wage variances can indicate that less-skilled, lower-paid employees were used.~~

~~BJT should be concerned about the cost of a unionized labor force which could lead to contentious labor issues. A favorable wage variance is likely not worth the increased labor cost or potential disruption in the workforce at BJT plants that could accompany unionization.~~

~~Favorable wage variance or favorable wage efficiency variance can also compromise product quality.~~

~~All variances must be analyzed as an integrated whole. A favorable materials price variance and a resulting unfavorable materials quantity variance can cause unfavorable wage or labor efficiency variances if extra material and labor are used due to the substandard materials.~~

9. Fall 2021 CFE FD Exam (LOs 3a, 3b)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3a) Assess how managerial accounting can drive decision making and impact behavior and performance evaluation

(3b) Assess and recommend methods used to allocate costs and how these methods can distort perceived performance

Sources:

Zimmerman, Accounting for Decision Making and Control, 10th Edition, Chapter 7: Cost Allocation: Theory

CFE201-105-25 Product Costing in Service Organizations

Case Study - Frenz

Commentary on Question:

Candidates generally did not perform well on this question. This question was testing candidates' understanding of how overhead allocation affects performance from both an accounting view, and from the incentive impact accounting views have on managers. Candidates who did well were able to demonstrate an understanding that the "best" accounting method varies as an individual moves through a company.

Solution:

(a) **(LO 3a, 3b)**

(i) Calculate the overhead rate for Frenz from 2016 through 2020. Show your work.

(ii) Critique Kitty's statement to Jeff (Case Study Section 4.5, Exhibit B) regarding the success of the current allocation method.

Commentary on Question:

Common mistakes made by candidates in part (i) were including cost of sales in the total indirect costs and including depreciation in the total indirect costs. Including depreciation in the indirect costs was considered an acceptable answer, but not preferred.

On part (ii), many candidates critiqued the current allocation method rather than Kitty's statement.

9. Fall 2021 Continued

(i)

Euros in thousands	**2020**	**2019**	**2018**	**2017**	**2016**
Sales	453,044	431,483	411,049	391,681	373,321
Cost of Sales	46,906	56,395	37,700	34,148	30,896
Store Operating Expenses	226,166	216,716	207,662	198,985	190,671
Depreciation	25,822	23,359	20,856	18,290	15,643
General and Administrative Expenses	54,483	53,189	51,963	50,801	49,699
Impairment of Goodwill	0	0	0	10,385	0
Total Operating Expenses	353,376	349,660	318,180	312,610	286,909
Total Indirect Costs	280,649	269,905	259,625	249,786	240,370
Overhead Rate	61.95%	62.55%	63.16%	63.77%	64.39%

(ii) Kitty's observation that the overhead rate is decreasing every year is correct. By Kitty's standards, the current allocation method is successful.

(b) **(LO 3a, 3b)** Explain why Jeff believes that Frenz is allocating overhead in a way that punishes the most successful store managers.

Commentary on Question:
Candidates generally did very poorly on this question. While many candidates identified the increase on costs allocated to store managers with higher sales, very few candidates provided additional information on cost allocations aligning with Jeff's concerns.

Since Operating Expenses are included in Indirect Costs to be allocated across all stores, managers who successfully manage costs are punished because they are covering costs of other stores that may not be as well-managed.

Store managers with the highest sales have the most costs allocated to them as a tax for increased revenue.

Overhead allocation ratio has been decreasing almost every year. When overhead allocation ratios are decreasing, it means that more overhead is being allocated than marginal cost incurred from sales.

(c) **(LO 3a, 3b)** Explain how Jeff benefits from:

(i) The existing allocation method.

(ii) His suggested allocation method.

9. Fall 2021 Continued

Commentary on Question:
Candidates generally did poorly on this question. Many candidates described a general benefit of the allocation methods to the store owners, and did not describe the benefit to Jeff, who is the Division Head of Non-Coffee Product Marketing, not a store owner.

(i) The existing allocation method is non-insulting. Allocated costs depend on the coffee line's sales, not just the non-coffee line sales. This benefits Jeff because the variability of his performance measures will decrease, causing Jeff's bonuses to be more regular.

(ii) Jeff's suggested allocation method is to allocate total overheard by store. With this approach, the profitability of the non-coffee products is unaffected by coffee sales in the short term. This benefits Jeff because store managers can be encouraged to market and sell more non-coffee items without the additional overheard in the short term, which would increase Jeff's bonus.

(d) **(LO 3a, 3b)** Explain one reason why Frenz should not use allocated costs to price its products.

Commentary on Question:
Many candidates were able to identify a reason to not use allocated costs when pricing products. However, a common mistake made by candidates was not tying their answer to Frenz specifically, and those candidates did not receive full credit.

Allocated costs result in a joint-product-costing problem for Frenz. There are a high level of fixed costs that produce the range of Frenz products. Attempts to allocate involve an arbitrary allocation of costs, which can lead to inappropriate product pricing.

(e) **(LO 3a, 3b)**

(i) Describe three considerations that Jade needs to address in the strategy to allocate marketing costs.

(ii) Recommend an allocation strategy that would meet Jade's marketing strategy goals. Justify your answer using each of the considerations in (i).

Commentary on Question:
Candidates generally did poorly on this question. While many candidates were able to successfully describe three considerations that Jade needs to address, many candidates did not address those considerations in their justification of an allocation strategy that would meet Jade's goals. Very few candidates identified Jade's goals.

9. Fall 2021 Continued

(i) Cost: Volatility of branch profitability: Jade needs to consider if different Frenz stores can have significant variance in profitability.

Subsidization: Jade needs to consider if the allocation method should subsidize under-performing departments or stores

Cost: Jade needs to consider if the cost of a more detailed allocation method is justifiable

(ii) Jade's first priority is to expand into the fast-growing Asian market.

I recommend pooling total corporate overhead costs, then allocating them by store based on total sales in USD.

Allocating based on total sales is a non-insulating allocation method, which ties profits to other stores' results. This is needed to reduce variance in branch profits as Frenz expands into new geographic areas.

Allocating based on total sales allocates more overhead to stores that are already operating profitably, which subsidizes new stores in the Asian market until they are able to ramp up sales.

Indirect costs for Frenz are a large portion of total operating expenses, and the cost of tracing and allocating costs further down the value chain is not justified since indirect costs like marketing aren't specific to any market, product, etc.

1. Spring 2021 CFE FD Exam (LOs 1a, 1b)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

Sources:

~~Corporate Finance, Fourth Edition, Chapters 18, 22 and 27;~~
~~Hurdle Rates, Cost of Capital Structure: CFO Spotlight;~~
~~Damodaran on Valuation, Chapter 15;~~
~~Creating Value Through Best-In-Class Capital Allocation; International Financial Statement Analysis, Chapters. 7 and 16;~~
~~Handbook of Corporate Finance, Ch 10;~~
~~Cost and Benefit of Reinsurance; Securitization, Insurance, and Reinsurance; and Corporate Restructuring and Value Creation~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 10: Framework for Valuation (excluding "Problematic Modifications to Discounted Cash Flow" and "Alternatives to Discounted Cash Flow" sections)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 40: Flexibility

CFE201-100-23: CFI: Hurdle Rate – Definition

Case Study – Blue Ocean

Commentary on Question:

Parts of the question asked for recommendations. The best candidates gave a recommendation and justified their recommendation. Candidates making multiple recommendations did not receive full credit.

1. Spring 2021 Continued

Solution:

(a) **(LO 1a, 1b)** Recommend a cost of capital rate to use for the pet and travel expansion project. Justify your recommendation.

Commentary on Question:
Below is an example of an acceptable answer. It is also acceptable to say that this project is unlike any other for Blue Ocean and use a competitor's cost of capital as long as that recommendation is justified.

I recommend using the WACC. It is equal to
WACC = (equity/[equity + debt]) * equity cost of capital + (debt/[equity + debt]) * debt cost of capital * (1 - tax rate)
WACC = (60%) * 14% + (40%) * 8% * (1 - 20%)
WACC = 10.96%

RPPC requires that "return on its economic capital must exceed the cost of the capital acquired to fund that risk. Blue Ocean's hurdle rate is 12%. We should use a cost of capital risk of the project.

Since Blue Ocean is part of RPPC, it is reasonable to assume that RPPC would provide the capital so we should use RPPC's WAAC.

(b) **(LO 1a, 1b)** Explain four reasons that the cost of capital rate of Blue Ocean's competitors might be different than what you recommended in (a).

Commentary on Question:
The question asks for four reasons. The first four reasons were accepted. Additional answers were not accepted. Below are four examples of acceptable answers. There are other responses that may get full credit.

1) Competitors may have different balances of debt and equity that would likely result in different costs of capital
2) Financially distressed firms may have to use higher costs of capital because capital suppliers are wary
3) Smaller firms may have a higher cost of capital because they don't have ready access to capital
4) Foreign firms may have a different tax rate that affects the cost of capital

(c) **(LO 1a, 1b)** Explain two non-financial factors that could have an impact on the cost of capital rate Blue Ocean ultimately uses for the expansion project.

1. Spring 2021 Continued

Commentary on Question:
There are several acceptable responses, below are two of them.

1) Because of the potential for agency conflicts through management compensation, the firm's managers may have some impact on the ultimate cost of capital rate that is used
2) RPPC rules around risk appetite and payback period of no greater than 10 years will impact Blue Ocean's flexibility. All the steps Blue Ocean must go through with RPPC are lengthy and complicated. All this might have an impact on the type of capital deployed for the project and thus the cost of capital rate.

(d) **(LO 1a, 1b)** Recommend how Blue Ocean should finance its pet and travel expansion project. Justify your recommendation.

Commentary on Question:
This is one response that could get full credit. Other response can receive full credit as long as a recommendation and justification are given.

I recommend financing the expansion with long-term debt or bonds. The project is an expansion rather than a new market; therefore Blue Ocean needs some up-front funds for things like marketing but the majority of the capital need is to finance reserves. The cashflows from the expansion should be steady and predictable. That lines up well with using debt financing.

~~(e)~~

~~(i) Explain how Blue Ocean can use reinsurance to mitigate agency conflict between policyholders and shareholders.~~

~~(ii) Explain how Blue Ocean would view reinsurance if it were a mutual company.~~

~~(iii) Evaluate the effectiveness of securitization compared to reinsurance for pet insurance and travel insurance.~~

~~(i) The agency problem arises because policyholders are interested in the ultimate viability of the enterprise, but shareholders want a return on their investment. Money spent reducing policyholder risk could instead go to shareholders. Stockholders are the ultimate risk bearers or residual claimants if the business (expansion project) fails. Raising new capital for an insurance enterprise is costly because of the information asymmetries between firms and the capital markets. Reinsurance has fewer information problems. Reinsurance reduces insolvency risk by stabilizing loss experience, limiting liabilities and protecting against catastrophes.~~

~~1. Spring 2021 Continued~~

~~This would allow Blue Ocean to hold lower levels of capital and still have the same insolvency risk. Lower capital levels would improve returns to shareholders while not increasing the policyholder's risk.~~

~~(ii) There is no agency conflict here as the policyholders are the shareholders. However, mutual ownership restricts access to capital markets so perhaps reinsurance would be a good alternative source of capital for the expansion.~~

~~(iii) Both securitization and reinsurance can assist as a source of capital for a new line of business. Reinsurance is efficient for diversifying relatively small, symmetrical, and statistically independent risks. Securitization is better for risks that are correlated and would need lots of capital to cover the variance. Pet and travel insurance are subject to a high number of relatively small and uncorrelated claims. Therefore, reinsurance is more effective for assisting in the growth of this business. Conversely, one could argue that pet and travel insurance are relatively new and niche products so deep reinsurance markets may not exist so securitization may be the only way to go if one had to use one of the two.~~

~~(f) Critique the capital Blue Ocean is holding with respect to its minimum regulatory capital requirement.~~

~~RPPC has a stated desire to "maintain a strong capital position" among its companies, that exceeds minimum regulatory capital requirements. Blue Ocean's required capital is stated as 99% VaR - 95% Var (Case Study Section 5.4.3).~~

~~Both RPPC's and Blue Ocean's internal requirements are quite strong/high~~
~~Holding more capital than required increases the firm's safety margin~~

- ~~May reduce borrowing costs~~
- ~~Could be looked upon favorably by rating agencies/analysts and, in turn, customers~~
- ~~Might be a requirement as part of some debt covenant~~
- ~~Holding additional capital could also be viewed as inefficient~~
- ~~Might induce management to underinvest in the type of projects they need to move the company forward~~
- ~~Could reduce the attention given to risk measurement~~

~~Blue Ocean is holding more than the minimum regulatory requirement so it is not in violation of any laws~~

3. Spring 2021 CFE FD Exam (LO 3c)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization’s performance evaluation and decision making.

Learning Outcomes:

(3c) Recommend best practices in business processes to achieve operational excellence

Sources:

Managing Business Process Flows, Anupindi, R., Chopra, S. and Deshmukh, S., 3rd Edition, 2012

- Chapter 1: Products, Processes and Performance
- Chapter 2: Operations Strategy and Management

~~Enterprise Risk Management Models, Olsen and Wu, Chapter 1~~

Case study – Snappy Life, Darwin Life

Commentary on Question:

Candidates should

- *Understand product space, functional strategies, and the process view (input-process-output) on product development process and how apply those concepts for insurance operations and*
- ~~*Understand supply chain risk management, set supply chain risk management process and identify internal and external supply chain risks*~~

Solution:

(a) **(LO 3c)**

(i) Identify the four dimensions of key product attributes.

(ii) Describe an example for each dimension in (i) that Darwin should consider in its venture with Snappy.

Commentary on Question:

Answers for (ii) *cannot be generic and should be relevant to Darwin's situation and the key points. In addition, answers for* (ii) *below are more detailed to illustrate all possible answers*

3. Spring 2021 Continued

(i) The four components of competitive product space (i.e., four dimensions of product attributes) are:
- Product Cost;
- Process Flow Time (or Product Response Time);
- Product Flexibility (or Product Variety); and
- Product Quality

(ii) Regarding product cost, customers will look for cheaper prices especially with more competitors coming into the market. Several issues Darwin should consider as follows:
- Darwin Life should work with Snappy Life develop underwriting standards for products to be sold through the internet (those can be accepted automatically and those need further review or be rejected). Darwin needs to realize the UW standard will be different from what they have traditionally been used for term life. Based on the UW standards, then assumptions for mortality and morbidity can be set.
- In addition, sales, lapse, expenses, and investment earned rates should be also determined based on the new product's feature, e.g., discussion of the effect of sales and lapse assumptions based on the sensitivity analysis provided in Exhibit C or investment discussion related to Darwin's thinking on expanding to more high yield bonds
- The cost of building the internet platform. How much Darwin can utilize Snappy's existing platform and experience?
- Darwin and Snappy are very different in capital position. Snappy RBC ratio is likely to drop significantly with increasing sales, while Darwin is at a stronger capital position. How to determine the new company's capital requirement is also a key assumption for cost. Balances among profitability target (including risk appetite and capital requirements), sales volume, and competitive premium scale of products and channel conflict should be considered in the product cost components.

Regarding process flow time (or product response time), customers will expect immediate decision and fast turn-around time. New product to market time will also likely need to be much shorter
- Darwin needs to consider the IT infrastructure efficiency and speed and the overall online process design to ensure a speedy customer experience. Possibly leverage Snappy's existing process with improvements.
- Darwin Life should have clear picture on the role and responsibility in ideal generation, product design, pricing, approval, underwriting, competitive analysis, and launch into the web and time needed to make products available to market.
- Darwin Life should also consider the process and timing of making Term, Whole Life, and Wealth Management products available.

Regarding process flexibility (or product variety), the range of products can be offered to customers with existing products in mind

- Can Darwin Life provide a variety of the product selection suitable for the consumers (including riders and benefits) using a certain algorithm that can be constructed by Snappy Life (with Darwin Life's review and input)?
- Will products available based on consumer's life cycle e.g., the variety of Term, Whole Life, and Wealth Management products?
- Should Darwin offer all types of products online given its product lineup?

Regarding product quality,

- Does product coverage meet customer expectation?
- Is price vs. service provided reasonable, comparing to both other online competitors and Darwin's own products distributed through agency?
- From customer service perspective, would Darwin be able to keep its current call center track record, or it needs to develop new service capacity
- Survey should be collected from the customers on suitability, ease of using the system, customer experience of the sale process, after sale, and on-going services.

(b) **(LO 3c)**

(i) Identify three primary functions for most organizations.

(ii) Explain what DEF needs to consider as it develops a functional strategy for each function in (i).

(i) Three main functional strategies include: marketing, operations, and finance. [Note: *Sales and IT are other acceptable answers*.]

(ii) Marketing:

- Market research: Since DEF is new, it should conduct market research of the size and competition of the target market and branding (through hiring outside consultants or using Snappy Life opinions).
- Role and responsibility: DEF should discuss the role of marketing department. Should marketing department have considerable influence with the actuarial and pricing per Snappy Life current situation?

Operations:

- Design of process flow: DEF should design an internal driven process from underwriting, policy issue, admin, premium collection, policyholders service, claim adjudication, and payment of claim.

- Channel conflict and value-added: DEF should consider any potential of the channel conflicts with Darwin and Snappy. The sale of Term and Whole Life can be through Insurtech easily. When it comes to Wealth Management, can Darwin Life current sale force play a role.
- Data security: Even though, Snappy Life is expert in web sales, but its CFO is not sure if the company is sufficiently protected from cyber-risk. Darwin also has no technology infrastructure around the management of data privacy. This will be a major issue for DEF.

Finance:
- Financial resources: DEF is to obtain financial resource to support the product, track product performance and report profitability and related capital requirements.
- Funding impact: Darwin Life should consider what is the impact to its funding need, capital requirements, investment policies, etc.
- Ownership structure and shareholder agreement: Snappy Life is in a weaker capital position, the agreement should be reached regarding DEF ownership, the financial well-being of DEF, performance standards (net income, risk adjusted return of capital), and capital required (RBC ratios) and risk management policies of the company. Darwin has its own set of explicit requirements on IRR requirement, capital requirement etc., Would DEF adopt Darwin's standard or a modified one?

(c) **(LO 3c)**

(i) Identify the five elements of the process of transforming input into output for DEF.

(ii) Recommend how Darwin should apply the five elements in (i) to work with Snappy on product development. Justify your recommendation.

Commentary on Question:
Answers for (ii) *should be relevant to the case study and be justified for full credit.*

(i) The five elements of the process of transforming input into output for DEF include:
- Input and Output (or Product Information Input and Product Launch and Feedback)
- Flow Units (or Information Flow in each Activity)
- Network of activities and buffers (or Milestone of the Activity)
- Resources
- Information Structure

3. Spring 2021 Continued

(ii) Regarding input and output,

- It includes all tangible (documentation) and intangible (time) items.
- Darwin Life can apply its current procedure with modifications on how to have underwriting procedure, application form, product options, premiums scale and premium collection available in the web. Snappy Life can help from this aspect.
- Input items include product proposal, pricing assumptions, pricing model, profitability target, underwriting guideline, marketing intelligence, etc.
- Output items include final products available to the market, marketing materials, etc.

Regarding flow units,

- It includes the required production from each critical path. Darwin Life can use it current process with the modification per Snappy life input.
- Typical flow units from each critical path include, for example,
    - Product sponsored committee: Product approval documentation
    - Market intelligence team: Competitor information, product feature, premium scale
    - Product development team: Product features documents, product filing document, profitability, premium rates, web-page flow, product offer decision tree, etc.
    - Assumption and model committee: Approved pricing assumptions and pricing model version
    - Understanding team: Understanding questionnaire and rating algorithms
    - Product filing team: Product filing document and approved states
    - Web team: web design algorithms and flow charts
    - Admin team: Insurance policy, billing options, changes.

Regarding network of activities and buffers,

- It simply connects the unit flow described in the second element and determine its sequent
- It required Darwin and Snappy Life to work together to agree upon the process

Regarding resource,

- Darwin Life should consider the form of resources (initial investment, future capital and funding, shared service, independent staff, etc.) to put into the joint venture
- It includes manpower and capital

Regarding information structure,

- What information is needed and is available for whom in order to perform activities or make decisions. For example, customer information, market data, competitor experience, regulatory and technology relate information etc.

3. Spring 2021 Continued

(d) **(LO 3c)** Propose two examples each of appropriate financial, internal, and external measures for DEF. Justify your answers.

Commentary on Question:
Answers must be relevant to the case study for credit.

Financial measures include
- Absolute performance (e.g., revenue, costs, P&L, B/S, etc.) and IRR as required by Darwin;
- Performance relative to asset utilization (e.g., ROE, ROI, etc.), for example, IRR RAROC as required by Darwin; and
- Survival strength (Solvency ratio, liquidity, cash flow, etc.), for example, if the capital position will satisfy Darwin's requirement.

Internal measures include:
- Controllable indicators linked to external and financial measures;
- Sales quality (vs. expected) Snappy's system is biased towards accepting more risks, need to make sure the new company DEF doesn't have same issue;
- Policy acceptance ratio (vs. expected);
- Customer response (call center, on-line chat wait time, issue resolution, Darwin has good service now, a human can answer phone within 4 rings 95% of the time, they should strive to the same standard no matter what service platform will be);
- Customer ratio; and
- Legal compliance (data security is an issue for both Darwin and Snappy, they need to make sure they comply the minimum legal requirement plus other requirements for insurance products).

External measures include
- Customer expectation;
- Customer satisfaction (Per CS 8.3, new competitors are entering the market in the internet platform, cannot compete on price alone, so customer satisfaction is important);
- Competitive position;
- Product cost;
- Product variation;
- Product quality (coverage);
- Product services; and
- Actual vs. expected.

~~(e) Apply the supply chain risk management process to the risk of an IT breakdown within DEF.~~

~~3. Spring 2021 Continued~~

~~The supply chain risk management process is similar with the general risk management process. It includes:~~

- ~~Risk analysis and identification;~~
- ~~Risk assessment and evaluation (or Risk examination);~~
- ~~Selection of appropriate risk management strategy (or individualize most adequate option to manage risk);~~
- ~~Implementation; and~~
- ~~Risk monitoring /mitigation. working on adding content for IT breakdown and Pandemic specific answers~~

~~Management process on IT breakdown includes:~~

- ~~Risk identification: Identify what systems can fail, what are the consequences (for example: data breaches cause loss of sensitive client and company information, platform failure so client can't access the website);~~
- ~~Risk assessment and evaluation: Evaluate the probability of the risk even happening. Consider both Darwin and Snappy have inadequate data security, the probability will be higher than peers. Darwin and Snappy needs to calculate the cost of the loss (including reputational loss) and the cost of implementing better IT security;~~
- ~~Selection of appropriate strategy: Darwin and Snappy needs to decide the significance of the risk and if they would spend money to mitigate the risks or accept of cost of incurring the risk. And if decide to mitigate, which strategy to go;~~
- ~~Implementation: If decide to mitigate, implement appropriate hardware and software, establish appropriate process and protocol; and~~
- ~~Risk monitoring: Establish process to perform ongoing monitoring of IT related failures and establish proper process and response plan.~~

4. Spring 2021 CFE FD Exam (LOs 1a, 1b)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

Sources:

~~CFEFD-S1-02-19 Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 18: Capital Budgeting and Valuation with Leverage~~

~~CFEFD-S1-03-19 Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 22: Real Options~~

~~CFEFD-S1-06-19 Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 28: M&A (pages 962-978)~~

~~CFEFD-S1-09-19 Aswath Damodaran, Damodaran on Valuation, Ch 15: The Value of Synergy~~

~~CFEFD-S4-35-19 Dowd, Measuring Market Risk 2nd ed, Ch 9 Applications of Stochastic Risk Measurement~~

~~CFEFD-S4-36-19 Dowd, Measuring Market Risk 2nd ed, Ch 13 Stress Testing Risk~~

~~CFEFD-S4-38-19 Dowd, Measuring Market Risk 2nd ed, Ch 16 Model Risk~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 10: Framework for Valuation (excluding "Problematic Modifications to Discounted Cash Flow" and "Alternatives to Discounted Cash Flow" sections)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 40: Flexibility

Case Study – Blue Jay Tire (BJT)

4. Spring 2021 Continued

Commentary on Question:

This question test candidates on Section 1 – LOs 1a & 1d the cost of capital to use for some project and how to finance it. The candidates generally struggled in part c) and f). In parts a) and b), most candidates did generally well and were able to calculate the NPV for two alternatives of the expansion project; and made correction financial decision based on the NPV calculation.

~~*In part c), many candidates struggled. This part tests the candidate's knowledge utilization from the learning objectives 4b and 4c. Most candidates only stated the simple statistics without stating concerns/comments about the accuracy of the model/graph/numbers. Quite a few candidates did not state enough observations with respect to the stochastic output. We expected multiple observations with respect to the stochastic output; and comments displaying some concern for the accuracy of the numbers/model/graph.*~~

~~*In part d) and e), the candidates generally did well except e) ii. Several candidates forgot the definition of the profitability index.*~~

~~*In part f), this is a summary of the summary results from prior parts. Most candidates forgot to evaluate the results of prior methodology; or they failed to discuss the limitation or concerns. Several candidates did not provide adequate support for their position in order to justify their recommendations.*~~

Solution:

(a) **(LO 1a, 1b)**

(i) Calculate the Net Present Value (NPV) for each of the two alternatives of the product expansion project. Show your work.

(ii) Recommend which alternative BJT should select based on your calculation in (i). Justify your recommendation.

Commentary on Question:
Recommendations should be justified for full credit.

4. Spring 2021 Continued

(i)

Under the option to buy TNT.

First need to calculate the WACC for the project

r(WACC) = [equity/(equity + debt)] x r(equity = [debt/(equity + debt)] x r(debt) x (1 - tax rate)

Since BJT is a member of RPPC, it makes sense to use RPPC's info for the WACC

= 0.6 x 14% + 0.4 x 8% x (1 - 20%)

= 0.1096 or 10.96%

Value of the project is just future cashflows discounted at the WACC

Value = 10.0 / 10.96% = 91.24

NPV = value less the cost of buying TNT

NPV = 91.24 - 100 = -$8.76 million

Under the option to build its own plant.

We can use the same WACC for the project as calculated in part a)

Value of the project is just future cashflows discounted at the WACC

However, we need to account for the 2-year delay in getting the plant built and running

value = 1/(1+ 10.96%)^2 * 12/10.96%

value = 88.93

NPV = value less the cost of building the plant

NPV = 88.93 - 85 = $3.93 million

(ii)
Generally, we should follow the course of action that leads to the highest NPV

There were a lot of simplifying assumptions that went into the NPV calculations that perhaps should be reviewed

The NPV for the project to buy TNT is negative
The NPV for the project to built their own plant is positive

So, with respect to these calculations BJT should build their own tire plant since that gives the best result.

(b) **(LO 1a, 1b)** Calculate the value of the option for BJT to reduce staff. Show your work.

Redoing our work from part a) ii, if BJT is successful 2/3 of the time it earns \$15M but the other 1/3 it earns 0

Value if successful = 15 / 10.96% = 136.86

Value if unsuccessful = 0 / 10.96% = 0

Applying the probability of success, value = 2/3 x 136.86 + 1/3 x 0 = 91.24

NPV = 91.24 - 100 = -\$8.76 million same answer as part a)

Now to account for the option from the labor union to cut staffing

Value if successful = 15 / 10.96% = 136.86

Value if unsuccessful has cashflows of 0, (0 -6), 3, 3, 3, 3, …

= 0(10.96)^-1 + -6(1.1096)^-2 + (3 / 0.1096) x (1.1096)^-2 = 17.36

Applying the probability of success, value = 2/3 x 136.86 + 1/3 x 17.36 = 97.03

NPV = 97.03 - 100 = -\$2.97 million

The value of the "option" to reduce the scale of the project is the NPV (with option) - NPV (w/o option)

Option value = -2.97 - -8.76 = \$5.79M

So the option to scale back the plant has value but not enough to make the NPV of buying the TNT plant positive

~~(c) Analyze the results of WC's stochastic model.~~

~~**Commentary on Question**~~:
~~*Below are examples of acceptable answers.*~~

~~The output covers a reasonable number of sample runs so we should be able to get a good read of the profitability~~

~~With 10,000 simulations, we can be pretty sure our results will not be impacted by random sampling error~~

~~From this output, we can also get a feel for the average profitability and the variability around that profitability~~

~~Average profitability is 0.27 million so that is good that it is positive, the variance in results looks small~~
~~The extreme percentiles tell us how bad/good things could be~~

~~The graph of results looks like they are somewhat normally distributed. The extremes (up and down) are tails.~~

~~Both the maximum loss and the maximum gain are about \$3 million. BJT's maximum risk won't be devastating.~~

~~Those extremes can be viewed as a "stress test" quantifying how bad things could be for BJA~~
~~We can use the output to go back and analyze the scenarios that gave rise to the results. This would help to refine our understanding of the success factors for the expansion.~~
~~We can rerun the model to see what factors are most important and we could do sensitivity testing around those factors with this model.~~

~~Based on the graph of results, it appears that the model may have some errors. These should be reviewed.~~

4. Spring 2021 Continued

~~Small discrepancies are often good warning signs of larger problems with a model~~

~~The median listed in the chart is a small positive (0.2432) but on the graph, it looks like the median is negative~~

~~Var(50) should equal the median but they have opposite signs~~

~~Also on the chart, the maximum value is listed as 2.9268 but the graph clearly has values at 4~~
~~There is a "flat spot" on the graph which may indicate that some correlation parameters are not working in the model~~

~~(d) Describe three shortfalls of using a stochastic model for decision making.~~

~~**Commentary on Question**:~~
~~*Below are examples of acceptable answers. However, on the exam only the first three written by the candidate were accepted.*~~

- ~~Stochastic models are more difficult to use and explain than some other methods~~
- ~~These models are computationally complex~~
- ~~Not the best for modeling optionality and early exercise options~~
- ~~Could require a lot of customization in order to simulate the problem at hand~~
- ~~Modeled process will necessarily be discrete while the true process is continuous~~
- ~~Have to be able to specify the nature of the dependence/correlation between variables without making the problem incalculable (increasing the dimensions too much)~~

(e) **(LO 1a, 1b)** Using your information from part (a)

(i) Calculate the highest hurdle rate that would allow BJT to accept the expansion project under the alternative to buy TNT. Show your work.

~~(ii) Calculate the profitability index value for BJT's expansion project under the alternative to build its own plant. Show your work.~~

~~(iii) Recommend which alternative Blue Jay Tire should select based on the above rules of thumb. Justify your recommendation.~~

Commentary on Question:
Candidates could receive full credit for other recommendations if that recommendation is supported by their calculations.

4. Spring 2021 Continued

(i) Calculate the highest hurdle rate that would allow BJT to accept the expansion project under the option to buy TNT. Show your work.

Hurdle rate is just the discount rate where the NPV is zero
Solving for hurdle rate: value = 100 = 10 / x
Therefore x = 10%

~~(ii) Calculate the profitability index value for BJT's expansion project under the alternative to build its own plant. Show your work.~~

~~Profitability Index = NPV / Initial Investment~~
~~From part a) the NPV = $3.93M~~
~~Profitability Index = 3.93 / 85 = 0.046~~

~~(iii) Recommend which alternative Blue Jay Tire should select based on the above rules of thumb. Justify your recommendation.~~

~~Hurdle rate just changes the discount rate until the NPV becomes zero; then use the hurdle rate to evaluate the project and its financing~~

~~Invest if the profitability index is > 0 or higher if you also have the option to delay the investment~~
~~Applying these rules-of-thumb validated what we knew by calculating the NPVs.~~

~~So, building their own tire plant still gives BJT the best outcome~~

~~(f) Recommend a course of action for BJT including your summary of results. Justify your recommendation.~~

~~We evaluated the BJT expansion plan under a few different methodologies. Each provided useful information for the ultimate decision.~~

~~The simplest method was a rule-of-thumb criteria which would support building our own plant~~
~~If BJT has (or can access within RPPC) significant cash, that would reduce its cost of funding the project perhaps making it more profitable~~

~~Evaluating cash flows from the options under a NPV method added more support for building our own plant~~

4. ~~Spring 2021 Continued~~

~~The NPV is based on a lot of assumptions perhaps it would look even better under more favorable assumptions~~

~~Options to delay are always valuable. You buy time to get more information. Similarly, the option to reduce scale if things didn't work out according to our initial assumptions was also valuable.~~

~~The stochastic simulation showed that if we built our own plant, break-even was highly likely and that the potential for a large loss was remote. Although, the stochastic simulation results also pointed out the need to refine our models and assumptions to be sure they are correct and that we understand what they are doing.~~

~~We also need to consider that financial projections may not drive the ultimate decision. Synergies either through cost reductions or increased revenues may be enough to offset the NPV deficiencies~~

~~This is a new area for BJT and may be the most effective way to acquire the expertise, even with negative financials.~~

~~I recommend that we continue to move forward with the expansion by building our own plant. Most of the metrics showed that this would be profitable and that the downside risks were neither catastrophic nor likely. BJT should continue to refine its assumptions and models as the project progresses.~~

5. Spring 2021 CFE FD Exam (LO 2c)

Learning Objectives:
2. The candidate will understand how to gauge an organization's performance through an evaluation of its financial reports.

Learning Outcomes:
(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

Sources:
Robinson et al., International Financial Statement Analysis, Ch. 16 Multinational Operations

Case Study – RPPC, Big Ben Bank

Commentary on Question:
This question required candidates perform a translation of foreign currency financial statements. Candidates were also asked to assess and recommend actions to mitigate the impact of foreign exchange volatility on consolidated financials.

Solution:
(a) **(LO 2c)** Explain four considerations relevant to Big Ben when determining its functional currency.

Commentary on Question:
Candidates generally did well on part a. To receive full credit, candidates had to include one of the factors noted in the text as having greater weight when determining the functional currently (see factor 1 below). Answers not shown below received full credit if mentioned in the text and relevant to Big Ben.

Factors relevant to Big Ben when determining its functional currency include:
1. The currency that mainly influences sales prices for goods and services for Big Ben. This could include the competitive forces or regulatory environment of the countries in which Big Ben provides its asset management, commercial banking, or investment banking services.
2. The currency Big Ben's employees are paid in, deposits are denominated in, or other business expenses are incurred in.
3. The currency of the country where the majority of Big Ben's operations take place, such as retail branch locations.
4. The currency used to accept payments and deposits from customers.

5. Spring 2021 **Continued**

(b) **(LO 2c)** Calculate Big Ben's 2019 foreign currency Cumulative Translation Adjustment that should be included on RPPC's 2019 financial statements, including AOCI and Retained Earnings. Show your work.

Commentary on Question:
Candidates struggled on part b. Partial credit was awarded where elements of the calculation were correct.

RPPC's functional and presentation currencies are the Euro, as they are a conglomerate headquartered in Europe. Big Ben's functional currency is likely the Pound (based on the considerations in part a). Thus, the current rate method should be used.

All items used to calculate Big Ben's net income in GBP are translated at the average exchange rate in 2019 (1.18 EUR per GBP). Big Ben's 2019 dividend (22 GBP) is translated at the exchange rate on the declaration date (1.13 EUR per GBP).

2019 net income: (-37) + change in AOCI (-23) is -60 * (1.18) = -71 EUR
2019 retained earnings: -71 - (22 * 1.13) = -96 EUR

Big Ben's 2019 assets and liabilities are translated to Euros at the 2019 year-end exchange rate. Big Ben's 2019 stockholder's equity balances are translated at historical exchange rates.

Assets: 42,988 * (1.1) = 47,287 EUR
Liabilities: 41,236 * (1.1) = 45,360 EUR
Capital: 1,143 * (1.25) = 1,429 EUR

Total retained earnings including AOCI at EOY 2019 are 609 GBP (513 + 96), which includes the 2019 retained earnings. The 2019 retained earnings are equal to -82 GBP (net income + change in AOCI less dividend). The pre-2019 retained earnings are 691 GBP (609 EOY less -82 during 2019). The pre-2019 retained earnings are translated at 1.21 EUR per GBP.

pre-2019 Retained Earnings = 691 * (1.21) = 836 EUR
2019 Retained Earnings = -96 EUR (from above)
Total Retained Earnings = 740 EUR

Using the values above, the 2019 balance sheet translation adjustment is 242 EUR (47,287 - 45,360 - 1,429 - 740).

Note: there is no translation adjustment on the income statement with the current rate method.

5. Spring 2021 Continued

(c) **(LO 2c)** Assess the directional impact of 2019 currency movements on the following if management were to determine that Big Ben's functional currency is EUR:

(i) Big Ben's translated assets

(ii) Big Ben's translated revenues

(iii) Big Ben's translated net income

(iv) Big Ben's income statement and/or balance sheet foreign currency translations

Show your work.

Commentary on Question:
Candidate performance was mixed on part c. Candidates were expected to provide the directional impact with explanation for each item. Many candidates received partial credit for providing the correct directional impact, but few candidates correctly supported their answers.

Big Ben and RPPC would have the same functional currency, so the temporal method should be used to translate Big Ben's financial statements into RPPC's consolidated statements.

Assets are translated at the current or historical exchange rate under the temporal method. Given that the Pound weakened versus the Euro in 2019, the translated assets would decrease in Euros.

All revenue is translated at the average exchange rate in 2019. The weakening Pound will result in lower translated revenue to Euros.

Big Ben has a net monetary liability exposure at EOY 2019. See below. Thus, the weaker Pound will result in a higher translated net income.

Assets Translated at Current Rate = 39,076 = 42,988 – 3,407 – 28 – 234 – 243 (exclude Other Assets, Equity Method Investments, DTA, Goodwill/Intangibles)

Liabilities Translated at Current Rate = 41,223 = 41,236 – 13 (exclude deferred tax liability)

5. Spring 2021 Continued

The weakening Pound combined with the net monetary liability exposure will create a negative translation gain from Big Ben. There is no translation adjustment under the temporal method.

(d) **(LO 2c)** Recommend three specific actions to decrease foreign exchange volatility on RPPC's financial statements assuming Big Ben's functional currency is EUR. Justify your recommendation.

Commentary on Question
Few candidates were able to provide three specific actions to decrease foreign exchange volatility. To receive full credit, the action must be connected to RPPC and/or Big Ben. Many candidates simply listed different currency hedging techniques (e.g. swaps, options, futures) without any explanation, which received minimal credit.

Big Ben and RPPC have the same functional currency (Euro), so the temporal translation method will be used.

- Big Ben could hedge their Fx volatility using futures. For example, a futures contract may allow them to exchange Pounds for Euros at a future date, so currency fluctuations have limited impact on consolidated net income.
- Under the temporal method, long-term debt is translated at current exchange rates, while equity is not. Thus, RPPC could issue debt at the holding company level and use it to repay long-term debt in Big Ben to reduce Fx volatility. Note that Big Ben has a net liability exposure based on part c, so they should look to increase cash/short term investments and/or decrease liabilities.
- Big Ben could incur a large enough volume of trading liabilities in Euros to net out its exposure to Pounds.

(e) **(LO 2c)** Explain how investors can objectively compare RPPC's financial results to its competitors despite foreign exchange volatility.

Commentary on Question:
Most candidates did poorly on part e. Most commonly, candidates recommended comparing financial ratios, which still may be exposed to Fx volatility when the numerator and denominator come from financial statements subject to different translation methods and levels of Fx risk.

Investors could compare RPPC's financial results to its competitors by using the disclosures required under IFRS and GAAP to adjust net income or other financial metrics, so the impact of foreign exchange volatility and translation adjustments are included or excluded consistently across companies (often referred to as "clean surplus accounting").

6. Spring 2021 CFE FD Exam (LO 3c)

Learning Objectives:

3. The candidate will understand how managerial accounting and operational processes impact an organization's performance evaluation and decision making.

Learning Outcomes:

(3c) ~~Apply~~ Recommend best practices in business processes to achieve operational excellence

Sources:

~~CFEFD-S3-30-19 Caldwell, A Framework for Board Oversight of Enterprise Risk, CPA Canada~~

~~CFEFD-S5-55-19 Vakharia and Yenipazarli, Managing Supply Chain Disruptions, sections 2-5~~

~~CFEFD-S3-21-19 Olsen and Wu, Enterprise Risk Management Models, Ch. 4~~

CFE201-106-25: Procurement, Early Warning Systems, and the Next Disruption

Case Study Blue Jay Tire (BJT)

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) **(LO 3c)** Define supply chain disruption.

Commentary on Question:

Many candidates did well on this part by defining the basic concept, though many didn't mention of negative consequences/impacts or of causing confusion/disorder or any similar impact to get full credit.

A supply chain disruption can be defined as any occurrence which has negative consequences for regular supply chain operations and hence, causes some degree of "confusion/disorder" with the Supply Chain.

A supply chain risk is the unavailability of products that are essential for a business to operate.

(b) **(LO 3c)** Describe two disruptions that the global pandemic may cause to BJT's supply chain.

6. Spring 2021 Continued

Commentary on Question:
To get full credit the answers needed to be specific to BJT and classifying supply chain based on the type of disruptions by adopting the flow and process method, examining each of nodes/arcs. A supply chain likely encounters disruptions caused by change in quantity, lead time, quality and technology as illustrated below. Any two of these would be fine as the question required. Many candidates did well in this question with answer involving general reasoning, however, couldn't use the theoretical concept well as below.

(1) Quantity: Reduced finished goods due to reduction in raw material from Malaysia used to manufacture tires that were severely impacted by a global pandemic. Reduced workers in Tire factories (or possible factories closure) due to social distancing reduces production quantity.
(2) Lead time: delay of raw material from Malaysia to production factories in Canada. Delay of finished products shipment to US from its factories in Canada due to limited capacity at Us-Canada customs.
(3) Quality: any reasonable answer that contributes to Blue Jay Tire's product quality is also acceptable.
(4) Technology: Ill-equipped Blue Jay Tire online store cannot support the increase in online orders. Online virtual assistance is also badly built.

(c) **(LO 3c)**

(i) Recommend two risk management strategies that could help BJT mitigate future global pandemic supply chain disruptions. Justify your answer.

~~(ii) Evaluate the tradeoffs to the recommendations in (i) with respect to BJT's supply chain.~~

Commentary on Question:
The answers below are a few possible risk management strategies, other well-reasoned answers were acceptable. Most of the candidates couldn't explain well, specifically part (ii) of the question.

(i) One lesson learned from global pandemic is the importance of burdening supplier choices, local or near-shore sourcing. Given the fact that "85% of the raw material is sourced from Malaysia", Blue Jay Tire's supply chain would turn vulnerable rather quickly during a global pandemic. Therefore, to mitigate supply chain risk, BJT should consider diversifying its supplier choices, may consider multiple geographic locations.
Furthermore, BJT can also incorporate disruption related metrics in the evaluation of its suppliers to mitigate supplier related risks.
~~BJT can automate tire manufacturing processes as much as possible to reduce labor costs, avoid manufacturing hazard to the workers and eliminate disruptions imposed by social distancing during a pandemic.~~

6. Spring 2021 Continued

~~BJT can set up distribution channel so that the finished products are shipped only from the closest manufacturing plants and US-Canada border crossing is minimized. Therefore, delay on shipment would be minimized due to border closure during a pandemic.~~
A comprehensive classic supply and demand analysis ~~global scenario planning~~ should be conducted such that an organization such as BJT becomes connected to their complete supply network to promote end-to-end visibility, collaboration and optimization. The goal of the analysis is to position a company's procurement categories on a continuum, with "continuity risk" (the highest level of concern) on one end and "no immediate danger" on the other.

(ii) ~~Automation – there are high upfront costs that would use capital that could otherwise be deployed for strategic initiatives such as expansion into non-road tires.~~

~~Distribution channel – there's a trade-off between reliability and robustness. While adding an additional plant will let BJT's distribution be more flexible, the added complexity increases the likelihood failure. BJT would need additional oversight and management of its supply chain if it adds new nodes.~~

(d) **(LO 3c)** Describe two tools the BJT ~~Board~~ could use to oversee the operational risk from future global pandemic supply chain disruptions.

Commentary on Question:
The following are the required answers; however, other reasonable answers were accepted. However, most of the candidates couldn't get this section well, many digressing from what the question asked.

Capacity constraint analysis/ Operational
~~The Board~~ BJT should analyze capacity limitations for any strategy it implements. If BJT chooses to produce tires in both Canada and the US, it needs to determine if the plants can produce the number of tires, it will be expected to produce. It should also identify risks to these production levels and implement plans to mitigate those risks.

Vendor and distribution dependencies/ Structural
~~The Board~~ BJT should review critical dependencies and the risks with those. BJT sources its rubber mainly from a single source, so ~~the Board~~ it could help review alternative sources of rubber in an effort to diversify its supply and manage the negotiations with the new suppliers.

7. Spring 2021 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:
~~CFEFD-S5-54-19 Brown, Demystifying the Risk Margin Theory Practice and Regulation, (exclude section 3)~~
~~CFEFD-S5-53-19 Hubbard, How to Measure Anything, Ch 14~~
~~CFEFD-S3-22-19 Olsen and Wu, Enterprise Risk Management Models, Ch. 5~~
~~CFEFD-S3-24-19 Olsen and Wu, Enterprise Risk Management Models, Ch. 7~~
~~CFEFD-S4-35-19 Dowd, Measuring Market Risk 2nd ed, Ch 9 Applications of Stochastic Risk Measurement~~
~~CFEFD-S4-36-19 Dowd, Measuring Market Risk 2nd ed, Ch 13 Stress Testing Risk~~
~~CFEFD-S4-38-19 Dowd, Measuring Market Risk 2nd ed, Ch 16 Model Risk~~
~~CFEFD-S4-39-19 ASB, Proposed ASOP on Modeling, pages 1-10~~

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics, Ch. ~~8~~ 9 Evaluations

Case Study – Big Ben Bank

Commentary on Question:
Commentary listed underneath question component.

Solution:
~~(a)~~

~~(i) Design a mathematical programming model to optimize Big Ben's allocation to each city.~~

~~(ii) Explain each component of (i).~~

7. Spring 2021 Continued

~~(i)~~

~~In this problem we need to optimize the cash flow from the project. The model can be defined as below~~

~~Max: P1%*f(1)+P2%*f(2)+P3%*f(3)~~

~~Subject to: P1>=20%, P2>=20%, P3>=20%, P1+P2+P3=100%~~

~~(ii)~~

~~In the model above, P1, P2, and P3 represent the % of allocation in each of the three cities; f(1), f(2) and f(3) represent the total cash amount received from each city.~~

~~Total cash amount received from each city = Sum of 20 years loan repayment + government subsidy.~~

~~Each year's loan repayment =Max(loan interest + principal due, proceeds from selling excess energy). If the proceeds from selling energy is higher than the interest and principal due, Big Ben receives the full interest + principal payment; otherwise they won't receive full interest + principal payment (just receive the proceeds from selling energy).~~

~~(b) Recommend two additional metrics Big Ben can use to evaluate the Solar Energy Financing opportunity other than the total cash payments received and IRR. Justify your recommendation.~~

~~7. Spring 2021 Continued~~

~~There are several metrics that can be used to evaluate the financing opportunity. Two other metrics are as below:~~

~~1. Net Present Value (NPV): NPV is the most accurate and reliable method for allocating the firm's resources so as to maximize its value. In general, a company should not invest in projects with negative NPV.~~

~~2. Hurdle Rate: Hurdle rate is higher than Weighted Average Cost of Capital (WACC) taking into account risk premia and option to wait. Any project with positive NPV using the hurdle rate as the discount rate is worth investing in..~~

~~(c) Analyst X suggests using the model that created deterministic results under Exhibit B and using the assumptions in Exhibit D to project the total cash payments received.~~

~~Critique Analyst X's suggestion on building the model.~~

~~1. Original model intended purpose: The original model is built to produce financial projections for the loan opportunity for a single location. It doesn't perform projections for multiple locations and calculate the maximum amount that Big Ben can get across all locations. To apply the model results to all 3 cities may not be appropriate. The existing model could be a base but it will need to be modified and improved for current purpose.~~

~~2. Assumptions of the original model: The data source for the results in Exhibit 8 could be from a region not even close to the 3 cities in discussion. Energy generation data and consumer consumption data or weather mix data may not be applicable to develop assumptions for this model.~~

~~3. Limitations of the model: It is unknown if we have any documentation for the limitations and simplifications done to the original model. We would need to understand first if there is any major limitation and simplification within the current model before it can be improved.~~

~~(d) Recommend which two risk factors should be modelled stochastically. Justify your recommendation.~~

~~The risk factors which take random paths are most likely to be modeled stochastically. The two factors which should be modeled stochastically are:~~

~~1. Weather: Weather follows random path under normal circumstances.~~

~~2. Retail Sales of Energy: Retail sales of energy has a significant random component.~~

7. Spring 2021 Continued

(e) Explain which risk factors listed in Case Study Section 6.4 may be hedgeable.

The hedgeable risk can be eliminated through trades into a deep liquid market.

For non-hedgeable risks a deep, liquid market does not exist. The risk factors that are hedgeable are

1. Weather: There exists capital market solutions for trading against weather. This risk is somewhat hedgeable.

2. Demand for Electricity: Demand for electricity is highly dependent on weather and we can structure capital market solutions to hedge this risk. This can have high residual or basis risk though.

(f) Patel says: "These stress tests are excellent! Not only do they cover all identified risks, they illustrate the adverse direction and correct magnitude of impacts. Now we know the events we need to worry about!"

Critique Patel's statement regarding the stress test proposal and results.

Patel is suggesting to use stress test results as if these cover all possible adverse impacts. While the stress results provide great insights to the financial implication, there are several drawbacks of using these as comprehensive results.

1. The stress tests do not cover all identified risks. Big Ben has identified the following risks which are not included in the stress tests: weather, solar panel installation issues, and solar panel equipment failure.

2. Some of the proposed stress tests do not adversely impact the cash payment. An increase in the loan rate should increase (not decrease) Big Ben's cash payment. Similarly, a reduction in personal energy consumption results in a favorable event (more energy to sell), not an adverse event.

3. The magnitude of some impacts are clearly not correct. Stress testing is dependent on the chosen scenario and the judgement, skill, intuition, good sense, and experience of the people carrying out the tests. The negative events that we want to guard against can be hard to predict. Choosing the 'right' scenarios is an important but sometimes difficult task. It can also be very difficult even to identify the risk factors to look at.

4. The proposed stress tests are not the only events Big Ben needs to worry about with the solar financing opportunity. In addition, the stress tests ignore interdependency or correlation among the risk factors. Under tail events, the correlations are likely to increase in adverse manner.

7. Spring 2021 Continued

(g) **(LO 4a, 4b)**

(i) Contrast the two models.

(ii) Interpret the results of the two models.

(iii) Recommend which model Big Ben should pursue. Justify your recommendation.

(i)
The analysts are trying to build a predictive model here. From a predictive modeling perspective, Analyst Y used a hold-out test set and avoided the issue of peeking that is apparent in Analyst X's model. Analyst Y used 5 years of data as a training set to develop a machine learning algorithm and 2 years of data to test the prediction performance of the model. Analyst X did not use separate data to train and evaluate the data.

(ii)
Analyst X's model appears to perform very well with high R-squared and low mean squared error, but we know nothing about the predictive power of the model. In comparison, Analyst Y's model doesn't seem to perform well, but the model's purpose (predicting weather to estimate cash payment more accurately for the coming month) aligns with the original purpose.

(iii)
Since this is a predictive model, Analyst Y’s model is the preferred model. She is following the approach of building the model and testing the model in two different datasets. In addition, Analyst Y’s model performance (R-squared, MSE) is in an acceptable range.

(h) **(LO 4a, 4b)** Explain which assumption or data source Big Ben should invest in for quality improvement.

Based on the information provided by case study, the utility company’s participation rate impacts the financial result greatly. So even a little information gain on utility company decision making can be very helpful. Big Ben should invest in quality improvement of utility participation data.

8. Spring 2021 CFE FD Exam (LOs 2a, 2c)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2c) Analyze the impact of accounting policies related to taxes and foreign exchange rates on financial statements

Sources:

CFEFD-S2-14-19 Robinson et al., International Financial Statement Analysis, Ch. ~~7~~ 6 Financial Analysis Techniques

CFEFD-S2-16-19 Robinson et al., International Financial Statement Analysis, Ch. ~~13~~ 9 Income Taxes

Case Study - Darwin

Commentary on Question:

This question is asking the candidate to show their ability to analyze the interrelationships between the income statement, cash flow statement, and balance sheet. Most candidates have trouble analyzing the impact of tax accounting. Some candidates entirely omitted this question.

Solution:

(a) **(LO 2c)** Calculate 2021-2024 cash tax payable, deferred tax payable, and post-tax net income for each line of business if the business is ceded to the subsidiary in Happy Tax Island. Show your work.

Commentary on Question:

Most candidates were able to calculate cash tax payables or were rewarded partials marks for showing their work. However, many candidates had trouble calculating the deferred tax payable.

Change in Tax Reserve = Increase in reserves & S/A Transfers * 0.9
Taxable Income = EBIT + Increase in reserves & S/A Transfers – Interest – Tax
Cash Tax = Taxable Income * 30%
GAAP Tax = (EBIT – Interest) * 30%
Deferred Tax = GAAP Tax – Cash Tax
Post-Tax Net Income = EBIT – Interest – Cash Tax – Deferred Tax

8. Spring 2021 Continued

Result: VA	**2021**	**2022**	**2023**	**2024**
Change in Tax reserves	584,325	726,660	934,200	1,318,050
Taxable income	94,925	116,440	153,450	221,350
Cash Tax	28,478	34,932	46,035	66,405
GAAP Tax	9,000	10,710	14,895	22,470
Deferred Tax	-19,478	-24,222	-31,140	-43,935
Post-Tax Net Income	21,000	24,990	34,755	52,430

Result: TL	**2021**	**2022**	**2023**	**2024**
Change in Tax reserves	46,170	52,470	58,320	64,170
Taxable income	43,030	43,230	43,780	44,830
Cash Tax	12,909	12,969	13,134	13,449
GAAP Tax	11,370	11,220	11,190	11,310
Deferred Tax	-1,539	-1,749	-1,944	-2,139
Post-Tax Net Income	26,530	26,180	26,110	26,390

Result: UL	**2021**	**2022**	**2023**	**2024**
Change in Tax reserves	137,043	164,340	192,969	221,796
Taxable income	55,047	55,370	52,591	51,784
Cash Tax	16,514	16,611	15,777	15,535
GAAP Tax	11,946	11,133	9,345	8,142
Deferred Tax	-4,568	-5,478	-6,432	-7,393
Post-Tax Net Income	27,874	25,977	21,805	18,998

Result: Term	**2021**	**2022**	**2023**	**2024**
Change in Tax reserves	10,800	11,880	13,140	13,590
Taxable income	33,300	36,120	38,160	37,710
Cash Tax	9,990	10,836	11,448	11,313
GAAP Tax	9,630	10,440	11,010	10,860
Deferred Tax	-360	-396	-438	-453
Post-Tax Net Income	22,470	24,360	25,690	25,340

Result: Others	**2021**	**2022**	**2023**	**2024**
Change in Tax reserves	-26,820	-8,010	-9,900	-18,360
Taxable income	48,620	61,610	48,600	39,185
Cash Tax	14,586	18,483	14,580	11,756
GAAP Tax	15,480	18,750	14,910	12,368
Deferred Tax	894	267	330	612
Post-Tax Net Income	36,120	43,750	34,790	28,858

(b) **(LO 2c)** Recommend which line of business to cede to the subsidiary in Happy Tax Island based on the results in (a). Justify your recommendation.

Commentary on Question:
Candidates did poorly on this question. Most candidate failed to realize that they should compare the cash tax calculated in part a) with the current tax payable for each line of business.

	VA	UL	TL	Term	Others
Current tax payable	10,500	13,900	13,300	11,200	24,400
New tax payable	28,478	16,514	12,909	9,990	14,586
Difference	**-17,978**	**-2,614**	**391**	**1,210**	**9,814**

Based on the above results, ceding the UL and VA block would increase Darwin's time zero tax payable. Since Darwin's preference is to reduce current tax payable, TL, Term, and other LOB are the business that would be preferential. Also, because Darwin only wants to cede one LOB, Darwin should choose the Others LOB to cede as it can result in the biggest savings.

(c) **(LO 2a, 2c)** Construct the 2021-2024 income statement for Darwin if all lines of business are ceded to the subsidiary in Happy Tax Island. (*3 points*) Construct the 2021-2024 income statement for Darwin if all lines of business are ceded to the subsidiary in Happy Tax Island.

Commentary on Question:
Candidates had trouble calculating the new earned rates but were still rewarded partial marks for using the correct formulas for EBIT, tax (30% tax rate) and net income.

8. Spring 2021 Continued

Total	2021	2022	2023	2024
REVENUES				
Premium - First Year	1,077,880	1,289,710	1,594,260	2,090,450
Premium – Renewal	293,230	329,160	365,520	401,560
Total Premiums	1,371,110	1,618,870	1,959,780	2,492,010
Net Investment Income = Asset supporting Stat Reserves * New Earn Rate	671,020	693,521	722,742	768,487
Other income	61,150	73,190	85,850	103,940
Total Revenues	2,103,280	2,385,581	2,768,372	3,364,437
BENEFITS AND EXPENSES				
Claims	143,730	168,890	198,370	235,170
Surrender and other benefits	722,420	726,080	791,210	863,940
Increase in reserves & S/A Transfers	835,020	1,052,600	1,320,810	1,776,940
Total Benefits	1,701,170	1,947,570	2,310,390	2,876,050
Field Compensation	119,100	138,800	161,100	193,200
Change in DAC	-75,070	-87,090	-100,330	-120,350
Total Acquisition Costs	44,030	51,710	60,770	72,850
Total Administrative Expenses	84,090	91,700	99,740	107,750
Total Benefits and Expenses	1,829,290	2,090,980	2,470,900	3,056,650
EBIT = Total Revenue – Total Benefit and Expenses	273,990	294,601	297,472	307,787
Interest	18,000	18,000	18,000	7,375
Tax = (EBIT – Interest) * 30%	76,797	82,980	83,841	90,123
Net Income = EBIT – Interest - Tax	179,193	193,621	195,630	210,288
Statutory Reserves	12,299,000	13,160,200	14,280,300	15,856,500
Asset supporting Stat Reserves = Stat Res *105%	12,913,950	13,818,210	14,994,315	16,649,325
Current Investment Income	606,450	624,430	647,770	685,240
Current Earned Rate = Current Investment Income / Asset supporting Stat Reserves	4.70%	4.52%	4.32%	4.12%
New Earn Rate = Current Earned Rate + 50bps	5.20%	5.02%	4.82%	4.62%

(d) **(LO 2a, 2c)** Complete the summary Kaladin requested. Show your work.

Commentary on Question:
Candidates struggled with this part of the question.

8. Spring 2021 Continued

From part c)

2021 Change in Tax Reserve
= Increase in reserves & S/A Transfers * 0.9
= 835,020 * 0.9
= 751,518

2021 Taxable Income
= EBIT + Increase in reserves & S/A Transfers – Interest – Tax
= 273,990 + 835,020 - 751,518 - 18,000 = 339,492

2021 Cash Tax
= 2021 Taxable Income * 30%
= 101,848

	Net Change	**Total cash tax**	**Comments**
Current tax payable	67,000	67,000	
plus inpact due to Change in tax reserve	29,226	96,226	Change = 835,020 (Increase in reserves & S/A Transfers) * 10% * 35%
plus impact due to change in tax rate	-13,746	82,480	Change = 209,420 (EBIT pre-reinsurance)
plus impact due to change in asset base	0	82,480	
plus impact due to change in earned rate	19,371	101,851	Change = (671,020 (new investment income) - 606,450 (old investment income))*30%
Post-reinsurance tax payable	101,851	101,851	
Unexplained		3	Due to rounding in the case study

1. Fall 2020 CFE FD Exam (LOs 1a, 1b, 1c)

Learning Objectives:

1. The candidate will understand how an organization 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) Evaluate and apply the methods to determine the value of a business or project, including the impact of financial and non-financial factors on capital budgeting and allocation decisions

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

Sources:

~~Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 18: Capital Budgeting and Valuation with Leverage~~

~~Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 25: Leasing~~

~~Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 27: Short Term Financing~~

~~Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 28: M&A~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 10: Framework for Valuation (excluding “Problematic Modifications to Discounted Cash Flow” and “Alternatives to Discounted Cash Flow” sections)

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 22: Leases

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 31: Mergers and Acquisitions

~~Aswath Damodaran, Damodaran on Valuation, Ch 15: The Value of Synergy~~

1. Fall 2020 Continued

~~Dean LeBaron and Lawrence S. Speidell, Why Are the Parts Worth More than the Sum? "Chop Shop", A Corporate Valuation Model~~

~~Vyas, Krishna Kant, Corporate Restructuring and Value Creation~~

~~Caldwell, A Framework for Board Oversight of Enterprise Risk, CPA Canada~~

Case Study – Blue Jay Air (BJA)

Commentary on Question:
Commentary listed underneath question component.

Solution:
~~(a) Critique Doe's statement.~~

~~**Commentary on Question**~~:
~~*Answers to this question looked at diversification from one of two perspectives – either from an investor's perspective or from the company's perspective. Either perspective was acceptable. Answer 1 comes from the investor's perspective. Answer 2 shows an acceptable answer from the company's perspective.*~~

~~Answer 1 (investor perspective): Diversification alone is not a good reason to move forward with an acquisition. Shareholders can diversify better on their own by diversifying their portfolio of shares. Diversification is a financial synergy that proponents of acquisitions use to justify acquiring a company. However, diversification is one of the least likely financial synergies to actually be realized in the process.~~

~~BJA could look at earnings enhancement synergies instead since SEA operates in a very different competitive product space than BJA, focusing on local, unique locations in the Pacific Northwest compared to BJA's typical hub and spoke routes.~~

~~Answer 2 (company perspective): Doe has a point to what she is saying. Diversification is not sufficient if it's the only reason; however, it could be part of the justification for an acquisition. Many things go into the decision of an acquisition and when it comes to BJA and SEA, there might be other cost synergies, expertise knowledge base, and economies of scale that highlight the benefits of the acquisition along with diversification. In this particular situation, I don't think that diversification would even be that large of a contributor to the decision since BJA and SEA are both in the aviation business. They both require similar raw materials for their planes: fuel, parts, etc. and they would be hit by similar reduction in business if there were catastrophic events (like 09/11/2011) that impact the comfort level customers have with the aviation business.~~

1. Fall 2020 Continued

(b) **(LO 1c)** Explain the synergy and economies of scale that BJA would gain if it were to acquire SEA.

Commentary on Question:
Each of the statements should be supported by the case study or information in the question itself.

A source of synergy is that it could leverage SEA's aircraft restoration capabilities. BJA has a need to upgrade their fleet, and SEA does this on seaplanes for customers from all over the world. However, SEA does this for seaplanes and not passenger jets, so to realize this synergy would require a lot of planning. SEA has a highly skilled maintenance team and large capacity in their maintenance hangars, so with the right planning, this synergy stands to generate significant value for BJA.

BJA has cut back on most of its training programs except for safety, but SEA has robust training programs (especially for safety) that BJA could potentially begin to offer once again with the acquisition of SEA.

SEA wants to set up partnerships with larger airline companies who have Vancouver and Seattle operations, which BJA has. Being able to better coordinate these flights would help create some economies of scale.

BJA stands to gain some financial synergies as well from SEA, as it is much more liquid than BJA is. Specifically, a cash slack synergy could be realized a SEA is relatively cash-rich but due to its small size might not be pursuing as many investment opportunities as it could if acquired by BJA.

BJA can leverage SEA's weather/safety management process to increase the efficiency of flight cancellations and delays, potentially resulting in a financial synergy by expanding operating margins.

BJA needs to revamp its booking process, and SEA has a well-developed online booking system, even praised by its customers as easy to use. BJA could leverage SEA's already-existing online booking infrastructure to revamp their own booking system at a lower cost, using SEA's expertise in this area to ensure that revamping the booking process generates value.

(c) **(LO 1c)** Explain Doe's concerns with respect to the following.

~~(i) Probability of completing the acquisition of SEA~~

~~(ii) Control of SEA~~

1. **Fall 2020 Continued**

(iii) Cost to purchase SEA

(iv) Ability of BJA to unlock value in SEA

~~Because Bill has a majority position, as long as Bill cooperates on the acquisition, the acquisition can be completed. However, Doe is concerned because disagreements amongst the board can turn an otherwise friendly takeover into something that becomes lengthy and more costly, as these board members might demand a higher premium price in order to go along with the acquisition.~~

~~By purchasing Bill's 60% stake, BJA will effectively have control of SEA. Because BJA will have majority ownership, they can replace the board of directors, if necessary, to retain control of the company.~~

The cost to purchase SEA may go up because of Bill's sister and the foundation. If they are resistant to the acquisition, they can demand a higher premium for the acquisition and convince Bill to seek one too. Although Bill's majority stake allows his appointees on the board to outvote his sister and the foundation's, there is still some risk to increased cost here. While not a fully hostile takeover, it will not be completely friendly either.

Unlocking value in SEA after acquisition requires a good amount of due diligence and planning. Synergies can only be realized if there are plans in place to realize them, and resistance to these plans by Bill's sister and the foundation could limit their ability to add value.

(d) **(LO 1c)** Recommend if BJA should retain SEA management upon acquisition. Justify your recommendation.

Commentary on Question:
Candidates should make a recommendation and justify that recommendation.

BJA should retain SEA management upon acquisition. While retaining acquisition management typically represents a risk in the acquisition especially when strategic visions are not aligned, SEA has operational expertise that should provide significant synergy benefits to BJA. Without SEAs management BJA could lose this expertise including:

- Knowledge of seaplane operations
- Pilot training program
- Maintenance staff training program and expertise

1. Fall 2020 Continued

BJA should mitigate the risk of maintaining SEAs management by carefully overseeing the integration of BJA and SEA operations while also managing the SEA knowledge that could be lost without SEA management.

(e) **(LO 1a, 1b)** Critique Doe's statement.

Doe is correct that in a perfect capital market with competitive prices, leasing vs. buying should be a comparable decision from a net present value (NPV) perspective. However, there do exist valid reasons for leasing and since BJA is already highly-leveraged, leasing may make more sense. Purchasing the fleet would require a lot of upfront capital that BJA simply doesn't have at its disposal. A key risk management objective is to maintain the credit rating of the company and taking out more debt to fund a fleet expansion will increase their already high leverage ratio and could negatively impact their credit rating.

(f) **(LO 1a, 1b)** Explain four benefits to BJA of leasing the additional planes.

1. Reduced resale costs: could obtain easier access to purchasers of the planes at the end of the leasing period than it could find if it bought the planes outright
2. Expertise: The lessor of seaplanes could provide maintenance services/laborers/classes that would reduce BJAs costs to obtain this information on their own
3. Improved incentives: Assets obtained under lease arrangements can be treated better since the company does not own the asset themselves and any extraneous damage to the asset caused by negligence will likely incur costs from the lessor
4. Reduced distress costs and increasing debt capacity: BJA can avoid taking out debt in order to finance a direct purchase. One of BJA's objectives is to retain a BBB- credit rating or higher and using a lease could work towards this objective and help avoid interest rate exposure.

~~(g) Recommend a financing option to support leasing more planes to fulfill BJA's expansion plans. Justify your recommendation.~~

~~**Commentary on Question**~~:
~~*There are many acceptable solutions to this part. Successful candidates made a recommendation and justified it with information from the question and the case study.*~~

~~I'd recommend getting a short-term loan from RPPC to fund the leasing. It is because BJA already have a negative equity. It would be very difficult and expensive for BJA to get a funding externally. $100m of annual lease expenditure could be supported by the expected revenue of $270m.~~

2. Fall 2020 CFE FD Exam (LOs 2a, 2b)

Learning Objectives:

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

Learning Outcomes:

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

(2b) Identify unusual or questionable accounting practices and analyze their impact on the quality of key financial metrics

Sources:

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

Robinson et al., International Financial Statement Analysis, Ch. ~~17~~ 11 ~~Evaluating~~ Financial Reporting Quality ~~of Financial Reports~~ ~~(Section 1-6 Only)~~

Case Study – Blue Jay Tire (BJT)

Commentary on Question:

This question is trying to test candidate's ability to identify and analyze the impact of unusual accounting practices on the quality of earnings, including recognizing the signs of questionable accounting. Candidate should know the major types of ratios, what they are used for, and be able to perform analysis to compare with industry norms. Candidates are also expected to have a good understand of Altman Z-score ~~and the Beneish Model~~.

Solution:

(a) **(LO 2a, 2b)** Evaluate how each action individually impacts BJT's financial statements.

Commentary on Question:

In order to earn full marks, candidate must be able to identify/explain the issue as well as state the impact on financial statements.

(i) BJT's activity ~~is referred to as "channel stuffing", this activity~~ inflates the current results by pulling future sales into present. This will accelerate revenue and enhance earnings to make BJT's income statement look more appearing than reality.

(ii) Income Taxes Payable should be classified as current liabilities as oppose to non-current liabilities. This misclassification will mislead investors by show a more attractive financial ratio (e.g. current ratio) comparing to BJT's peers for financial strength analysis.

2. **Fall 2020** Continued

(iii) Classification shifting from investing cashflow to operating cashflow does not change the total cashflows but creates inconsistency between financial years. This can affect investor's evaluation of BJT's cashflows (trend analysis) and expectations for future cashflows.

(b) **(LO 2a)**

(i) Analyze Day's Sales Outstanding and Accounts Receivable Turnover for BJT for financial reporting year 2018 and 2019. Show your work.

(ii) Evaluate BJT's sales and receivables as compared to industry norms.

Commentary on Question:
Many candidates failed to recall and calculate the ratios correctly. Candidates are expected to know what the ratios are used for, and be able to perform analysis with them to compare to industry benchmarks.

(i)
Days Sales Outstanding = Account Receivable / (Revenue /365)

Account Receivable Turnover = 365/ Days sales outstanding

DSO(2018) = 108 / (366/365) = 107.7

DSO(2019) = 113 / (385/365) = 107.1

ART(2018) = 365/ DSC(2018) = 3.39

ART(2019) = 365/ DSC(2019) = 3.41

BJT's ART and DSO ratios are both relatively stable for financial reporting year 2018 and 2019.

(ii)
Number of days sales outstanding indicates how fast receivables are paid each year. BJT's DSO ratio is high comparing to industry average, indicating that receivables were not being collected on a timely basis, or possibly that revenue may not be right in the first place.

Account receivable turnover is the number of times the receivables are converted to cash each year. BJT's ART ratio is very low in both 2018 and 2019 comparing to industry average, indicating that cash is being collected in an extremely slow manner.

2. Fall 2020 Continued

(c) **(LO 2a)**

(i) Assess the likelihood of bankruptcy using Altman's Z-score on BJT's 2019 financials, replacing Market Value of Equity with the Book Value. Show your work.

(2) Recommend four ways for BJT to improve its current Altman's Z-score. Justify your recommendation.

Commentary on Question:
Most candidates were able to calculate the Z-score but some failed to comment on the likelihood of bankruptcy. In order to receive full marks in part ii), candidates also needed to justify their recommendations.

(i)
Altman Z-score = 1.2*(592-244)/1420+1.4*(271/1420)+3.3*(78/1420)+ 0.6*(496/923)+ (385/1420) = 1.34

Since Altiman Z-score is 1.34 (<1.81), the probability of BJT going bankrupt appears to be elevated.

(ii)
BJT could improve its's current Altman Z-score by doing any of the following:

1) Improve asset turnover. Sales of $385M on $1,420M of assets appears to be a very low Asset Turnover ratio.
2) Improve operating returns. EBIT/Total Assets = 78/1420 = ~6% indicates that either industry is very competitive, or management isn't doing a great job.
3) Increase working capital (current liabilities could be reduced. Current assets are also relatively small compared to total assets).
4) Replace some of the $923M of liabilities with equity. Very high E/D ratios almost guarantee a good Z-score."

~~(d)~~

~~(1) Explain specific implications for BJT based on the components of the Beneish Model below. Show your work.~~

~~I. Gross Margin Index (GMI)~~
~~II. Sales Growth Index (SGI)~~

~~(2) Assess the likelihood of misreporting for BJT if M-score is -1.47. Show your work.~~

~~**Commentary on Question**:~~
~~*Many candidates failed to calculate the index correctly.*~~

~~2. Fall 2020 Continued~~

~~(i)~~
~~GMI = Gross margin t-1 / Gross margin t~~
~~SGI = Sales t / Sales t-1~~

~~GMI (2019) = 140/171 = 0.8187~~

~~GMI of 0.8187 means that the gross margin is increasing, a healthy growing margin implies lower chance of manipulate earnings.~~

~~SGI = 385/366 = 1.0519~~

~~SGI of 1.0519 means that the sales growth is positive related to the previous year. BJT could be predisposed to manipulate earnings to manage perceptions of continuing growth and to obtain capital needed to support growth.~~

~~(ii)~~
~~By looking up the Normal CDF table, the probably of manipulation = 1 - 0.9292 = 0.0708~~

~~The probability of manipulation for BJT is 7.09%. Although the classification of companies as manipulators depends on their relative cost of type I and type II errors, the value greatly exceeds the cut off of 2.9% the Beneish identified as the relevant cut off. Therefore, the likelihood for misreporting for BJT is high.~~

~~(e) Explain two specific areas of concern for any investment decision in BJT.~~

~~**Commentary on Question**:~~
~~*Many candidates failed to recognize BJT's issue with questionable sales figures or revenue recognition practice. However, partial credit was given if other areas of concerns were identified.*~~

~~Based on the Beneish Model results and the other financial information identified above regarding BJT's practices, there is a chance that BJT could be currently misreporting. This implies that any investor in BJT lacks a reliable source of information about the firm due to not being able to rely on the financial statements.~~

~~The results of the Z-Score also indicates that BJT has a high-than-threshold bankruptcy risk. Although BJT is unlikely to go bankrupt as it is a subsidiary of RPPC, investors should still be concerned for their investment.~~

~~Based on the two areas of concerns identified above, potential investors should avoid investment in BJT.~~

7. Fall 2020 CFE FD Exam (LOs 1c, 2a)

Learning Objectives:

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

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

Learning Outcomes:

(1c) Assess the impact on value creation from business strategies such as acquisitions, divestitures, or reinsurance

(2a) Analyze the reported financial statements and the interrelationships among them, in order to measure financial performance

Sources:

Robinson et al., International Financial Statement Analysis, Ch. ~~7~~ 6 Financial Analysis Techniques

~~Jonathan Berk and Peter Demarzo, Corporate Finance, Fourth Edition, Ch 28: M&A~~

Koller, Goedhart, and Wessels, Valuation: Measuring and Managing the Value of Companies, 8th Edition, Ch 31: Mergers and Acquisitions

Case Study – RPPC, Seaplane Expeditions and Aviation Company (SEA)

Commentary on Question:

Candidates should demonstrate an understanding of financial ratios and how to utilize them to analyze annual statements and inform business decisions. The candidates should know the major types of ratios, what they are used for, and be able to perform analysis to compare two companies.

Solution:

(a) **(LO 2a)**

(i) Explain the purpose of each of the Activity, Liquidity, Solvency, and Profitability ratios.

(ii) Recommend a specific ratio within each ratio type in (i) that will be useful to analyze the potential acquisition. Justify your recommendation.

7. Fall 2020 Continued

Commentary on Question:
(i) *Candidates generally understood the ratios and were able to explain their purposes.*
(ii) *Many candidates could provide examples of specific ratios and discussed their recommendation. Candidates should keep their answers tied to the case study.*

Activity ratios measure the efficiency of a company's operations, such as collection of receivables or management of inventory.

Major activity ratios include inventory turnover, days of inventory on hand, receivables turnover, days of sales outstanding, payables turnover, number of days of payables, working capital turnover, fixed asset turnover, and total asset turnover.

Comparing the Receivables Turnover between SEA and BJA would provide significant insight into whether there might be any efficiencies in collecting payments from customers at BJA that could be gained at SEA upon acquisition.

Liquidity ratios measure the ability of a company to meet short-term obligations.

Major liquidity ratios include the current ratio, quick ratio, cash ratio, and defensive interval ratio. Current Ratio would be important to know in order for RPPC to know how the overall liquidity profile of their conglomerate might change, which would be especially important if airline sales were to decrease unexpectedly.

Solvency ratios measure the ability of a company to meet long-term obligations.

Major solvency ratios include debt ratios (including the debt-to-assets ratio, debt-to-capital ratio, debt-to-equity ratio, and financial leverage ratio) and coverage ratios (including interest coverage and fixed charge coverage). Debt-to-equity Ratio is something that RPPC would potentially want to adjust for their own target, in order to calculate the value of the company to them.

7. Fall 2020 Continued

Profitability ratios measure the ability of a company to generate profits from revenue and assets.

Major profitability ratios include return on sales ratios (including gross profit margin, operating profit margin, pretax margin, and net profit margin) and return on investment ratios (including operating ROA, ROA, return on total capital, ROE, and return on common equity).Gross profit margin may provide some indication of marginal profitability to RPPC if they believe there is some level of scale at BJA that could be utilized for managing SEA.

(b) **(LO 2a)**

(i) Perform a DuPont analysis using the five-way decomposition method on the 2019 financials for both BJA and SEA. Show your work.

(ii) Contrast three structural differences between BJA and SEA, based on the DuPont analysis.

Commentary on Question:
Candidates had difficulty with the DuPont analysis and the application of the financial ratios.

(i)
Five way DuPont Analysis:

$$\frac{\text{Net income}}{\text{Average shareholders' equity}} = \frac{\text{Net income}}{\text{EBT}} \times \frac{\text{EBT}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{Revenue}} \times \frac{\text{Revenue}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average shareholders' equity}}$$

which can be interpreted as:

$$\text{ROE} = \text{Tax burden} \times \text{Interest burden} \times \text{EBIT margin} \times \text{Total asset turnover} \times \text{Leverage}$$

				Tax Burden		Interest Burden		EBIT Margin		Total assets turnover		Leverage	
SEA	ROE	Income	217	Net Income	217	Earnings before tax	334	Earnings before interest and tax	457	Revenues	10920	Average 18/19 Assets	6500
		Equity	2627	Earnings before tax	334	Earnings before interest and tax	457	Revenue	10920	Average 18/19 Assets	6500	Average 18/19 Equity	2627
			8.3%		65.0%		73.1%		4.2%		168.0%		247.4%
BJA	ROE	Income		Net Income	117	Earnings before tax	126	Earnings before interest and tax	167	Revenues	1841	Average 18/19 Assets	1485.5
		Equity		Earnings before tax	126	Earnings before interest and tax	167	Revenue	1841	Average 18/19 Assets	1485.5	Average 18/19 Equity	-172
			-68.0%		92.9%		75.4%		9.1%		123.9%		-863.7%

7. Fall 2020 Continued

(ii)
Some observation on structural differences between BJA and SEA are given below:

- SEA has a much higher tax burden as compared to BJA
- BJA has a better margin than SEA, pointing to lower expenses per dollar of revenue
- SEA has a higher asset turnover ratio, pointing to a more efficient use of inventory
- BJA is much more leveraged than SEA (higher debt to equity ratio)

(c) **(LO 2a)**

(i) Perform a horizontal analysis over 2017-2019 for each of BJA and SEA using an appropriate liquidity ratio. Show your work.

(ii) Compare BJA's and SEA's ability to meet liquidity needs over the past 3 years.

Commentary on Question:
Many candidates had difficulty with this part as well. Candidates needed to apply the financial ratios to information from the case study.

(i)

		2019	2018	2017
SEA	Current Ratio	145%	147%	149%
	Quick Ratio	82%	83%	84%
	Cash Ratio	47%	47%	48%
	Defensive Int	75.0	77.2	77.7

	2019	2018	2017
Current Assets	**3,669**	**3,611**	**3,555**
Cash & Short-Term Investments	1,179	1,161	1,143
Receivables	890	876	862
Current Liabiliti	2,532	2,458	2,387
Total Operating Expenses	**10,463**	**10,019**	**9,801**
Depreciation & Amortization	393	387	381

		2019	2018	2017
BJA	Current Ratio	173%	162%	132%
	Quick Ratio	106%	102%	78%
	Cash Ratio	70%	65%	37%
	Defensive Int	135.1	126.7	79.1

	2019	2018	2017
Current Assets	**966**	**701**	**406**
Cash & Short-Term Investments	390	283	113
Receivables	200	160	127
Current Liabiliti	558	432	309
Total Operating Expenses	**1,691**	**1,352**	**1,176**
Depreciation & Amortization	96	77	67

(ii)
BJA is in a better liquidity position than SEA, i.e. better able to meet its short-term obligations.

BJA has improved its liquidity position substantially over the last 3 years whereas SEA has maintained a relatively stable ratio.

7. Fall 2020 Continued

(d) **(LO 1c, 2a)** Recommend whether SEA should be acquired as a direct subsidiary of RPPC or incorporated into BJA. Justify your response.

Commentary on Question:
The answer to this question is very broad. Acceptable responses varied and included arguments involving tax, funding, currency, synergy and other cross-benefits. Candidates needed to build a recommendation and justify it.

BJA should pursue SEA through acquisition to be a direct subsidiary.

SEA shows revenue growth in both passenger and other and strong profitability, despite some increase in the cost of fuel in 2019. Additionally, SEA has a healthy debt to equity ratio.

There are promising synergies to be had from the acquisition. Primarily the pilot training program the SEA has can supplement or potentially replace BJA's training program, which is of high importance to BJA. Additionally, SEA's presence in Canada could help BJA's ambitions to expand internationally. There are also efficiencies to be had with airplane maintenance and fuel costs. As a larger company they can reduce redundancies and perhaps achieve lower prices or at least leverage better processes or systems for maintenance and fuel costs.

~~(e) Based on the Framework for Board Oversight of Enterprise Risk,~~

~~(i) Describe four areas the RPPC Board should focus on during the due diligence process.~~

~~(ii) Evaluate the level of involvement the RPPC Board would have with respect to each of the risks listed in SEA's Risk Profile (Case Study Section 9.3) after acquisition.~~

~~**Commentary on Question**:~~
~~*Candidates did well on this part of the question.*~~

~~(i)~~
1. ~~Review in advance scope of the due diligence plan~~
2. ~~Should perform comprehensive customer interview in addition to the financial, legal and operational due diligence~~
3. ~~Should perform due diligence on SEA existing leadership if RPPC to keep current management~~
4. ~~Stress testing using financial modeling especially if the acquisition requires external financing~~

~~7. Fall 2020 Continued~~

~~(ii)~~

- ~~Level 1 risks include customary operational risks, such as health, safety and environment and facility or system disruption, and other risks where the potential adverse effect on the business is moderate or has been offloaded such as through an insurance program or other means. Provided the board is satisfied with the efficacy of the risk management systems and processes, board oversight for Level 1 Risks would involve customary questioning, review of periodic reporting, counselling and monitoring.~~

- ~~Level 2 Risks-Board involvement in risk oversight would be heightened for Level 2 Risks, which fall into two categories:~~
    1. ~~High-impact risks that cannot be adequately mitigated~~
    2. ~~Risks involving the presence of management bias.~~

10. Fall 2020 CFE FD Exam (LOs 4a, 4b)

Learning Objectives:

4. The candidate will understand the appropriate application of evolving quantitative methods and technologies that help to manage the business.

Learning Outcomes:

(4a) Evaluate the appropriateness of applying evolving methods and technologies to manage specific business issues

(4b) Apply evolving methods and technologies for quantifying and managing business risks and opportunities

Sources:

~~ASB, Proposed ASOP on Modeling~~
Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics, Ch. ~~8~~ 9 Evaluation~~s~~

Kelleher, Mac Namee, and D'Arcy, Fundamentals of Machine Learning for Predictive Analytics, Ch. ~~10~~ 12 Case Study: ~~Galaxy Classifications~~ Customer Churn

Commentary on Question:
Commentary listed underneath question component.

Solution:

~~(a) Describe two best practices recommended in Actuarial Standard of Practice No. 56 to evaluate a predictive model.~~

~~**Commentary on Question**:~~
~~*Candidates generally did well for this part, best practices were correctly named with reasonable description.*~~

~~Model output validation: The actuary should evaluate whether the model applied to hold-out data produces model output that is reasonably consistent with model output developed without the hold-out data, as may be used for predictive models.~~

~~Model meeting the intended purpose: When evaluating a model, the actuary should confirm that, in the actuary's professional judgment, the model reasonably meets the intended purpose.~~

10. Fall 2020 Continued

(b) **(LO 4a, 4b)**

(i) Interpret the Recall results.

(ii) Interpret the Precision results.

(iii) Critique the CEO's statement.

Commentary on Question:
Most candidates were able to interpret the recall and precision results correctly. However, only a few candidates critiqued the CEO's comments with respect to ABC's goal of the predictive model which were time and accuracy.

(i) Recall is equivalent to true positive rate (TPR). Recall tells us how confident we can be that all instances of the target level have been found by the model. The model correctly classifies the 'Preferred' contracts 96% of the time and misclassifies them 4% of the time. The model correctly classifies the 'Standard' contracts 56% of the time and misclassifies them 44% of the time.

(ii) Precision captures how often, when a model makes a prediction, this prediction turns out to be correct. Precision tells us how confident we can be that an instance predicted to have the target level actually has the target level. When the model predicts 'Premier', it has correctly classified a 'Premier' contract as 'Premier' 88% of the time and misclassified a 'Standard' contract as 'Premier' 12% of the time. When the model predicts 'Standard', it has correctly classified a 'Standard' contract as 'Standard' 80% of the time and misclassified a 'Premier' contract as 'Standard' 20% of the time.

(iii) The CEO is incorrect. The CEO might be looking at the class accuracy which is 86%, whereas the average class accuracy of 75.7% does not meet ABC's goal of 90%. The Profit Matrix shows that misclassifying a Premier contract as Standard results in a loss of $100, which is the loss due to not getting the business. ABC will want high accuracy for both Premier and Standard classifications in order to meet the average class accuracy goal given the frequency of Premier and the cost of misclassifying Standard.

(c) **(LO 4a, 4b)** Recommend a credit review approach that meets ABC's goals. Justify your recommendation.

10. Fall 2020 Continued

Commentary on Question:
Very few candidates recommended a 2-stage model which meets both the time and accuracy goal of ABC. Credit was given to alternative responses if it showed that the model could meet ABC's goal.

A 2-stage model is recommended – 2-stage model means the premier+ and premier will be using the predictive model since both the recall and the precision results are good. The standard++, standard+ and standard class will be manually underwritten to improve its results.

This 2-stage model will satisfy ABC's goal for both time and accuracy:

Average class goal of 90%:
The recall for standard++, standard+ and standard class will be 100% if they were underwritten manually, therefore the average class accuracy of the 2-stage model is expected to be 98%=(96%+96%+100%+100%+100%)/5。

At least 50% reduction in processing time of current portfolio:
Current processing time is 161 days – 1 day each for 161 policies.

The expected processing time of the 2-stage model is 33 days (1 day each for 33 policies and instant results for the rest of the policies). Therefore, the processing time is cut by 80%.

(d) **(LO 4a, 4b)**

(i) Explain the downside to relying on stability index results.

(ii) Recommend next steps for ABC based on the stability index results. Justify your recommendation.

(i) A stability index does not directly measure the performance of a model. A high stability index may reflect a change in the underlying population rather than a change in model performance. Relying solely on a stability index can lead to models being rebuilt when it is not required.

(ii) At T1, the stability index is 0.179, which is between 0.1 and 0.25 and indicates that some change has occurred, and further investigation may be useful.

At T2, the stability index is 0.320, which is greater than 0.25 and suggests that a significant change has occurred, and corrective action is required.

10. Fall 2020 Continued

Although the high stability index reflects the change in the underlying population, it is important that ABC take corrective action because the Standard classes are growing faster than the Premier classes. The current 5-class model does not predict these classes well and the misclassification of these classes is very costly.