

Exam CFEFD

MORNING SESSION

Date: Wednesday, May 1, 2019

Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).
 - a) The morning session consists of 7 questions numbered 1 through 7.
 - b) The afternoon session consists of 5 questions numbered 8 through 12.

The points for each question are indicated at the beginning of the question. Questions 1 – 5 pertain to the Case Study.
2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam CFEFD.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

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Tournez le cahier d'examen pour la version française.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

****BEGINNING OF EXAMINATION****

Morning Session

*Questions 1 – 5 pertain to the Case Study.
Each question should be answered independently.*

1. (7 points) Frenz wants to build a contingency risk margin into the Vietombia project. The new CRO likes the Market Cost of Capital (MCoC) approach for Solvency II and would like to develop a similar methodology.

(a) (3 points)

- (i) Describe the difference between the MCoC approach and the Percentile approach.
- (ii) Provide four reasons why the CRO Forum recommends the MCoC approach.
- (iii) Explain how to apply the MCoC approach to Frenz.

The CRO wants you to calculate the Market Value of Margins (MVM) for the Vietombia project. You estimate the capital requirements of the non-hedgeable risks to be \$60M, running off uniformly to \$0 at the end of five years, and a discount rate of 5%.

(b) (2 points) Calculate the MVM for the Vietombia project using the MCoC approach. Show your work.

The CRO mentions that one of the reasons he favors a MCoC approach is because he is worried about “Down but not Out” scenarios.

(c) (2 points)

- (i) Describe the “Down but not Out” concept.
- (ii) Provide three examples of events that could put Frenz into a “Down but not Out” situation. Justify your response.

Questions 1 – 5 pertain to the Case Study.
Each question should be answered independently.

- 2.** (9 points) Frenz has hired your company to assess the risks of the Vietombia Proposal. You schedule a meeting with the Frenz senior officers to discuss their various concerns.

Mr. Pirot, Frenz’s Marketing VP, says “The coffee price is our number one concern! Without a competitive price, it is not worth pursuing the Vietombia Proposal.”

Your colleague expands the existing Frenz supply-demand risk model (Case Study Section 4.3, Exhibit 2) to stochastically project coffee prices for Frenz with the Vietombia Proposal (Case Study Section 4.3, Exhibit 5b). The revised model uses expected coffee prices from the Vietombia Proposal with no further model assumption changes.

- (a) (1 point) Analyze the results of the coffee price risk analysis shown in the Case Study Section 4.3, Exhibit 5b.
- (b) (2 points) Describe four risk exposures specific to the Vietombia Proposal that are not captured in the coffee price risk analysis.

Mr. Jacobs, Frenz’s CEO, says “The political risk is huge! There is no way to measure this exposure for Frenz.”

- (c) (2 points) Outline how to estimate the risk of political instability in Vietombia.

Mr. Jansen, Frenz’s CFO, says, “The increased foreign currency exposure is unmanageable!”

You propose a currency model based on two factors: the 3-month Vietombia government rate and the 3-month swap rate. Jansen insists that your model needs more factors. He suggests that you add MSCI Asia equity returns, Vietombia unemployment rate, and Vietombia GDP. Your analysis shows that the five factors fit the *Rubiaceae* historical data better than two factors, but you are concerned about the increased model complexity.

- (d) (2 points)
- (i) Explain why a better fit of available data may not justify increased model complexity.
- (ii) Describe a technique to reduce model complexity.

2. Continued

Mr. Kaplan, Frenz's CRO, says "All these risk analyses are performed in silos! We need to assess the potential Vietombia risk exposure holistically."

- (e) (2 points) Propose a stress scenario for the Vietombia Proposal that addresses the concerns of Kaplan, Jansen, Jacobs, and Pirot.

Questions 1 – 5 pertain to the Case Study.
Each question should be answered independently.

- 3.** (11 points) An investment analyst complains that minority shareholders of Frenz are being ill-served. Her investment report states: “Frenz is in the low-margin coffee business so there is no reason to stockpile cash except to insulate its managers from making hard decisions on running the business efficiently. Paying shareholders a half-cent dividend when the company made over 50 cents per share is unfair. With a recent reduction of Frenz’s corporate tax rate to 21%, they should set-up a reliable dividend program to reward shareholders for their patience with the company.”

Frenz CEO, Julien Jacobs, responds by tweeting: “More fake news! Frenz using cash to take advantage of GREAT opportunities. Vietombia Project 👍👍👍”

- (a) (1 point) Identify four agency costs to Frenz of retaining cash.
- (b) (2 points) Compare and contrast the benefits to Frenz of funding projects with cash vs. debt.
- (c) (2 points) Calculate the return on the Vietombia project to shareholders if it is funded with \$100 million of Frenz’s accumulated cash assuming the equity cost of capital is 14%. Show your work.
- (d) (2 points) Calculate the return on the Vietombia project to shareholders if it is funded with a 5-year \$100 million interest-only loan. Show your work.
- (e) (1 point) Explain additional considerations for the loan in part (d) if the borrower were a Frenz subsidiary, based in Vietombia, instead of Frenz.
- (f) (1 point) Describe how dividends may impact the value of management stock options.

Frenz announces a plan to pay a one-time special dividend of \$2 to shareholders in six months.

- (g) (2 points)
 - (i) Describe how this plan is expected to impact Frenz’s share price over the next six months.
 - (ii) Explain how the special dividend may impact Frenz’s share price in the long-term.

Questions 1 – 5 pertain to the Case Study.
Each question should be answered independently.

- 4.** (8 points) You are an analyst at Big Ben Bank. Big Ben is considering an \$80 million loan request from Blue Jay Air for its fleet upgrade proposal (CS Section 2.6, exhibit 4). The loan proceeds will be used to cover part of the initial expenditure.
- (a) (4 points)
- (i) Evaluate four elements with regards to Blue Jay Air that will affect Big Ben’s decision.
 - (ii) Evaluate each of the three fleet upgrade proposals for its impact on the loan decision, given the information available.
 - (iii) Identify additional information for each proposal that would help with Big Ben’s decision. Justify your response.
- (b) (1 point) Describe two covenants Big Ben should include in the loan document to mitigate default risk.

In addition to the Blue Jay Air loan request, Big Ben is also evaluating the following two projects:

- I. Financing Frenz’s Vietombia proposal (CS section 4.2.3 and 4.3 exhibit 5)
 - II. Consulting on the securitization of Blue Ocean’s marine insurance line (CS section 5)
- (c) (1 point) Assess the appropriateness of Big Ben’s 15% hurdle rate for each of the three projects.

Big Ben’s CRO suggests increasing the hurdle rate to 20% for all divisions, saying, “Using a high hurdle rate in capital allocation will make the company more risk averse and will protect the value of the company. All divisions should meet this same standard.”

- (d) (2 points) Critique the CRO’s suggestion.

Questions 1 – 5 pertain to the Case Study.
Each question should be answered independently.

- 5.** (8 points) Blue Ocean (Case Study Sections 5.1.4-8) is reviewing its financial projections and capital requirements.

Geoff Olive, CRO, states, “Our required capital calculation aims to cover most of the tail risks.”

- (a) (2 points) Critique Olive’s statement.

Andrew Grey, EVP of Business Operations, views the current required capital amount to be too high. He states, “If we calculate the required capital amount as VaR 90, our projected ROEs will improve.”

- (b) (2 points) Critique Grey’s statement.

Anne Green, the Chief Actuary, suggests that the required capital be calculated as VaR 99.5% in accordance with Solvency II standards.

- (c) (2 points)

- (i) Calculate Blue Ocean’s required capital as suggested by Green. Show your work.
- (ii) Recommend an improvement to Blue Ocean’s required capital calculation. Justify your recommendation.

Michael Tan, CFO, suggests that stress tests be developed to gain a better understanding of the Marine, Pet, and Travel Insurance tail risks.

- (d) (2 points)

- (i) Describe four ways in which stress testing can provide valuable information that may not be available with a VaR analysis.
- (ii) Propose an appropriate stress test for Blue Ocean. Justify your proposal.

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6. (11 points) Taylor, Inc. is a successful producer of high-end liquor with a dominant position in its domestic market due to exclusive access to unique ingredients. It is looking to expand into one new country and has narrowed its search to four countries. Taylor has conducted market surveys in three countries and classified the results as favorable or unfavorable for expansion.

Country	Number of Market Surveys	Number of Favorable Surveys
A	5	3
B	2	1
C	4	3
D	0	0

Taylor considers the Gittins Index below to help decide its expansion plans.

		Successes					
		0	1	2	3	4	5
Failures	0	.7021	.8001	.8452	.8723	.9005	.9149
	1	.5001	.6346	.6972	.7439	.7869	.8115
	2	.3796	.5163	.5810	.6279	.6996	.7208
	3	.3021	.4342	.5184	.5609	.6176	.6508
	4	.2488	.3720	.4561	.5179	.5676	.6071
	5	.2103	.3245	.4058	.4677	.5168	.5581

- (a) (4 points)
- (i) Identify the most desirable country and the least desirable country for expansion based on the market survey results and the provided Gittins Index. Justify your answer.
 - (ii) Analyze whether the most desirable country in (i) would change if Taylor had a lower cost of capital assumption.
 - (iii) Assess the appropriateness of using a Gittins Index to support this decision.
 - (iv) Recommend an alternative decision-making approach for Taylor. Justify your recommendation.

6. Continued

Taylor decides to expand into Country A. The CRO states: “The intense competition in Country A will lead to decreasing profit margins and an infinite price of anarchy of liquor producers over time.”

(b) (1 point)

- (i) Define the price of anarchy.
- (ii) Evaluate the CRO’s statement.

Taylor plans to invest in Country A in multiple stages over a period of 24 years, due to capital constraints.

- Success is defined as covering Taylor’s cost of capital.
- Each stage proceeds only if the previous stage has been successful.
- Longer stages require larger investments and produce a higher return on capital if successful.
- Assume there are no exit costs.

(c) (3 points)

- (i) Recommend the number of stages and length of each stage Taylor should use assuming the first stage is four years long. Justify your recommendation.
- (ii) Assess whether the recommended staged investment approach for Country A would be appropriate for Taylor in its domestic market.

Question 6 continued on the next page.

6. Continued

Taylor’s prime competitor, Perry, LTD, is also considering an expansion into Country A. Country A has a small market, the project will be less profitable if both companies enter with a large investment. The table below shows the three possible actions for each company and the expected profit outcomes in each scenario.

<i>Profits (Taylor, Perry) in \$millions</i>		Taylor		
		Do not enter	Small Investment	Large Investment
Perry	Do not enter	(0,0)	(300,0)	(500,0)
	Small Investment	(0,300)	(250,250)	(400, 75)
	Large Investment	(0,500)	(75,400)	(100,100)

Each will decide its action at the same time with no knowledge of the other’s action.

- (d) (2 points)
- (i) Determine the optimal strategy for Taylor.
 - (ii) Determine the optimal strategy for Perry.
 - (iii) Explain whether Taylor and Perry achieve the optimal outcome based on the optimal strategies determined in (i) and (ii).

Country A imposes an import quota on liquor producers that results in a 50% profit reduction for the ‘Large Investment’ strategy.

- (e) (1 point) Describe how the equilibrium outcome will change with the import quota limitation.

7. (6 points) Underwood Shoe Company uses a normal distribution to model the price of rubber. Historical rubber prices are used to calibrate the model.

To validate the model, it performs an exceedance test at the 95th percentile using the most recent non-overlapping set of data:

- Number of data points: 2,300
- Actual number of times rubber price exceeded the model's 95th percentile: 130

Assume a one-sided exceedance test with enough data points such that the results converge to a normal distribution.

(a) (2 points)

- (i) State the null hypothesis and alternative hypothesis for the test.
- (ii) Determine whether the null hypothesis should be accepted or rejected. Show your work.

Underwood's product manager comments, "The 95th percentile lacks rigor; we should perform the same exceedance test at the 99th percentile to increase our confidence in the accept/reject decision."

(b) (2 points) Critique the product manager's comment.

(c) (1 point) Identify two drawbacks of an exceedance test.

Underwood performs additional analysis of the model with the following results:

- Christoffersen Backtest: null hypothesis is accepted
- Backtesting based on the Rosenblatt Transformation: null hypothesis is rejected

(d) (1 point) Interpret the results of the additional analysis.

****END OF EXAMINATION****
Morning Session

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