

# CFE SDM Model Solutions

## Fall 2015

### 1. Learning Objectives:

3. The candidate will understand best practices for ERM processes and Capital Management and their use in setting a risk-return strategy.

### Learning Outcomes:

- (3a) Explain ERM principles and frameworks.
- Describe the best practices and frameworks for ERM processes under various industry forums and regulatory guidelines and standards.
  - Explain the principles driving the direction of new regulation and industry standards in risk governance.
  - Describe the components of a risk appetite statement. Design and develop a risk appetite statement and risk return strategy.

### Sources:

SDM-313-14 US ORSA Developments

SDM Exam Case Study, Section 7

### Commentary on Question:

*This question asks candidates to demonstrate an understanding of the NAIC ORSA requirement, including principles of the framework, impacts, and benefits.*

### Solution:

- (a) Outline the three major sections required in an Own Risk Solvency Assessment (ORSA) summary report.

### Commentary on Question:

*Most candidates did well on part a. Candidates did not need to provide descriptions; a correct listing of the three sections resulted in full credit. A common mistake was providing three purposes or outputs from ORSA and not the three sections of the summary report. Some candidates even listed the summary report itself as a section within the report.*

### Section 1 – Description of Insurer’s Risk Management Framework

- Risk culture, risk governance.
- Risk identification and prioritization.
- Risk appetite, tolerance, and limits.
- Risk management, controls, and reporting.

# 1. Continued

## Section 2 – Insurer’s Assessment of Risk Exposure

- Focus on material risks identified in section 1.
- Done under normal and stressed environments.
- Stress on risk capital and on available capital.

## Section 3 – Group Risk Capital and Prospective Solvency Assessment

- Integrate capital management with the firm’s business strategy.
- Look at the decision making process over the longer time horizon.
- Coordinated with relevant internal and external circumstances.

- (b) Describe how the ORSA process and ORSA Summary Report creation will impact three operating areas within Darwin.

### **Commentary on Question:**

*Candidates generally performed poorly on this part of the question. Only a few received full marks. Most candidates provided general impacts that would apply to all insurance companies. To receive full credit, candidates needed to describe impacts specifically related to Darwin and the information provided in the case study. Some candidates only gave general information about the ORSA process and did not call out the impacts to any specific operating areas. These responses received little to no credit. Below are a few possible answers; the candidate only needed to write down three areas’ impacts. Other responses were accepted if reasonable.*

### ERM/Risk Management Department

- Darwin adopted an ERM committee in 2007 but has placed their focus more on customer relationships and increasing sales than on managing risks.
- With the ORSA process, the ERM committee will need to take risk management more seriously and ensure that it is implemented at all levels of the company.
- More in-depth assessments of risk exposure and significantly increased levels of analysis and risk reporting will need to be performed.

### IT Department

- Darwin has invested significantly in IT for new administrative and reporting platforms and automated workflows.
- Under ORSA, Darwin will need to take a deeper look at these new platforms and workflows to assess the possible risks associated with them.
- The IT department may also need to invest more money and resources to develop new or modify current systems to meet risk reporting standards.

## 1. Continued

### Product Development & Inforce Management

- Darwin is a fast follower and is quick to replicate new product designs in the market, but sometimes lacks the expertise to replicate processes and infrastructure.
- Legacy products and systems have drained resources; as a result not enough resources have been devoted to inforce management or infrastructure.
- Under ORSA, Darwin will have to analyze the risk impacts of being a fast follower. The company would need to understand the products, assess the risks, and determine if they are able to meet risk limits and capital management strategies if the products are added. This may result in Darwin being more selective in choosing products to offer.
- By completing the ORSA process, the lack of resources devoted to inforce management and infrastructure will be called out. This may lead to strategic decisions from management to reallocate some resources from new business to inforce management, investing in new infrastructure, or possibly reinsuring some of their risks.

### Asset Management

- Currently, Darwin has higher leverage, lower interest coverage, and lower liquidity than other competitors.
- Completing the ORSA assessment will help Darwin understand the risks with holding these positions.
- Darwin will need to determine the proper limits, tolerances, and controls for liquidity, leverage, and interest coverage.
- This analysis may result in significant changes to Darwin's asset management strategy.

- (c) Identify and describe three benefits to insurance companies that Reich can use to justify a more rigorous implementation of the ORSA reporting requirements.

### **Commentary on Question:**

*Almost all candidates were given at least some credit for part c. Multiple candidates received full marks. In order to receive full marks, candidates needed to provide a clear and detailed description of three benefits that ORSA provides. Below is a sample answer. Other reasonable responses were accepted.*

### Strengthens forward looking risk management

- Summarizes Darwin's key methodologies and assumptions.
- Gives management a common language for discussing risk.

## **1. Continued**

Links capital management with risk management more closely

- Will help Darwin to understand whether the capital projections can meet regulatory requirements both now and in the future.
- Understand risks that most impact capital.

Improves risk monitoring and makes it part of operations

- Standardizes risk reporting timing with standardized severity measuring.
- Still allows for flexible approaches based on Darwin's specific risk profile and business objectives.

## 2. Learning Objectives:

2. The candidate will understand various approaches to measuring and managing credit and liquidity risk.

### Learning Outcomes:

- (2a) Apply credit and liquidity risk concepts.
- Describe and analyze credit, counterparty, liquidity, and wrong-way risk.
  - Assess and critique results of various credit and liquidity models for their impact on decision making.
  - Assess credit value adjustment

### Sources:

SDM-106-13 (p.98-99, p.102-105, p.110-112)

### Commentary on Question:

*Commentary listed underneath question component.*

### Solution:

- (a)
- (i) Identify four determinants for corporate bond spreads.
  - (ii) Explain how each of these determinants impacts the bond spreads.

### Commentary on Question:

*Candidates were required to show what determines corporate bond spreads. Some of them didn't explain the determinants properly.*

- (i) The following are the lists of the determinants for corporate bond spreads.
  1. Liquidity premium.
  2. Credit spread or default risk.
  3. Carrying costs.
  4. Embedded options.
  5. Characteristics of bond market.
  6. Bond features.
- (ii) The following are the explanations on how the determinants impact the bond spreads.
  1. Liquidity premium: Bond yields include a risk premium for illiquidity. During the economic crisis of 2007 – 2009, the liquidity risk premium soared, and the spread between LIBOR and overnight index swap (OIS) rate soared. These spreads are built into bond yields.
  2. Credit spread or default risk: This is the risk that the counterparty defaults at a financially distressed situation. The more likely the counterparty is to default, the higher the required credit spread.
  3. Carrying costs: These are the frictional costs of buying or selling the bonds (for example, taxes and fees), which would increase spreads.

## 2. Continued

4. Embedded options: Risky corporate bonds contain embedded options, such as call and conversion features, as well as covenants and sinking funds. If an option is favorable to the bond holder, it would decrease spreads (for example, conversion of bond to equity). If an option is unfavorable to the bond holder, it would increase spreads (for example, call to redeem bonds earlier).
5. Characteristics of bond market: Only a small fraction of the volume of corporate bond trading occurs on organized exchanges. The rest of the trade is conducted over the counter by bond dealers. The interdealer market is not very competitive. That is, it is characterized by large spreads and infrequent trades, which increase transaction costs and reduce market liquidity.
6. Bond features: Bond features impact transaction costs and market liquidity. Larger and more recent issues have lowered transaction costs.

(b)

- (i) Describe the underlying assumptions within the framework.
- (ii) Critique the framework.
- (iii) Sketch a lattice or tree showing the backwards recursion process used to price the bond with appropriate probabilities of credit rating migration at each node. Use labels as appropriate.
- (iv) Calculate the risk-neutral valuations of the A-rated and B-rated nodes in period 1, respectively.
- (v) Calculate the value of the bond at period 0.

### **Commentary on Question:**

*Most candidates had a poor performance on parts (i) and (ii). They didn't understand that the underlying assumptions of the transition probability are risk-neutral probabilities and are the foundation of financial product valuation. On the contrary, most candidates performed very well in parts (iii), (iv), and (v). They knew the concept of risk-neutral valuation.*

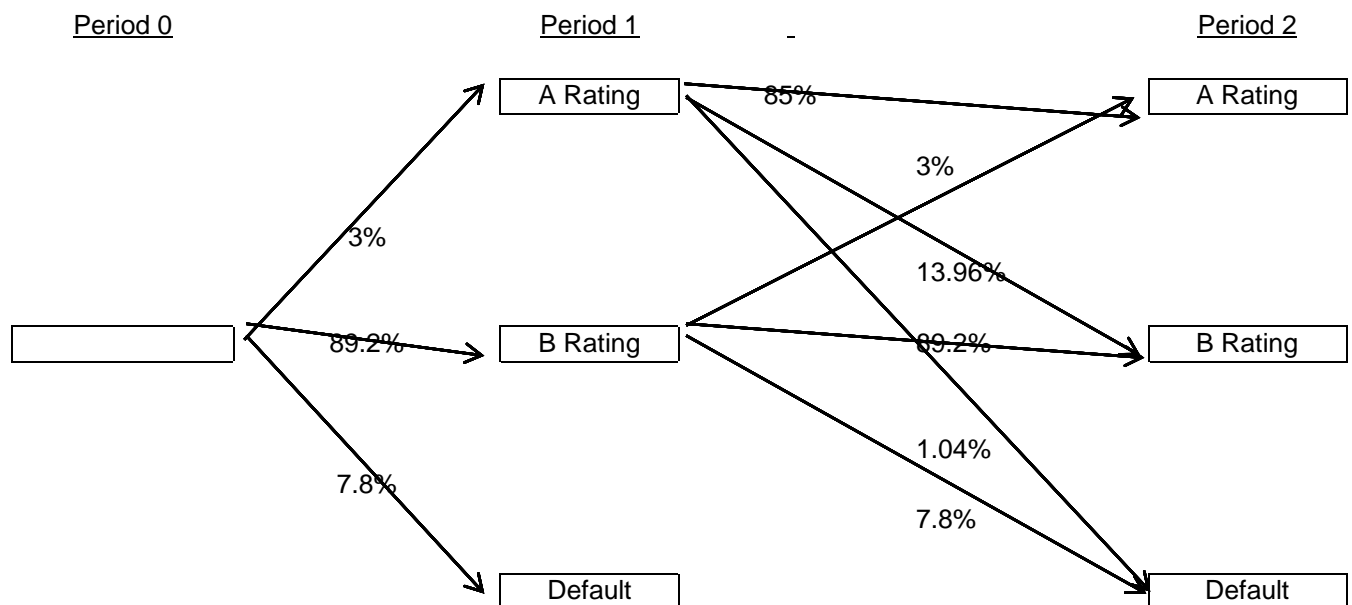
- (i) The underlying assumptions of the transition probability are risk-neutral probabilities.
  1. They assume no arbitrage opportunities, so expected returns on a risky asset must equal the returns on a risk-free asset (the risk-free rate).
  2. The observed yield on risky debt can be decomposed into a risk-free rate plus a risk premium.

## 2. Continued

3. The prices of all assets can be determined by simply discounting the expected future cash flows on the asset by the risk-free rate.
4. The equilibrium relationship (the expected return on a risky asset equals the risk-free rate) can be utilized to back out an implied risk-neutral probability of default (the equivalent martingale measure).

- (ii) The shortcomings of the framework
1. Reliance on noisy bond price data.
  2. The difference between risky bond yields and the equivalent maturity risk-free rate may be the result of credit risk.
  3. It can be due to a liquidity premium, carrying costs, taxes, or simply data and pricing errors.

- (iii) Sketch a lattice or tree showing the backwards recursion process



- (iv) The risk-neutral valuations of A-rated and B-rated nodes in period 1

1. The risk-neutral valuation of A-rated node in period 1  

$$0.85 * (100 / 1.042) + 0.1396 * (100 / 1.042) + 0.0104 * (0 / 1.042) = 94.9712$$

2. The risk-neutral valuation of B-rated node in period 1

$$0.8920 * (100 / 1.042) + 0.03 * (100 / 1.042) + 0.078 * (0 / 1.042) = 88.4837$$

## 2. Continued

- (v) The value of the bond at period 0

$$0.8920 * ( 88.4837 / 1.03 ) + 0.03 * ( 94.9712 / 1.03 ) + 0.078 * ( 0 / 1.03 ) \\ = 79.3948$$

- (c) Verify the bond credit spread is about 0.0863.

**Commentary on Question:**

*Most candidates had a good performance on this question. Credit spreads represent all the risks that a bond carries.*

$$79.3948 = 100 / ( ( 1 + 0.03 + CS ) * ( 1 + 0.042 + CS ) ) \\ CS = 0.08630$$

- (d) Calculate the spread for LMN's securitized product. Show your work.

**Commentary on Question:**

*Many candidates had a good performance. They grasped the valuation process to price risks on a financial product.*

$$70 = 100 / ( ( 1 + 0.03 + CS ) * ( 1 + 0.042 + CS ) ) \\ CS = 0.15924$$

- (e) Evaluate which investment the investor should buy.

**Commentary on Question:**

*Candidates were expected to assess which financial product was more appropriate for an investor based on his or her risk profile (that is, risk-averse or risk-taking). A product with a higher spread brings in more risk to an investor. Since a bond is associated with market risk independent of mortality risk on LMN's securitized product, the diversification effect should be evaluated when recommending one of two products.*

1. If the candidate recommend the bond priced in part (b):  
An investor prefers a less risky product (a safer product) with a lower investment return, that is, risk averse.  
As default probability increases (decreases), credit spread increases (decreases).  
The bond has a lower credit spread of 8.63% than that of the LMN's securitized product (15.924%).  
The bond's spread represents the market risk so an investor cannot diversify his or her risk because the LMN's product bears longevity risk compared to the bond's market risk.



## 2. Continued

2. If the candidate recommends the LMN's securitized product priced in part (d):  
An investor prefers a riskier product with a higher investment return, that is, a risk-taker.

As default probability increases (decreases), credit spread increases (decreases).

The LMN's securitized product has a higher credit spread of 15.925% than that of the bond priced in part b (8.63%).

The LMN's product represents longevity risk which is diversified from the bond's market risk.

### 3. Learning Objectives:

1. The candidate will understand measures of corporate value and their uses in risk management.

#### Learning Outcomes:

- (1b) Explain how economic capital can be used as a value measure by financial institutions.

#### Sources:

SDM -129 -14 (301): The impact of capital structure on Economic Capital and Risk Adjusted Performance

#### Commentary on Question:

*Most candidates demonstrated certain understanding on how costs of funding and investment strategies influence the economic capital. Only a few candidates mistakenly thought that since equity are risky, the cost of funding by equity should be higher.*

#### Solution:

- (a)
  - (i) Identify one internal and three external stakeholders of economic capital.
  - (ii) Describe how each stakeholder interprets economic capital.

#### Commentary on Question:

*Candidates generally did well on the retrieval part of the question. Some candidates were able to identify the stakeholders of economic capital, but failed in justifying their answers. A few candidates incorrectly considered the policyholder as a stakeholder of economic capital.*

#### Internal Stakeholders

Firm: Comparison of the firm's actual capital to its economic capital allows the firm to assess if it has enough actual capital to cover the risks that it is running. If it does not, then it should consider raising more actual capital, or de-risking its balance sheet. If it holds more actual capital than economic capital, this may be inefficient, deflating equity capital provider returns, and the firm may therefore wish to consider reorganizing its balance sheet.

#### External Stakeholders

Rating Agency: In assessing the ability of a firm to service its actual capital, and the security of that capital, ratings agencies will be interested in comparing the firm's actual capital amount to its economic capital amount. It will influence the credit rating decision of the rating agencies.

### 3. Continued

Capital provider: The providers of actual capital, both equity and debt capital, will want to know how secure their investment is and may require an assessment of the risks they are taking on, as well as an estimate of the risk adjusted returns that they are likely to earn. These questions can be answered by measuring risk adjusted firm performance using the rate of return earned on the equity capital that backs the firm's economic capital amount.

Regulator: A firm's regulatory capital amount should represent a good approximation to its economic capital amount. If regulatory capital does not represent a good approximation to economic capital, the regulator may wish to revisit the firm's regulatory capital requirements and also to consider improving the regulations.

- (b)
- (i) Identify which product has a longer duration.
  - (ii) Rank the economic capital under different funding strategies for Product A.
  - (iii) Rank the economic capital under different funding strategies for Product B.

Justify your answers.

**Commentary on Question:**

*Candidates did poorly on this analysis question. Most candidates were able to identify that product A has a longer duration and to rank the economic capital correctly. However, only half of the candidates could explain why debit funding requires higher economic capital vs. equity funding.*

- (i) Product A has longer duration. If the two products have similar risk profiles, the product with the longer duration will have higher economic capital.
- (ii)  $A2 > A4 > A3 > A1$

Cost of funding for debt is higher than equity. Issuing debt increases the D/E leverage ratio and the obligation of paying a higher interest rate. Therefore, the default risk will increase. On the other hand, dividends on common shares are not obligated.

Therefore, economic capital increases when issuing more debt, due to the increase in cost of capital.

### 3. Continued

- (iii)  $B2 > B4 > B3 > B1$

The length of the duration will impact the sensitivity of cost of funding but not its ranking.

- (c) Identify which change is the largest and which change is the smallest among all the sensitivities (A2-A1, B2-B1, A4-A3 and B4-B3). Justify your answers.

**Commentary on Question:**

*Candidates generally did well on providing the lists of largest and smallest changes. Most of the candidates recognize that the sensitivity of economic capital increases with the liability duration. Only candidates who correctly explained why debit requires higher economic capital than equity in either part b) or c) received full credits.*

As concluded in part b), economic capital increases when issuing more debt. The largest change should be either A2-A1 or B2-B1. The smallest change should be between A4-A3 and B4-B3.

As the liability duration increases, the default possibility also increases. As a result, the costs of capital from issuing debt also increase due to the longer duration. Since product A has longer liability duration, it is more sensitive to the cost of funding.

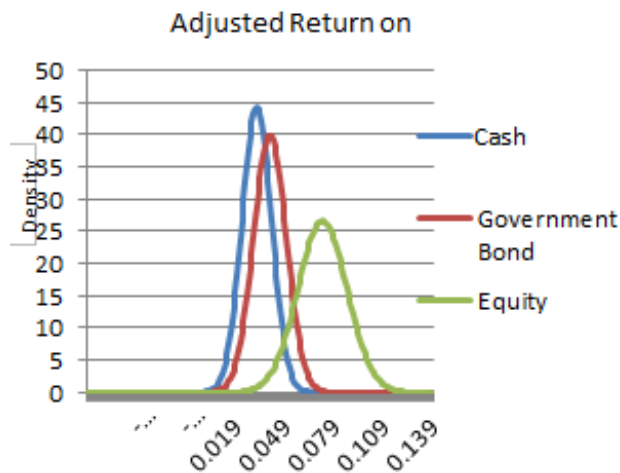
Therefore, the largest change is A2 - A1 and the smallest change is B4 - B3.

- (d)
- (i) Sketch the risk adjusted return on Product A's economic capital investing actual capital in 100% risky equities.
  - (ii) Sketch the risk adjusted return on Product A's economic capital investing actual capital in 100% government bonds.
  - (iii) Explain the difference in risk adjusted returns between each of the three funding strategies (cash, risky equities and government bonds).

**Commentary on Question:**

*Candidates generally recognized that the mean and the volatility of risk adjusted return on economic capital increase with increased investments on equity. However, many candidates didn't sketch the tail part of the three distributions correctly. They ignored the factor that equity assets have a fatter tail due to their higher risk. Also, only a few candidates mentioned the fact that the longer duration gives the actual capital assets sufficient time to influence the extreme scenarios.*

### 3. Continued



The sketch for cash: lowest mean and standard deviation.

The sketch for risky equities: highest mean and standard deviation.

The sketch for government bonds: the mean is between cash and equity, and the standard deviation is slightly higher than cash.

The distribution of the risked adjusted return on economic capitals are reasonably symmetric and shift to the right as raised capital is progressively allocated to cash, then to government bond and finally to equity assets.

Product A has longer duration. The longer duration gives the actual capital assets sufficient time to influence the extreme scenarios. As a result, the higher return on risky assets dominates the corresponding return on economic capital.

- (e) Describe the differences in Product B's graph compared to your revised Figure 1 for Product A. Justify your answer.

**Commentary on Question:**

*Candidates did relatively well on this question. Most of them recognized that the duration of the product doesn't impact the relationship of the three distributions, and instead only impacts their own mean and volatility.*

The increase on economic capital is lower for product B when allocating available capital to high-earning risky capital. The shorter duration may not give the actual capital assets sufficient time to influence extreme scenarios. As a result, the higher return on risky asset may not be reflected in the corresponding return on economic capital.

### **3. Continued**

Due to the shorter duration, allocating raised capital to government bonds does not cause too much difference on risk adjusted return as compared to that of allocating to cash.

The density where the raised capital is allocated to equity assets is located further to the right and more positively skewed than the other density functions.

#### **4. Learning Objectives:**

2. The candidate will understand various approaches to measuring and managing credit and liquidity risk.
5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

#### **Learning Outcomes:**

- (2a) Apply credit and liquidity risk concepts.
  - Describe and analyze credit, counterparty, liquidity, and wrong-way risk.
  - Assess and critique results of various credit and liquidity models for their impact on decision making.
  - Assess credit value adjustment
- (2c) Explain how regulatory requirements impact capital and management of credit and liquidity risks.
- (5c) Assess the risk of the status quo alongside any other risky and or risk management decision.

#### **Sources:**

SDM-308 -14 (p. 9-10 & 14-15)

SDM-307 -14 (p. 1-2)

SDM-234 -13 (17.2.3)

#### **Commentary on Question:**

*Commentary listed underneath question component.*

#### **Solution:**

- (a) Explain why the personal and commercial banking business has historically had stable revenue streams considering the elements I-IV.

#### **Commentary on Question:**

*The question aimed to test candidates' understanding of various risks embedded in the traditional banking model.*

*Many candidates were able to recall the study note, which questions references.*

## 4. Continued

- (I) **Leverage** – Banks lever a small capital base into an asset pool that is much higher. Profits are earned off the interest.
  - (II) The "**Gap**" of Asset Liability Management (ALM) risk – Banks take advantage of the asset and liability duration mismatch by using short-term deposits to lend long. This takes advantage of the positive sloping yield curve.
  - (III) **Liquidity** - Banks have a good ability to roll over its funding as it comes due. This means issuing new debt to when mature debt is retired.
  - (IV) **Credit or default risks** – Banks have developed a good understanding of credit risk. Risk management techniques have been developed to reduce the likelihood of losses due to 1) default in interest and principal repayment and 2) decrease in market value in case of a credit event, i.e. credit rating downgrade.
- (b) Describe the impact on each business division, A-D, of European deleveraging and the sovereign debt crisis.

### **Commentary on Question:**

*The question aimed to test candidates' understanding of i) deleveraging's damage to growth and credit demand, thus traditional and investment banking and ii) deterioration of collateral and balance sheet quality from the sovereign debt crisis and its damage to investment banking. If candidates showed clear understanding of these business lines, they received partial marks (i.e. Personal and Commercial Banking - making loans; wealth management - financial planning advice; asset management - collecting fees for managing assets; investment bank - underwriting debt and equity, prime brokerage, and OTC derivative)*

*Most candidates did poorly on this question. They did not consider how each business line earns revenue, and/or did not link this with the economic impact of deleveraging.*

- A) **Personal and commercial** - Deleveraging will weaken credit demand. Thus, clients will cut down spending and credit outstanding. This weighs on growth. The financial crisis led to higher default and slower growth. The environment will hurt the business line.
- B) **Wealth Management** - Deleveraging will depress credit demand, meaning clients will spend less in favour of either paying down existing loans or preserving wealth. The financial crisis triggered slower growth, making the equity market unattractive. In this situation, a pure advisory model will help clients. This could be an opportunity for wealth management to grow the business line by focusing on financial planning advice.



## 4. Continued

- C) **Asset Management** - Deleveraging will depress economic growth, making it more difficult for asset managers to gather asset. Big Ben's existing asset management business didn't fare well in the financial crisis due to reduced assets under management (AUM). This will have a negative impact on the business line.
  - D) **Investment Banking** - With deleveraging, the financial system will generate less demand for leverage, hurting underwriting and capital markets business in the investment banking unit. The financial crisis also reduced investors' appetite for risk.
- (c) Recommend three ways to mitigate this counterparty risk. Justify your recommendations.

### **Commentary on Question:**

*The question aimed to test candidates' understanding of risk management strategy and techniques used by institutional to mitigate counterparty risk.*

*Most candidates did well on this question.*

- 1) **Margin Call** - Big Ben could require Big Italian bank to post-additional collateral. This would capitalize the outstanding derivative position for potential profit or loss. However, this could backfire since Big Italian Bank could face many such calls that could cause insolvency.
  - 2) **Netting** – Big Ben could take an offsetting position, borrow from a counterparty, or diversify the counterparty exposure. All these options would effectively cancel the outstanding position, therefore closing the exposure with Big Italian Bank. However, this action could cause the counterparty to go insolvent.
  - 3) **Buy a CDS** – Buying a CDS of the counterparty would protect Big Ben from counterparty insolvency without inducing liquidity problems for Big Italian Bank. It will cause the CDS spread to go up.
- (d) Describe the netting exposure at default for each of the three methods I-III.

### **Commentary on Question:**

*The question aimed to test candidates' understanding of the three methods outlined in Basel II standard. A successful answer should describe how the netting works.*

*Candidates did poorly on this question. They failed to describe what types of netting are allowed under each exposure method.*

## 4. Continued

- 1) **Current Exposure Method** - Under the current exposure method, exposure can be netted only for contracts that are under legally enforceable bilateral netting agreements.
  - 2) **Standardized Method** - Under the standardized method, exposure has to be netted within hedging sets, each of which is driven by the same risk factor. Netting between hedging sets is not accounted for.
  - 3) **Internal Model Method** - Under internal model method, banks are allowed to build and use their own model to model future exposure. This generates the most risk-sensitive result. Under internal model method, exposures could be netted at netting set level. However, full cross-product netting is allowed.
- (e) Recommend a method for Big Ben to measure its counterparty default risk based on its existing business. Justify your recommendation.

### **Commentary on Question:**

*This question aimed to test candidates' ability to utilize the knowledge from the reading and make a practical recommendation for a small bank.*

*Since the bank has been increasing derivative use, it is essential to note only OTC derivatives exposes Big Ben to counter-party credit risk. Big Ben does not have capital market business, thus its credit risk ranks low on complexity. CEM is preferred because of the relatively simple risk factors.*

*Candidates did poorly on this question. They failed to recognize the business model and derivative characteristics of the bank.*

Big Ben uses various types of over the counter contracts derivatives, i.e. forward and swaps. Big Ben's derivative usage has been increasing. They are up more than 40% on asset and liability sides. Netting these contracts would be a reasonable approach.

Big Ben currently has a simple banking model with plans to grow its wealth management business. The growth will not require high capital commitment. The complexity of the needed hedging program is likely to be low. For the size of the bank, it is reasonable to assume there will only be a small set of counterparties, so bilateral netting should be easy to set up.

As a result, Big Ben would prefer a simple model to report counterparty risk. The current exposure method (CEM) provides the best value for Big Bens needs.

## 5. Learning Objectives:

3. The candidate will understand best practices for ERM processes and Capital Management and their use in setting a risk-return strategy.

### Learning Outcomes:

- (3a) Explain ERM principles and frameworks.
  - Describe the best practices and frameworks for ERM processes under various industry forums and regulatory guidelines and standards.
  - Explain the principles driving the direction of new regulation and industry standards in risk governance.
  - Describe the components of a risk appetite statement. Design and develop a risk appetite statement and risk return strategy.

### Sources:

SDM-236 How Is Your Risk Appetite These Days

SDM-237 The Full Spectrum of Risk Attitude

### Commentary on Question:

*The question tests the candidates understanding of risk appetite and risk perspectives and approaches.*

### Solution:

- (a) Describe Mr. Ruiz's risk appetite and risk tolerance when he started the coffee shop business in 1985.

#### Commentary on Question:

*The candidates had some understanding of risk appetite and risk tolerance, but they were not able to apply those concepts well to Frenz*

Risk appetite defines the risks we are prepared to assume, or alternatively those we deliberately choose not to assume. It also defines the overall magnitude or size of those risks that we are prepared to manage. Risk tolerance defines the limits to be applied for the risks assumed. When Mr. Ruiz started the coffee shop, he was willing to assume the risks associated with running such a business up to a total loss of his investment of \$720k.

- (b) Describe each of the four risk approaches I-IV.

#### Commentary on Question:

*Candidates did very well on this question, and they were able to define the various risk approaches.*

Diversification is to spread risk exposures among a variety of different classes of risk and avoid large risk concentration.

## 5. Continued

Loss Controlling seeks to identify and mitigate the firm's most significant risks.

Risk Trading focuses on getting the price of risk correct, which leads to complicated models of risk, to ensure the correct risk/return tradeoff.

Risk Steering applies risk trading at a macro level to the major strategic decisions of the firm. Rather than focusing on the proper price of risk, the question becomes how much of each type of risk the firm should take.

- (c)
- (i) Identify which risk perspective is not present in the risk committee members of Lamb, Messy, Percy, and Silvia.
  - (ii) Identify which risk approach would likely be used by a person with the missing risk perspective identified in (i).

RPPC grew steadily in the early years 1985-1988.

- (iii) Critique the risk approach identified in (ii) if applied during the years 1985-1988.
- (iv) Recommend the best risk perspective and risk approach for the years 1985-1988.

### **Commentary on Question:**

*Candidates did very well on this question, and they were able to map risk perspective to the risk approach correctly and apply them to the context of Frenz.*

- (i) The 3 perspectives—Conservators, Maximizers, and Pragmatists—are covered by Silvia, Messy, & Lamb respectively. The lacking perspective is the "Manager" perspective.
- (ii) Careful balancing of risks and rewards is the heart of this perspective, which is consistent with the Risk Steering approach
- (iii) Profit of the business increased progressively. Therefore, period 1985-1988 should be identified as Boom Times (profits go up). In Boom Times, the risk steering approach will restrict the business, more aggressive competitors will be much more successful, and therefore the approach is not ideal.

## 5. Continued

- (iv) The Maximizers perspective works best here since it does not consider risk to be very important. Large risks will be taken, which is the best for boom times. The approach used should be Risk Trading. As long as the price of the risk is found, the risk can be taken.
- (d)
  - (i) Describe two reasons for each statement X and Y.
  - (ii) Identify an example relevant to Frenz Corporation for each statement X and Y.

### **Commentary on Question:**

*Candidates did not perform particularly well on this question. They were unable to draw parallels to the material to explain the statements relating to corporate culture and risk perspectives. For those candidates that did draw the connection, they were able to come up with the examples from the case study that worked well.*

- (i) For X:  
Management would hire staff that held similar risk perspectives. Then the company would follow the ERM program that aligned with their perspectives.  
Also, individuals are drawn to employers with a perspective that makes sense to them. This would make the culture of the company self-perpetuating.  
  
For Y:  
Business is successful with this perspective under this environment. Therefore, management may cling to the strategy that gave them success. Also, the company may have suffered from losses during a period of dissonance between the old perspective and the risk environment and hence hesitates to shift.
- (ii) For X:  
Mr. Ruiz had a similar view on risk as Mr. Zheng, so he hired him and made him head of the risk management program. This perpetuates the same risk culture.  
  
For Y:  
Mr. Zheng remained head of the risk management program even though Mr. Ruiz was unsure of the risk environment. No changes were made to the program because of past successes from using this perspective.

## 6. Learning Objectives:

5. The candidate will understand the decision making process and the lessons learned from the risk taking activities and experiences of other organizations. In particular, the candidate will be able to apply the learning objectives of all the prior sections of the syllabus to the risk management principles embodied within the case studies explored in this section.

### Learning Outcomes:

- (5a) Critique financial models, assumptions and decisions including the impact of behavioral finance concepts.

### Sources:

SDM-250-13: Nudge Ch. 1

SDM-254-13: Nudge Ch. 5

### Commentary on Question:

*Candidates performed very well on this question, with many scoring the maximum. The question aimed to test the candidates' understanding of cognitive bias and choice architecture within the context of a prospective travel insurance policy purchaser.*

### Solution:

- (a) Explain how each bias, I-III, may deter customers from purchasing travel insurance.

### Commentary on Question:

*Candidates generally understood the definition of each cognitive bias introduced in part (a), with many able to articulate how each bias can contribute to a low election of travel insurance coverage.*

I: Availability Bias refers to the tendency to overweight readily recallable events, or underweight events that can't be readily recalled in a salient manner, in the decision making process. In the context of travel insurance, people may tend to underestimate the risks associated with traveling because incidents resulting in a travel insurance claim are rare, either to themselves or to their peer group. For example, many people may not have ever required medical assistance when traveling, may not have ever lost baggage or missed a flight, or may not be able to recall a high-severity event such as a plane crash in recent memory. This would diminish their perceived value of electing travel insurance coverage.

## 6. Continued

II: Overconfidence refers to the tendency to overweight one's ability to evaluate probabilities and hence better predict the outcome of an event or overestimate one's ability to control the outcome of an event. In the context of travel insurance, people may tend to be overconfident that their own probability of incurring a claim is low because they underestimate the probability of an insurable event happening to them specifically and/or overestimate their ability to control the impact of the event. This would also diminish their perceived value of electing travel insurance coverage.

III: Status Quo Bias refers to the tendency to maintain current behavior and experience inertia against change. In the context of travel insurance, people who have previously not elected travel insurance coverage in the past would tend not to elect it going forward.

- (b) Describe how each choice architecture technique, A-C, can be used to encourage customers to purchase travel insurance.

### **Commentary on Question:**

*Candidates generally understood each choice architecture technique introduced in part (b), with many able to articulate how each technique can be used to overcome cognitive biases and encourage prospective customers to elect travel insurance coverage.*

A: Framing is a technique to phrase a particular choice in a manner that emphasizes or highlights one option over another. In the context of travel insurance, framing a choice to encourage electing coverage would either downplay the costs and/or highlight the potentially substantial losses if uninsured. For example, the choice can be presented by emphasizing the probability of a claim occurring rather than the more common alternative that no claims are incurred or by highlighting the high costs associated with emergency medical assistance which can be avoided with a relatively nominal travel insurance premium.

B: The Default Option is the choice elected if no explicit choice is made to change from that option. People generally perceive the default option to be most popular and/or best choice. In the context of travel insurance, setting the default option to elect insurance, whereby the customer must explicitly opt out of travel insurance coverage. Due to the inertia associated with changing behavior, customers will tend to accept the default option.

## **6. Continued**

C: Structuring Complex Choices is a technique to guide the user through a complex choice mechanism by distilling or filtering the menu of choices. In the context of travel insurance, there are many possible configurations of a coverage package and customers may be overwhelmed and/or uninformed. For example, structuring the choice into high-level packages reflecting common or popular coverage choices can be preferable to the average customer (basic coverage, full coverage, emergency medical only, etc.).



## 7. Learning Objectives:

1. The candidate will understand measures of corporate value and their uses in risk management.

### Learning Outcomes:

- (1a) Apply basic accounting concepts used in producing financial statements.
- (1b) Explain how economic capital can be used as a value measure by financial institutions.

### Sources:

SDM-100-13

SDM-129-14

### Commentary on Question:

*The question asked candidates to demonstrate their understanding of Economic Capital and the impacts of capital structure on the level of Economic Capital.*

### Solution:

- (a)
  - (i) Explain what will happen to Bank XYZ's total Economic Capital, Tier 1 component, and Tier 2 component.
  - (ii) Explain what will happen to Bank XYZ's Risk Adjusted Assets.
  - (iii) Explain the overall directional effect on Bank XYZ's Tier 1 Capital Ratio.
  - (iv) Explain the significance of making this change to Bank XYZ's stockholders.

### Commentary on Question:

*Most candidates were able to obtain points on most parts of part a. However, many candidates were not able to recognize that no changes were made to the assets backing capital for part (ii). Candidates should have recognized that capital exists on both sides of a balance sheet: as debt and equity, as well as assets.*

- (i) Total Economic Capital will increase because when a firm introduces debt capital to back economic capital, the firm will be required to provide for the interest payments on the debt capital in times of stress. The magnitude will be relatively modest due to a bank's short duration of assets and liabilities. Tier 1 capital falls to 75% of Total Economic Capital. Tier 2 capital increases to 25% of Total Economic Capital.
- (ii) Risk Adjusted Assets remain the same because the actual capital asset allocation has not changed.

## 7. Continued

- (iii) Since Stockholder Equity [Tier 1] decreases and Risk Adjusted Assets remain the same, the Tier 1 Capital Ratio has decreased.
- (iv)
- Debt capital ranks ahead of equity capital. Firms may waive dividends on equity capital, but interest and principal payments on debt capital may not be waived.
  - The transaction involves the repurchase of existing equity, providing an immediate return opportunity to equity capital holders.
  - Gearing up Tier 1 capital with Tier 2 capital is beneficial to the providers of Tier 1 capital, as they are more likely to earn higher returns (i.e. the ROEC probability density function shifts to the right).
- (b)
- (i) Identify the company represented by Chart A.
- (ii) Identify the company represented by Chart B.
- (iii) Justify your identification by providing three reasons.

### **Commentary on Question:**

*Overall, candidates answered part (b) well. Nearly all the candidates were able to identify the appropriate company for (i) and (ii). Most candidates were also able to obtain most of the points for part (iii). The largest losses of points were due to candidates referring to the relative size of Darwin and Blue Ocean, or candidates providing justifications that did not refer to either Chart A or Chart B in any way.*

- (i) Chart A = Darwin
- (ii) Chart B = Blue Ocean
- (iii)
- Chart A demonstrates a larger increase in Economic Capital as it is backed with more Tier 2 capital, which is indicative of a company with a higher duration of assets and liabilities. Therefore, Chart A is Darwin since it has a comparatively high duration.
  - Chart B indicates almost no initial increase in Economic Capital, which is indicative of a company with a lower duration of assets and liabilities. Therefore, Chart B is Blue Ocean since it has a comparatively low duration.

## 7. Continued

- Economic Capital increase in Chart A over the first ten years (at a slightly higher rate over the first five years), while Economic Capital decreases in Chart B over the first ten years (at a significantly higher rate over the first five years). This indicates a higher duration company and a lower duration company, respectively, of Chart A and Chart B.
- (c) Explain the effects each initiative, I-III, will have on Darwin's Economic Capital. Justify your answer.

**Commentary on Question:**

*Most candidates were able to obtain points on most parts of part c. Points were lost when no comment was made to the magnitude of the effects or when no relation was given to Darwin's specific make-up. Points were not given on part II if candidates contended that a change to Economic Capital **would** occur and if the justification given was not appropriate. In addition, some candidates disclosed uncertainty with the definition of "moratorium." Efforts were made to award points based on an individual candidate's understanding of the event described in part III.*

- (i) Mortality risk is transferred, and therefore Economic Capital will decrease. This decrease will be minimal, though, since level term products are such a low proportion of Darwin's portfolio.
- (ii) This increases the availability of borrowed funds as a possible source for Tier 2 Capital. However, the Economic Capital needs of the company have not changed. Economic Capital remains unchanged.
- (iii) Since the sales of these products have only stopped and the liability portfolio of Darwin has not changed, there would be no immediate impact on Darwin's Economic Capital. But over time (all else being equal), not selling these capital intensive products will have a downward effect on future Economic Capital.

## 8. Learning Objectives:

4. The candidate will understand organizational behavioral concepts and apply strategic management frameworks to corporate financial and ERM business problems.

### Learning Outcomes:

- (4a) Apply organization behavior concepts.
- Describe the communication process and explain the strategic importance of communication to organizations.
  - Describe the fundamentals of decision making and explain decision-making styles and influences.
  - Describe common types and causes of organizational conflict and apply the elements of a basic negotiation process.
  - Assess how the behavior of individuals and groups in organizations drives organizational decisions and performance.

### Sources:

SDM 240-13 OB Chapter 12

SDM 241-13 OB Chapter 13

### Commentary on Question:

*The overall goal of this question was for candidates to assess the impact of poor feedback in the decision making process. It is important to differentiate between the decision making process and the actual execution of the project, which is where many candidates lost marks.*

### Solution:

- (a)
- (i) Identify the type of communication used by the team to provide Roger Heilman feedback at the meeting to prepare for the discussions with Insight Ratings.
  - (ii) Assess the implication of the feedback provided to Roger Heilman at the meeting.

### Commentary on Question:

*Full marks were awarded for “non verbal” feedback and partial marks for “no feedback,” but the question explicitly focused on the feedback in the meeting, not before or after. Full marks were awarded on part (ii) only when the implication considered both Roger Heilman’s interpretation of the feedback, or lack thereof, as well as the impact on the team.*

## 8. Continued

- (i) Non-verbal feedback was provided to Roger at the meeting.
  - (ii) Roger would interpret this as consensus or agreement; however, the team was not replying as they felt that they were not in control of the situation. This made them hesitant and afraid to reply.
- (b) Identify the managerial approach to associate involvement used by Roger Heilman when determining how to prepare for the meeting with Insight Ratings. Justify your answer.

**Commentary on Question:**

*It was not necessary to recall the specific codes from the Vroom-Yetton model, just the “manager alone” style and sufficient support from the case study. In general, this was done well.*

*The most common mistake made by candidates was commenting on how the response to Insight Ratings was prepared (i.e., the whole team worked on it). The focus of the question was on the process of deciding how to approach the work, not the implementation of the plan.*

Roger uses type A1: Manager makes the decision alone using only the information to which he currently has access.

- Heilman simply decided to implement the same approach as last year.
- No feedback or additional information was collected by Heilman regarding how the approach worked last year.
- There was no associate involvement in the development of the strategy.

- (c) Assess Heilman’s approach identified in part (b) to prepare for the Insight Ratings meeting.

**Commentary on Question:**

*Similar to (b), the most common mistake by candidates was using the five values to evaluate the execution of the project rather than the decision making process.*

*Candidates needed to provide supporting details from the case study as to how the factor applies to the process **and** comment on whether or not that supported Heilman’s decision to use the A1 style. Many candidates did not comment on whether or not Heilman’s approach was appropriate, which is a key element of the assessment.*

**Time:** Time is very limited (two week turn-around to complete all 100+ questions). This supports Roger’s decision to make the decision on his own.

## 8. Continued

**Cost:** The cost taken to make the decision is marginal, which is appropriate given the limited time window to perform the work.

**Nature of the Problem:** While the questions being asked are largely the same as last year, they are still complicated and require a lot of information from disorganized data elements across the company. Heilman should consult other people to make the best decision on how to proceed.

**Satisfaction and Commitment:** Employees feel dumped on and are clearly dissatisfied because they had little involvement in the decision making process. This was appropriate given the short time frame to perform the work.

**Personal Growth:** Roger making the decision himself deprives the employees of an opportunity to grow through involvement in the decision making process. However, it was appropriate given the time constraint to perform the work.

- (d) Rank the three approaches to prepare for the Insight Ratings meeting in order of appropriateness from most appropriate to least appropriate. Justify your ranking using the five Values of Group Decision Making.

**Commentary on Question:**

*The most relevant factors to consider were time, nature of the problem, and satisfaction and commitment. The cost of making the decision (Roger's time) is immaterial because it is small relative to the enormous amount of work needed. Personal Growth is irrelevant because of the time constraint of 4 weeks to perform the work. Candidates needed to recognize that the most limiting factor was time, which made G2 not simply less appropriate, but nearly impossible. Full marks were awarded for explaining which decision making style was supported by each material factor. C2 was the most appropriate.*

Order: C2, A1 (Heilman's), G2 (full marks)

Order: C2, G2, A1 (Heilman's) (partial marks)

**Time:** The limited time prohibits the use of G2, but C2 (one-on-one meetings) is still possible because it cuts out on time consuming discussion among a group.

**Nature:** The complexity of the problem requires input from across different areas of the company, which favors C2 and G2 over A1.

**Commitment:** Acknowledging the concerns of the other employees and incorporating their feedback will result in a better overall decision for this year and future requests, which favors C2 and G2 over A1.

## 9. Learning Objectives:

4. The candidate will understand organizational behavioral concepts and apply strategic management frameworks to corporate financial and ERM business problems.

### Learning Outcomes:

- (4b) Evaluate and apply the concepts of strategic management, recognizing the factors that affect the development and implementation of strategies.
  - Demonstrate the importance of analyzing the firm's external environment and the internal organization.
  - Define types of business-level strategies and recommend an appropriate business-level strategy for a given situation.
  - Explain the impact of competitive dynamics on strategic management.
- (4c) Use organizational behavior and strategic management concepts to evaluate and recommend corporate financial and ERM decisions.

### Sources:

Strategic Management Chapter 1-3  
The Full Spectrum of Risk Attitude

### Commentary on Question:

*Commentary listed underneath question component.*

### Solution:

- (a) Identify each attribute, A to E, as either a core competency or a sustainable competitive advantage. Justify your answer.

### Commentary on Question:

*Candidates needed to evaluate each item in the list based on the four criteria of Sustainable Competitive Advantages. Simply stating that an item on the list was not sufficient. Support from the case study was required. Only a single counter-example to indicate if an item was only a core competency earned full marks.*

*In general, this question was done well.*

The four criteria of a sustainable competitive advantage are:

- (i) Valuable
- (ii) Rare
- (iii) Difficult to imitate
- (iv) Non-substitutable

## 9. Continued

- A. Sustainable Competitive Advantage – Meets all four criteria. It is not possible for competitors to re-create the long history and established reputation of BJA
  - B. Core Competency – Routes are not unique to BJA (not rare).
  - C. Sustainable Competitive Advantage – Similar to part A, this meets all four of the listed criteria, and it has taken BJA 30 years to establish this unique relationship with higher-margin business travelers.
  - D. Sustainable Competitive Advantage – A non-unionized staff costs less than unionized staff (valuable), is rare in the industry, and cannot be imitated (convincing employees to de-unionize). Additionally, the cost savings cannot be substituted elsewhere.
  - E. Core competency – Other airlines can or do have safety programs.
- (b) Identify each observation, I to IX, as a Blue Jay Air strength, weakness, opportunity or threat. Justify your identification.

### **Commentary on Question:**

*Full marks were awarded for correctly identifying how each item fits into the SWOT analysis, clearly indicating if the observation is an internal or external factor, and providing justification based on the case study.*

*Simply stating if an element was good or bad was not sufficient as it did not demonstrate understanding of the SWOT concepts.*

- i. Threat – External; BJA offers a value-added service that requires a higher price-point and does not compete well in the discount area. New entrants would likely take away market share from BJA, lowering its profitability.
- ii. Weakness – Internal; outdated planes will decrease customer satisfaction and may result in loss of market share as customers choose other airlines with more state of the art aircraft.
- iii. Opportunity – External; the failure of other carriers gives BJA the opportunity to increase its market share by differentiating itself by executing on its vision of punctuality.
- iv. Strength – Internal; BJA has ownership over the agreements which allows it to grow and expand its reputation in line with its strategy.
- v. Threat – External; the new loyalty system may lure customers away from BJA.



## 9. Continued

vi. Weakness – Internal; BJA has heavy pension liabilities and needs to purchase assets and manage the investment risks.

vii. Opportunity – External; BJA can leverage their existing reputation with the business community to capitalize on this trend by expanding into international markets.

viii. Strength – Internal; may allow BJA to bring additional profitability from the new business and reduce their won cost of acquiring new planes.

ix. Threat – External; this is a common trend to all airlines, but it is a problem in particular for BJA as their business travelers are some of the primary purchasers of these higher-priced tickets.

- (c) Recommend one risk management strategy from strategies 1-4 to best manage the weakness. Justify your recommendation.

### **Commentary on Question:**

*Candidates were required to identify the risks associated with the selected weakness and provide a strategy to manage the risks including a specific action plan.*

*Many candidates failed to propose actions that were in line with the selected strategy. One strategy in particular stood out.*

***Risk Steering:*** *this is a macro-level concept, but candidates either provided very vague action plans (e.g., manage the risk according to their appetite) or they proposed actions that would actually be taken under a different strategy all together (e.g., purchasing interest rate swaps is Risk Trading).*

### For (ii) Outdated Planes:

There are safety risks associated with the outdated planes and newer models used by competitors offer more comfort that can lure passengers.

BJA can use Risk Trading by either purchasing newer planes or a manufacturing facility. Alternatively, BJA can lease out planes temporarily while they upgrade their existing fleet.

## 9. Continued

For (vi) Exposure to Interest Rate Volatility:

BJA will experience volatile changes in asset values with changes in the interest rate which may have a negative impact on earnings.

BJA can use Diversification by investing in different asset types with lower exposure to interest rate and credit quality to support their long-term pension liabilities.