Actuarial Society of South Africa

EXAMINERS' REPORT

June 2023

Subject F107/B100 —
Banking Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principal Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners and should not be taken as model solutions.

General comments on the aims of this subject and how it is marked

The aim of the Banking Principles subject is to instil in successful candidates the key principles of banking and to introduce students to the different types of activities undertaken by banks, including their associated risks, and the quantification of these risks.

A mix of question styles is used, covering knowledge of the material set out in the core reading, application of this in calculations and case studies and higher order skills such as synthesis and collation of recommendations.

Candidates are awarded marks for all reasonable answers including different but still reasonable numerical solutions. Marks are awarded for working in the case of numerical answers.

Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

Comments on candidate performance in this diet of the examination

This was the third sitting of the Banking Principles subject.

The paper covered a range of syllabus objectives and included questions that required candidates to apply knowledge to the circumstances described. Candidates who were able to apply their knowledge to specific scenarios in the questions were successful, with better prepared candidates able to generate a number of valid points.

Overall, candidates performed better than during the 2022 examination year. In particular, candidates appeared to be better prepared for bookwork knowledge questions.

However, as observed in the 2022 examinations, many candidates did not provide sufficient breadth and depth in their responses and failed to generate a sufficient number of points for the marks on offer.

QUESTION 1

Bank XYZ is a large bank operating in the country of Actuaria. It offers a range of retail products including: home loans, vehicle finance, transactional accounts, credit cards, insurance products and investment products.

The country of Actuaria has faced increasing climate-related risks and perils over the past decade, with a particular region of this country being predicted to experience a significant increase in the frequency and severity of floods over the next five years.

i. Describe any potential impacts of this on the main risks associated with the bank's products and operations. Focus on credit, operational and insurance risk impacts.

[7]

Credit Risk – secured

- Floods could destroy or damage the properties over which bonds are secured, severely affecting the value of the properties.
- Customers who are affected may not continue to pay for damaged property and therefore default.
- The bank may be unable to recover the full value of the property and end up writing off the loans, impacting the profits of the bank.
- The vehicle finance portfolio may also be expected to be impacted. Floods may damage vehicles or be the cause of more accidents.
- Similarly to home loans, flood damaged vehicles may impact the willingness to pay off the debt.
- If more vehicles are damaged beyond repair, then insurance claims will pay out. These pay-outs would reduce the profitability as the loans would be repaid earlier.
- If insurance would not cover the total amount, the bank may end up eventually writing off the loans, impacting profitability.
- For reasons above, including insurance failures, LGDs for secured lending are therefore expected to increase, causing higher credit provisions and capital demand.

Credit Risk – unsecured

- There may be some secondary effects on this portfolio in which borrowers would take on strain in servicing their loans.
- For example, if customers face difficulties paying their secured products, this will filter through to unsecured products.
- Therefore, this portfolio could see some increase in credit risk, mostly by an increase in PDs.
- Credit cards could see an increase in utilisation as more items may be required on credit, such as emergency funds.
- This PD and utilisation increase would also increase the credit provisions and capital held.

- For both secured and unsecured: companies employing customers of bank could be impacted and in extreme cases layoff staff which could flow through to ability to service debt.

Operational Risk

- The floods could also impact the bank's operations – such as branches or offices. Therefore, this would create an operational risk impact.
- The floods could also impact employee's homes and will have an effect on the staff's availability and productivity.
- The bank may need to revise its disaster recovery plans, procedures, policies, insurance to ensure that it could handle the expected floods.
- If customers are unable to visit ATMs or branch network then profitability of the bank may be impacted. (this is unlikely in places which are digital/cashless). Furthermore, there is the risk that digital service centres might fail.
- There may be an increased risk of fraud or cyber-crime if criminals target customers or employees who have experienced flood damage.
- All of these operational risk increases could also translate into higher operational risk capital requirements or mitigation spend.

Insurance Risk

- Depending on the insured portfolio, this could have a large impact.
- The impact will come through any increase in frequency or severity of claims.
- Impact may be mitigated through mechanisms such as reinsurance.
- Costs of reinsurance arrangements are likely to increase.
- If the bank has life insurance products, an increase in floods may lead to greater claims.
- The cost of insurance for the bank's own properties and assets are likely to increase.

[Total 7]

Over the course of the year, as had been predicted, the country experienced a higher number of floods. The CRO has been asked to update the Board of Directors on the impact to the bank and changes to the risk profile and strategy. During the update she stated the following:

"During the year, our portfolio has been relatively sheltered from the effects of the increasing flood risk in the country. In particular, our home loan portfolio did not experience a significant credit loss impact after the floods, with key portfolio indicators remaining stable."

ii. Suggest the possible reasons for the CRO's statement.

[6]

- The bank did not lend (or is not as exposed) to these high flood regions.
- Houses are not built close to higher flood risk areas.
- Houses and properties are well equipped or built to handle floods.
- The local town council/municipalities have infrastructure or plans in place to handle floods.
- It may be too soon to know of further consequences, as impacts are still to be seen on the portfolio.
- The homeowners could still be servicing the home loan even if a lot of damage has occurred.
    - This could be due to them still being able to pay the instalments even if damages have occurred.
- The rate of floods may have increased, but the severity/magnitude of floods may have not seen a commensurate increase.
    - For example, the number of flooding events may have increased but not the amount of water per flood event.
- It could be possible that not many jobs were lost during or after the floods.
    - It could be that businesses are still active and able to operate.
- As part of the lending process, properties are likely required to have insurance. Insurance has negated any credit loss impacts on the bank.
- LTVs offered at origination might be conservative enough so that even after flood damage the outstanding loans are less than property values with no impact of increased flooding

[Total 6]

The CRO has heard that a neighbouring country is experiencing higher frequency of wildfires. She has noted that this could have an impact on the bank as there are geographic similarities in the areas of the country that are near the neighbouring border. She wants to build a forecasting model to assess future impacts of wild fires on the credit portfolio.

iii. Describe the data that would be required to conduct the analysis.

[5]

Historic wild fire data

- Country-specific fire data/weather data
- Assessing how different regions may be affected by wild fires.

Geolocation data

- To understand at which locations the credit portfolio customers are.
- Will also assist in knowing and mapping at which locations the fires occur.
- Assessing which regions have lots of fields, versus rivers and other structures.

Insurance data

- Historic claims data could assist in assessing frequency and severity of damages.
- Data from reinsurers may be valuable in assisting in estimating various impacts.
- Insurance data from neighbouring country to assess change in pricing (if available).

Forecast data

- A forecasting model would need some type of forecasted scenario of variables.
- In this case, this may be future estimates of fires and forecasted impacts on the economy such as damages or impact on GDP.

Weather data

- Past patterns of weather data may influence the rate of fires.
- This could include: rain and temperature.

Credit portfolio data

- Once the climate related data is obtained, the relationship to the Bank's portfolio would need to be established.
- Historic data on the credit portfolios of the bank.
- To understand the historic loss rates of portfolios.
- To ensure that the correct portfolios are selected – for example home loan and vehicle finance portfolios may be more affected.

Credit was given for many alternative solutions, such as discussing the frequency and severity fire data that may be required.

[Total 5]

[Total 18]

This question was answered generally well.

Part (i) was answered well, candidates provided better insights for credit risk than compared to other risks.

Part (ii) was answered poorly. Many candidates spent too much time discussing provisions.

Part (iii) was generally answered well. Better candidates provided more meaningful points on the types of factors that would influence the risk of wildfires in a particular area and how these could be measured.

QUESTION 2

i. Define the term counterparty credit risk (CCR) and outline when it may occur.

[2]

- Counterparty credit risk (CCR) can be defined as a risk type that borders between market and credit risk and is the risk that a counterparty to a trade (that is a transaction in the trading book) defaults before settlement.
- CCR is subject to both the creditworthiness of the counterparty to the trade and general market changes which may affect the trade.
- It is important to note that CCR is applicable in cases where there is a bilateral risk of loss, i.e. either party to a transaction could default.
- An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default.

[Total 2]

ii. Outline the two Exposure at Default (EAD) measurement approaches for counterparty credit risk: Standardised Approach (SA-CCR) and the Internal Model Method Approach (IMM-CCR).

[6]

<u>Standardised approach (SA-CCR)</u>

- The SA-CCR is applied according to the following formula:

EAD = 1.4 × (RC + PFE)

Where:

- Replacement cost (RC): This is the cost incurred, or loss, if a counterparty had to default and the transaction had to be replaced immediately.
- Potential future exposure (PFE): This is the cost incurred, or loss, between the point of default and the initiation of a new transaction.

<u>IMM-CCR approach</u>

- The IMM approach can be used by banks where both regulatory approval is received and the IMM is used for market risk (either the SA or IRB can be used for credit risk).
- The IMM approach is applied according to the following formula:

EAD = 1.4 × EEPE (or α × EEPE)

Give credit if any other value used in place of 1.4

- EEPE (Effective expected positive exposure) is the weighted average over time of the Effective EE of a netting set, where this average is weighted according to the date at which the last transaction matures (capped at 1 year).
- Effective EE at a specific date means the maximum expected exposure that occurs at that date or any prior date. (Or for a specific date as the greater of the expected exposure at that date, or the effective exposure at the previous date.)
- Expected Exposure (EE) the amount that is expected to be lost if there is a positive MTM and the counterparty defaults.
- EEPE also incorporates out-of-the-money positions that could become credit exposures and roll-over risk where a counterpart might default during a large in-the-money change.
- Regulators have the discretion to require a higher factor than 1.4, based on a bank's CCR exposures.
- The IMM also addresses "wrong way risk", meaning the positions of counterparties can be correlated to their probability of default.

[Total 6]

Denote $f(\mathrm{t})$ as the exposure of a derivative contract at time t years from now. Let M be the notional amount and σ be the volatility of the underlying contract. The current time is t=0, and maturity is at time t=T.

The following information is given:

Expected Exposure (EE)(t) = $\mathbf{E}[f(\mathrm{t})] = M\beta\sigma\left(t^{1/4}\right)$

Effective Expected Exposure (EEE)(t)= Expected Exposure (EE)(t)

M = L$100m, β = 5, σ = 0.05, T = 1

i. Calculate the EAD under the IMM approach.

[4]

Hint:

$$Effective\ Expected\ Positive\ Exposure\ (EEPE) = \int_0^1 EEE(x)\,dx$$

$$\int_0^t x^n\,dx = \left[\frac{x^{(n+1)}}{(n+1)}\right]_0^t$$

Using the hint, calculate EEPE:

$$EEPE = \int_0^1 EEE(x)\,dx$$

$$= \int_0^1 M\beta\sigma(x)^{1/4}\,dx = M\beta\sigma\left[\frac{x^{(1/4+1)}}{(1/4+1)}\right]_0^1$$

$$= M\beta\sigma\left[\frac{x^{5/4}}{5/4}\right]_0^1 = M\beta\sigma\left(\frac{1}{5/4}\right) - M\beta\sigma\left(\frac{0}{5/4}\right)$$

$$= 100 \times \beta \times \sigma \times \left(\frac{4}{5}\right)$$

$$= 100 \times 5 \times 0.05 \times \left(\frac{4}{5}\right)$$

$$= 20$$

$$EAD = 1.4 \times EEPE$$

$$= 1.4 \times 20 = L\$\,28m$$

Give credit if any other value used in place of 1.4 with noting that the value can be set differently.

[Total 4]

[Total 12]

This question was generally answered well.

Part (i) was answered well. Many candidates did not understand the bilateral nature of the risk and confused this with credit risk in the lending book.

Part (ii) was generally answered well by candidates who scored well in part (i). Weaker candidates lost out on marks by not providing definitions of the components of the IMM-CCR approach.

Part (iii) was generally answered well, with many candidates scoring full marks. Many candidates missed out the second part of the calculation answering only part of the question.

QUESTION 3

i. Outline the main products that retail banks offer to individuals.

[4]

- The core banking product for individual customers is a current account which allows savings, payments, full transaction ability.
- Additionally, borrowing through overdraft facilities which are linked to transactional accounts.
- Credit Cards allow customer flexible payment and borrowing options and many customers may hold more than one.
- Savings and notice products allow either instant access or fixed terms at variable or fixed rates.
- Loan products such as unsecured personal loans.
- Mortgages, vehicle finance are also available to qualifying customers.
- For affluent customers, certain banks will provide specialised banking services such as a private banker, access to certain benefit and perks, or specialised wealth management.
- Forex and offshore facilities are standard products for larger retail banks.
- Recently many banks have ventured into providing life assurance products such as funeral policies, life cover,
- Other insurance products include short-term products such as travel insurance.
- Most banks offer rewards programmes that reward customers in different ways depending on their product usage.

[Total 4]

You work for Bank XYZ and the chief marketing officer has approached you to help investigate the feasibility of implementing a retail rewards programme. At this stage the bank is considering either reducing customer bank fees, providing an upfront “cashback” or allocating mobile minutes and data.

ii. For each of the three options, discuss the considerations you would highlight to the chief marketing officer when deciding on which form the rewards should take. Also highlight any overall considerations to take into account when deciding on a rewards structure.

[8]

- First consideration should be given to what the standard market practice is with regards to rewards in the banking sector.
- Regulation regarding of rewards/paybacks should be considered.
- The composition of the retail book with regards to demographics would be a major indicator of what would be a popular form of reward.
- Are there any other options than these three or could a combination of them be used?
- The current systems in the bank should be able to handle the distribution of the rewards, and if not, the cost of implementing new systems should be weighed against the expected benefit.

- The new rewards may require new accounting treatments (e.g. liability on the balance sheet) and new arrangements may be required.
- Consideration should be given to how the rewards would link to the products that rewards are given on.
- The bank should give consideration as to what behaviours will be targeted.
- Consideration should be given as to the cost of the rewards to the bank versus financial and non-financial benefits.
- All TCF considerations should be considered before choosing a specific rewards currency

<u>Cashback</u>

- This would probably be very popular with customers who have cash flow problems and could lead to a greater uptick of less credit-worthy customers.
- If the cashbacks are inconsequential in size, it could make customers feel done in when they could have had something that is tangible such as airtime, lessening the impact of the 'reward'.
- There would most likely be a very large gap in what more affluent customers receive back compared to what lower income customers receive, which could lead to unfavourable media attention.
- Determining how the cashback would work on different products could be quite complex:
- For debit and credit card spending, a simple percentage of total spend could easily work.
- For products such as mortgages or personal loans a % back on the first premium could be implemented, but then creates complexity between having separate messages across product lines as well as having only once off behaviour change.
- Cashback would probably be the easiest to market and have a relatively strong customer message as it is easy to understand.
- Unlike reducing fees, cashbacks are uncapped if applied as is, which could lead to a revenue leak that has limited benefit.
- From an operational standpoint it would probably be the easiest to implement as a payment into a customer's account.

<u>Mobile minutes/data</u>

- Rewarding mobile minutes/data/airtime would be the most challenging to implement operationally:
- Knowledge of each customer's mobile cellular provider would be needed which could have system as well as data privacy regulations (e.g. POPI/GDPR impacts).
- A mechanism would have to be implemented to deliver the airtime to customers which would either to be:
- Directly liaising with all providers to allow the purchasing of airtime on behalf of the customers.

- Providing customers with a voucher or redeemable code to receive airtime.
- The above is further complicated as the rewards would most likely have different amounts depending on the customers.
- If the bank has an established relationship with a service provider or their own license this could be leveraged.
- Consideration needs to be given on which form the airtime takes, be it data, SMSs, minutes or just a monetary amount.
- Airtime rewards would most likely be the most attractive to low-income customers who struggle to buy a necessity like this whereas for higher segment customers this would be an inconsequential reward as they would probably have access to unlimited data or already be on some sort of contract which covers their needs.
- It opens the bank to the risk of fluctuating data, minutes and SMS costs as the reward values would have to remain constant over set periods.
- Airtime rewards would, however, be the most tangible to customers as it is separate from their accounts and products and would have the impact of being felt in their pocket.

<u>Fees</u>

- From the perspective of linking behaviour to products, a reduction in fees would be the easiest as most products have an account fee in some guise that could be reduced.
- There is limited downside potential to the bank as fees can only be reduced so much and the exact monetary amount would be known.
- Conversely, this has the effect that customer's rewards are capped which provides a less strong marketing message compared to the other two (which at surface level would appear uncapped).
- For many customers, fees are a big part of why they choose a specific bank so it could offer more of a competitive advantage compared to other forms of rewards.
- Furthermore, it could also be an incentive for customers to upgrade accounts if the bank provides deferring levels of service between different types of current accounts or credit cards.
- Overall, the marketing message would be very simple to understand for customers and makes for a great headline message.
- It would be very easy to implement operationally as it would just be a fee reduction.
- Careful consideration would have to be given to accounting. As fee income makes up a large part of bank's income, a sudden reduction could create a distorted view of the bank's actual performance.

[Total 8]

The bank has decided to go ahead with the rewards programme and will provide cashbacks to customers. To drive credit card take-up and spend, the cashback will be determined as a percentage of monthly spend on a customer's credit card.

iii. Discuss the risks arising from this strategy with regard to: implementation, financial, regulatory, marketing and product risk. For each risk, also provide mitigating actions that can be taken.

[8]

Implementation Risk

- The major implementation risk would be that there is no system to implement the rewards, or the system does not work as intended.
    - This could lead to incorrect payments and financial loss.
    - The best solution would be to investigate whether a current system in the bank can handle this, such as the process by which reversals are done and adjust it.
    - Furthermore, proper testing will have to be implemented once the system is up and running before it gets launched for customer use.
- Customer refunds should be given thorough consideration:
    - If refunds are not netted off of spend, customers could have inflated rewards. This also opens the door for abuse where customers spend and request refunds to inflate rewards.
    - A secondary problem is if there is card fraud on a customer's account and they get refunded the spend, that spend should be netted off to avoid rewards that weren't intended.
- Furthermore, other transactions that aren't just refunds, but account adjustments or interest added to the account should also be excluded.
    - A robust list of transaction types and codes should be investigated beforehand and ensured they don't get included in the calculation of rewards.
- Adaption to customer statements will have to be made to reflect the reward as well as explaining to customer how their reward was calculated. If not done properly, it could open the bank to complaints and financial losses.
    - The statements will have to be set up properly by the finance and marketing teams to ensure it is clear and concise.
    - The legal team will have to review it as well to ensure there are no loopholes in the wording and explanation that opens the bank to risks.
- The program will have to be clearly scoped out as to how often and when payments are made. Without scheduling this, bad customer experiences could be had leading to reputational risk.
    - Clear timelines could help mitigate this risk as well as having a robust set of checks and balances to ensure swift payment of rewards.

Marketing Risk

- The marketing message should be clear and concise. If not, it could lead to confusion for customers and an overall bad customer experience.
    - Incorrect or confusing statements in marketing opens the bank to legal risks.
    - Proper review of any marketing material should be done and reviews by the legal team.

- There is the risk that the rewards program does not appear attractive compared to the programs implemented by competitor.
    - Thorough market research into the rewards’ landscape must be conducted to ensure that the program is competitive.
    - If any glaring problems are found the program should rather be reworked instead of risking the possibility of bad press and public backlash.

Product Risk

- As this benefit is aimed at credit card users, it could lead to an uptake of credit cards by customers the bank does not want.
    - The bank needs to ensure it has proper controls in place to ensure credit cards are only issued to creditworthy customers.
- A large risk is that no take-up of new credit cards occurs, and credit card spend remains flat, while there is now a reward pay out on the credit card spend, i.e., an extra cost to the bank without any upside.
    - The bank needs to ensure that customers are aware of this new benefit.
    - The rules should also ensure that mostly new behaviour is rewarded and existing behaviour is not rewarded unduly.
    - Targeted marketing to customers that have a credit card but are swiping their debit cards could help alleviate this.
    - Targeting customers with good credit scores that do not have credit cards by informing them of the rewards should lead to an uptick.
    - General education to the customer base on the rewards program can have a positive impact.
- As the program is only aimed at credit card holders, it is quite exclusionary towards customers who do not hold a credit card or don’t qualify for one. This would most likely also disproportionally affect lower income customers who are the most likely not to qualify for credit.
    - Proper consideration should be given to whether this is the correct way to implement the program and if adjusting it by segment would not be more appropriate to target different behaviours in different income brackets.

Financial Risk

- The bank runs the risk of either incorrectly reporting the rewards or creating a confusing view if it is not reported in the appropriate manner.
    - The finance team will have to clearly set out how the financial impacted will be reported and create a new line in the income statement to reflect this.
    - Further metrics will have to be included to prove the success of the program, or the lack there off. Monthly tracking will have to happen, and changes should be reported to management if there are any significant changes.

- A program like this opens the bank to fraud and abuse.
    - Customers could roundtrip money between different accounts, creating fake spend to increase their rewards or they could spend on the behalf of customers who do not qualify for credit cards to increase their own rewards earned.
    - Creating a cap on how much could be earned would substantially decrease the risk that customers would partake in fraudulent activities.
    - Tracking of irregular spending activities such as multiple transactions of the same amounts or constant transfers between accounts could help identify customers abusing the program. This tracking could be done in cooperation with the fraud or AML team of the bank.

Regulatory Risk

- As the program could have a large financial impact on the bank and customers, it would have to be reviewed by the Regulator(s) and runs the risk of either being disallowed or severely limited in its implementation.
    - Including financial impacts and mitigating strategies would go a long way in ensuring the program gets approved.
    - The regulator could also say that the programme was misleading and require large scale remediation (find, fix, pay) efforts or fines.
- The bank runs the risk that customer contracts are not updated properly and that there are loopholes.
    - Proper review of the updated credit card account contracts must be conducted to prevent this from occurring.

[Total 8]

[Total 20]

This question was generally answered well by the majority of the candidates.

Part (i) was answered well considering it was bookwork.

Part (ii) was answered well. Many candidates were able to identify and discuss the major considerations when designing a rewards programme. Better candidates were able to differentiate between the different options.

Part (iii) was generally answered well. Candidates were able to provide a number of risks arising from the strategy.

QUESTION 4

A customer is looking to purchase a new vehicle for L$ 15 000, with a loan from ABC Bank. The customer has been offered three loan products to facilitate this transaction. Details of the three offerings are shown in the table below.

Product	**A**	**B**	**C**
Type	Unsecured personal loan	Secured vehicle finance	Credit card
Term	72 months	48 months	12 months - revolving
Security	Credit life insurance	Vehicle	None
Interest rate	Fixed	Linked	Linked
Deposit required	None	10% of vehicle price	None
Credit limit	N/A	N/A	L$ 20 000

i. The credit analyst shows you the three offerings that will be presented to the customer. Discuss the relative merits of the different products offered from the perspective of:

(a) the customer,

[5]

(b) the bank.

[6]

Customer

- Loan A is over 72 months, depending on the interest rate charged this could be the lowest monthly repayment compared to B and C.
- A lower monthly repayment could better suit the customer affordability.
- However, the longer term will usually mean that the total interest paid is much larger.
- The security required for A is credit life insurance, which will be an added cost for the customer.
- The credit life insurance may also give the customer comfort that the loan will be paid if anything happens to them.
- The interest rate for A is fixed which gives some stability for future cash flows. However, if interest rates fall there will be no benefit passed onto the customer.
- A 10% deposit is required for option B, which may be an added cost strain for the customer if no funds are available.
- The customer may end up trying to obtain unsecured credit to fund this.
- No deposit or security is required for the credit card product; however, it is most likely the largest monthly repayment requirement for the customer.
- The card gives an extra credit limit than what is required for the purchase, which could benefit the customer for further transactions.
- Option C may give extra flexibility to the customer to prepay. If the customer has extra funds, he may be able to pay off the amount earlier and use the limit for other purposes.
- Unlike Option C, there may be penalty fees applied if the customer wants to settle early on option B (possibly A).

Bank

- Banks have a responsibility to treat customers fairly, and by suggesting alternative products to boost income at the expense of the customer does not fit into TCF principles.
- Suggesting option C (and A) as standalone products for this transaction can be classified as irresponsible lending and bad conduct.
- The bank would most likely receive the most interest income from Option A.
- As A has the longest term, the bank would potentially earn the most admin fee income from option A.
- Both A and C are unsecured lending, which means recovery after default are limited.
- Both A and C are unsecured lending, which would also mean the bank would need to hold higher capital demand and provisions relative to secured lending products.
- Credit life insurance is required for option A, which will give the bank assurance that the loan would be repaid upon death of customer.
- If the bank offers credit life insurance, it could offer the product and earn additional premium income.
- Option B requires obtaining the vehicle as security, which would mean greater upfront costs such a legal cost to the bank.
- Option B may take the longest processing time to complete.
- However, if the customer has to default the bank has a claim on the vehicle. This would mean the bank could recover a greater amount if the loan is not repaid.
- The greatest credit risk is arguably, C followed by A and then B.
- Option C offers an additional credit limit to the customer, increasing the credit exposure and EAD compared to the other options.
- Option B also requires a deposit, which therefore reduces the total credit exposure to the bank.

[Total 11]

Your team member is busy developing credit risk models and is investigating industry data. He suggests to the Head of Credit that the bank should rather target the used vehicle segment. This is due to the observation that used vehicles depreciate at a much slower rate than new vehicles.

ii. Evaluate your team member’s suggestion to the Head of Credit.

[5]

- The slower rate of depreciation could mean lower overall credit risk for the bank.
- This is due to higher implied recovery rates and lower LGDs for used vehicles.
- Lower credit risk would mean lower capital demand and a lower level of ECL provisions.
- Used vehicles may easily reach their ‘end of life’ quickly, and therefore the ability to recover reduces quickly over time.

- Used vehicles may have a greater chance of problems than compared to new vehicles, which poses a risk of the customer stop paying or the risk of a steep decline in value.
- Although the rate of depreciation is slower, the absolute recovery potentially may be lower for some used vehicles.
- There may be a large need for the new vehicle segment in the market, will need to assess the market and competitors.
- The used segment is a broad definition. In order to reduce risks, the bank may only decide to finance vehicles within a certain age range.
- The ability to decrease monthly repayments for the customer by using balloon payments may be limited with used vehicles.
- There may be more incidences of fraud with regard to used vehicles being sold with inherent problems. The bank may therefore need to deal with authorised used vehicle dealers.
- More diligence may be required to the bank before used vehicle approvals, therefore increasing processing time and costs.
- New vehicles turn into used ones. By offering both, you can have a bigger market and potentially refinance the same car across two customers over time.
- New vehicles are more expensive, and so you may have higher loans, bigger book, more interest, and higher potential revenues.

[Total 5]

[Total 16]

This question was generally answered well.

Part (i) was answered well. Candidates were able to use the information provided to generate valid points. Many candidates did not mention treating customers fairly or conduct risks from the bank's view in offering various products.

Part (ii) was not answered well. Most candidates struggled to generate a sufficient number of points to score well in this question. Better candidates were able to identify more sophisticated considerations.

QUESTION 5

You are a credit analyst at SNB Bank. The bank has been approached by the consortium who are planning on building stadiums and require finance.

i. Briefly describe project finance and outline the use of a Special Purpose Vehicle (SPV) in this arrangement.

[3]

- A company undertaking a large, long-term project might fund it by borrowing against its own balance sheet. However, it is often cheaper and safer for the company to limit the recourse of lenders (the ability of lenders to seek loan repayment) by borrowing against the infrastructure or industrial project on which the company is working.
- In this case, the loan repayments will be met by the cashflows generated by the project.
- To ensure limited recourse against the construction company, a project finance loan will normally be made to a special purpose vehicle (SPV). This is a limited liability company whose sole purpose is to undertake the project.
- It generally sub-contracts the work to be done. Contractors may offer guarantees over timescales and performance that the lender can claim against if the SPV defaults on the loan.

[Total 3]

ii. Outline any six types of credit guarantees.

[3]

Guarantees include:

- A payment guarantee, which ensures the seller that the purchase price will be paid on
- the agreed date if all contractual obligations are met.
- An advance payment guarantee, which ensures the buyer that the advanced payment will be reimbursed if the seller does not meet contractual delivery obligations in full.
- A performance bond, which serves as collateral for costs incurred by the buyer due to failure of the seller to provide goods and services promptly and as contractually agreed.
- A bid bond (tender bond), which secures the organiser's expenses in tenders by requiring participants to pay if their bid is accepted but withdrawn.
- A warranty obligations guarantee, which secures any claims by the buyer for defects appearing after delivery.
- A letter of indemnity, which secures the shipping company against any claims if goods are delivered prior to receipt of the original bill.
- A credit security bond, which serves as collateral for loan repayment.
- Sovereign guarantees back projects deemed in the public interest, and support development and promotion of infrastructure, new industries, regions, and exports.

[Total 3]

A colleague in your team has been reading up on guarantees and how any sovereign guarantees may affect the credit risk assessment on the project finance loan. He has asked you for your advice in considering guarantees as part of the overall credit risk assessment he is busy preparing.

iii. Discuss how a sovereign guarantee could impact the credit risk assessment on the project finance loan.

[4]

- The impact on the assessment would vary depending on the type of guarantee issued.
- The impact of the assessment would also vary if assessing the loan for regulatory capital, provisioning or economic capital purposes.
- For example, impact of guarantees is detailed differently for regulatory capital under standardised or advanced approaches.
- The impact will also depend on the seniority of the loan and ranking of other creditors.
- Generally, the PD would be reduced as the risk of default is reduced. The impact of a guarantee will depend on the bank's view of the credit risk posed by the guarantor.
- The guarantor's credit risk will also need to be assessed, as there is a possibility that the guarantor may not be able to pay as per the guarantee.
- If the guarantee is to ensure that any outstanding balance is paid off, then it may also make sense that the guarantee will affect the LGD.
- The bank will have more certainty on the recovery of funds after default, and hence reduce the LGD.
- In the case where a guarantee includes collateral, this will have an impact on the LGD if the bank has a clear legal ability to take possession of the collateral in the case of default. Note that the type of collateral could bring in volatility.

[Total 3]

A 'cash sweep' can be defined as: a company using excess cash to pay outstanding debts ahead of the scheduled payment date instead of distributing it to investors, shareholders or other stakeholders.

iv. Explain the advantages to the bank if it enforces a cash sweep clause.

[4]

- This may reduce the outstanding debt faster and reduce the amount of interest payable.
- This could give the bank certainty of payment, especially if some of the income is volatile, such as in some project finance deals.
- By using such a feature, the bank assessment of PD of a borrower could reduce.
- The bank's assessment of EAD over time could also reduce as the loan amount is being paid back faster and/or being prepaid.
- The expected reduction in credit risk parameters will reduce the capital demand and provisions.

- The bank may be able to price the loan more favourably, which could be a selling point to the customer.
- The clause may make the bank stand out from similar offerings of competitors.
- Repaying debts early could allow the borrower to access more funds at a later stage when it is required. It can therefore, make it easier for the bank to lend out to the customer in future.
- This could also strengthen the borrower's balance sheet which would make all stakeholders pleased, including shareholders and lenders.
- Strengthening the balance sheet may make it less likely that the company will not satisfy some of the loan covenants.

[Total 4]

[Total 14]

This question was answered relatively poorly.

Part (i) was answered relatively well. Most candidates were able to describe project finance, although many descriptions lacked the detail required to score the full marks available. Better candidates understood that the purpose of an SPV in the context of project finance and described this well.

Part (ii) was answered well.

Part (iii) was not answered well. Better candidates considered the question systematically, and covered potential impacts on PDs and LGDs. Few candidates considered the various perspectives from which the impact could be assessed (e.g. capital, provisions, pricing).

Part (iv) was generally answered well. Credit given for sensible advantages. Most candidates could list some benefits from a credit risk perspective. Better candidates also considered the liquidity benefits.

QUESTION 6

i. Briefly define model risk and outline ways of managing model risk.

[4]

- Model Risk is defined as the negative outcomes associated with the misuse of models.
- For example, losses from incorrect underlying assumptions, errors in model implementation or incorrect model use.

Managing model risk

- Having a strong internal audit environment where models, especially models that can have a material effect on business decision making or regulatory reporting, are vetted and tracked.
- Parameter risk largely managed through having a strong independent validation unit who checks that models are built appropriately and scientifically.
- Having a strong Model Risk Management governance process and framework in place.

Credit was given for many alternatives.

[Total 4]

Bank ABC offers a wide variety of lending and savings products. The chief marketing officer has approached you to help replace the current marketing approach with a personalised solution that will recommend one specific product to customers through their mobile application.

ii. List the specific factors of each client that you would require to build a recommendation model for the current product offering.

[4]

- Age
- Number of dependants
- Credit score
- Credit behaviour
- Products information from other providers
- Spending behaviour
- Income and expenses
- Disposable income
- Current amount of savings
- Current credit products
- Current credit limits and amounts outstanding
- Current product holding
- Banking behaviour related to the banking products

- History of previous products
- Interaction with banking app/tech savviness
- Time with bank

[Total 4]

You have decided on a simple model that groups customers into homogenous groups based on demographic data and banking behaviour that then determines their most likely product take-up.

iii. Outline the risks of implementing this model, including the model and operational risks associated with a personalised approach like this.

[6]

Model risk

- The model may be too simple and could make incorrect recommendations.
- The parameters in the model are not appropriately capturing behaviour.
- The model is not properly validated and does not work as intended.
- The model has no feedback loop to allow for recalibration.
- The model has inherent biases that favours certain products.
- The model groups are too homogenous, leading to very little value added.
- There could be incorrect implementation of the model.
- Human error could creep in if the model is not automated.
- Input data such as credit scores could be outdated leading to incorrect model results.
- Data history or quality could be insufficient.

Operational risks

- Credit products could end up being recommended to customers who don't qualify for them, due to low credit scores or income cut-offs.
  - This could lead to bad customer experiences if they then try to take-up these products and get rejected.
  - There could be legal implications if customers are recommended these products and take the bank to the ombudsman.
- There could be regulatory barriers as this could constitute providing financial advice which would need certain regulatory approvals.
- If the model is created without consulting the individual product houses on their targets, it could lead to a clash of product strategies.
- Reputational damage could be caused if recommendations are not appropriate, e.g., recommending a savings product to a customer who is heavily indebted and should rather be paying off high interest-bearing debt.
- Further reputational damage could be had if the process of applying for the products are not easy and leads to customer frustration.
- There is further conduct risk in what personal information could be used to calibrate and implement the model.
- The implementation on the application adds an additional layer of cyber risk if not implemented properly.
- Customers could end up taking more products than they need if they are continuously recommended new products.

- This could constitute a breach of TCF as the bank should not be pushing unnecessary products, and consequently costs and fees, unto customers.

[Total 6]

The model has been implemented for three months and take-up of certain products have increased. However, credit card take-ups have remained flat, even though it is one of the most recommended products. You have been tasked with investigating why this is the case.

iv. Outline which factors you would investigate to assist with your investigation.

[6]

General considerations:

- Firstly, look at the products that have seen a take-up and investigate why this happened.
- Investigate what products have had a greater take-up after implementation.
- Investigate any correlation between the products recommended compared to the take-up of products.
- Determine the historic take-up rates of products vs the current take-up rates.
- Determine the attributes of customers who are taking up new products compared to the customers who have no behaviour change.
- Look at the wording of the messages and determine if there are any similarities in the successful messages vs the non-successful messages.

Credit card specific information:

- Determine the type of customers that receive credit card recommendations and note any differences between other types of customers.
- Investigate whether the customers that receive recommendations for credit cards, do in fact qualify for credit.
- Determine whether the customers that receive credit card recommendation have a stable financial situation, i.e. Will be good credit risks.
- Determine whether any other products have been taken up by these customers and if they are linked to the recommendations from the model.
- Look over the pricing and interest rates of the credit card offerings and compare that with the general range of what these customers would find affordability to determine if this could be a barrier to take-up.
- Scrutinise the benefits of the credit cards (free travel insurance, access to loungers, interest free periods) to link to the possibility of additional incentive to take-up the credit card.
- Probe the spending habits of these customers to see if they would benefit from a credit card.
- Investigate what the overall market trend has been with regards to credit card spend and take-up
- Try to determine if the current macro-economic landscape is influencing the use of credit.

Model investigation:

- The model should be checked again to see if the inputs are correct.
- Any biases in the types of customers getting different recommendations should be investigated.
- The output should be checked to see if it is free of errors.

[Total 6]

[Total 20]

This question was generally answered well.

Part (i) was answered well, with many candidates scoring near full marks.

Part (ii) question was answered well.

Part (iii) was poorly answered, with a large variation in marks across candidates. Better candidates were able to provide a clear outline of the risks, considering various factors relevant to model specification and implementation as well as regulations and customer experience. Weaker candidates failed to consider the model implementation from a practical perspective and thus failed to highlight relevant risks.

Part (iv) was answered well by those candidates that attempted this part of the question. Better candidates were able to consider potential causes for the observations and outline the data they would request to investigate accordingly.

