

Actuarial Society of South Africa

EXAMINERS' REPORT

November 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 fourth 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. This paper required candidates to demonstrate sufficient understanding across a wide range of a bank's operations and consider the view of different stakeholders. There were questions that required candidates to demonstrate analytical capabilities including the calculation of estimates and interpretation of figures.

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.

As observed in the earlier 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 TP is a relatively new bank that has traditionally focused on the lower income segment of the market. Bank TP offers a range of retail products, which include personal loans and other types of unsecured lending. As the bank's loan portfolio has continued to grow, you have been recruited to help Bank TP explore more sophisticated pricing models.

i. Define tactical pricing and provide examples of various tactics.

[2]

Tactical pricing is the adjusted price incorporating wider market views.

Examples of tactics include:

- Customised pricing: The price is set a price based on customer characteristics, which is the most typical form of pricing in credit pricing.
- Non-linear pricing: Pricing is not directly proportional to the loan amount, e.g. this could include fees and charges that may be levied as a fixed amount as opposed to a percentage of exposure.
- List pricing: A seller sets a price, and each prospective customer decides whether or not to purchase, e.g. share price movements, or listed house prices. This is not commonly used in banking.
- Markdown management: This is pricing that is reduced from the "normal price". This is not commonly used in banking as the bank does not have "inventory" or "produce" to sell. It may however, form part of promotion deals which include products or other benefits.
- Revenue management: Prices are set around managing revenue. This approach is sometimes used in deposit pricing. It may also be used in certain parts of ALM.
- Risk-Based Pricing: As credit losses can vary, banks adopt risk-based pricing. This involves adjusting interest rates based on the credit risk associated with individual loans.
- Additional credit can be given for candidates that discuss the use of individual vs group pricing, deposit pricing, relationship pricing and product bundling.

[Total 2]

- ii. In order to manage its total income, Bank TP will need to ensure that its pricing is adequate to cover various aspects of its lending. Outline the factors considered in determining the profit requirements as part of loan product pricing.

[3]

Banks need to consider several factors such as expenses, credit risk, tax, funding requirements, capital requirements, and economic profit as part of creating a pricing strategy. The pricing strategy should ensure sustainable profitability and effective risk management.

The following factors are used to influence profit requirements:

- Funds Transfer Pricing (FTP)/ Cost of Funds (COF): The bank's treasury department sets prices for transactions related to funding and liquidity requirements. This ensures that the bank's internal funds allocation is aligned with its overall profitability goals.
- Credit Risk Management: Banks assess and manage the risk of loss from advanced funds. This involves analysing the creditworthiness of borrowers and setting appropriate interest rates to account for potential credit losses.
- Non-Interest Expenses: Operational costs related to loans, including initiation, maintenance, and collection expenses, are factored into the pricing to ensure that the income generated covers these expenses.
- Profit Considerations: The bank aims to generate a return on investment for shareholders. This is often tied to Common Equity Tier 1 (CET1) capital, however may be linked to other profit targets. The overall objective is ensuring that profits provide an adequate return to investors.
- Cost of Capital: Economic profit, considering the cost of capital, is evaluated to ensure that the pricing yields a positive economic profit.. Hurdle rates are set above this level, aiming for positive value generation.
- Tax considerations: The bank would typically need to consider the impact of pricing and income on its tax liabilities and cashflows, and so may incorporate this in the overall assessment.

[Total 3]

- iii. Describe the concept of credit cut-off decisions analysis and its role in risk-based pricing within a bank's lending operations. Include how this analysis is conducted and the factors considered.

[5]

- Credit cut-off decisions analysis involves setting thresholds for accepting or rejecting loan applications based on the applicant's credit risk.
- This process aids banks in making informed lending decisions that maximise profitability while effectively managing credit risk exposure.

- This analysis involves determining the threshold at which a potential borrower's credit risk is deemed acceptable, balancing profitability and risk management.
- Credit cut-off analysis is conducted as follows:
 - Scoring Factor Collection and Analysis: Credit cut-off decisions analysis starts by evaluating various applicant characteristics, financial metrics, and credit history to assess their creditworthiness. This involves examining factors such as income, credit score, debt-to-income ratio, employment stability, and collateral offered.
 - Risk Assessment: Based on the gathered data, banks assign a risk score or rating to each applicant. This score quantifies the level of credit risk associated with the borrower. Higher risk applicants are likely to default, while lower risk applicants are more likely to repay their loans.
 - Defining Cut-off Points: Banks then set specific cut-off points or thresholds for the risk scores. Applications with scores above the cut-off point are approved, while those falling below are rejected. This helps maintain a balance between granting loans to profitable customers and avoiding excessive credit risk.
 - Profitability Considerations: The cut-off point is strategically determined to attempt to maximise profitability. Approving too many high-risk applicants may lead to higher default rates, negatively impacting profitability. Conversely, setting the cut-off too high may exclude potentially profitable borrowers.
 - Risk Management: By using credit cut-off decisions, banks mitigate credit risk exposure. By excluding applicants with higher risk profiles, they reduce the likelihood of defaults and potential losses.
 - Loan Pricing: Risk-based pricing is employed in conjunction with credit cut-off decisions. Applicants with higher risk scores may be offered loans at higher interest rates to compensate for the increased risk, thus enhancing profitability.
- The goal of credit cut-off decisions analysis is to strike an optimal balance between lending to profitable customers and minimising credit losses. This ensures that the bank's lending portfolio remains profitable over the long term.

[Total 5]

- iv. During the course of the year there has been significant interest rate rises due to monetary policy decisions to control rising inflation rates in the country. Thanks to your work, your pricing model is rapidly able to assess changes in credit risk due to changing macroeconomic conditions. C1 and C2 represent a set of customers originated using your pricing model under the pre- and post-stress central bank rate changes respectively. Briefly discuss the implications on Bank TP's portfolio and credit risk management decisioning.

[5]

Single set of customer returns at pre- and post-stress interest rate

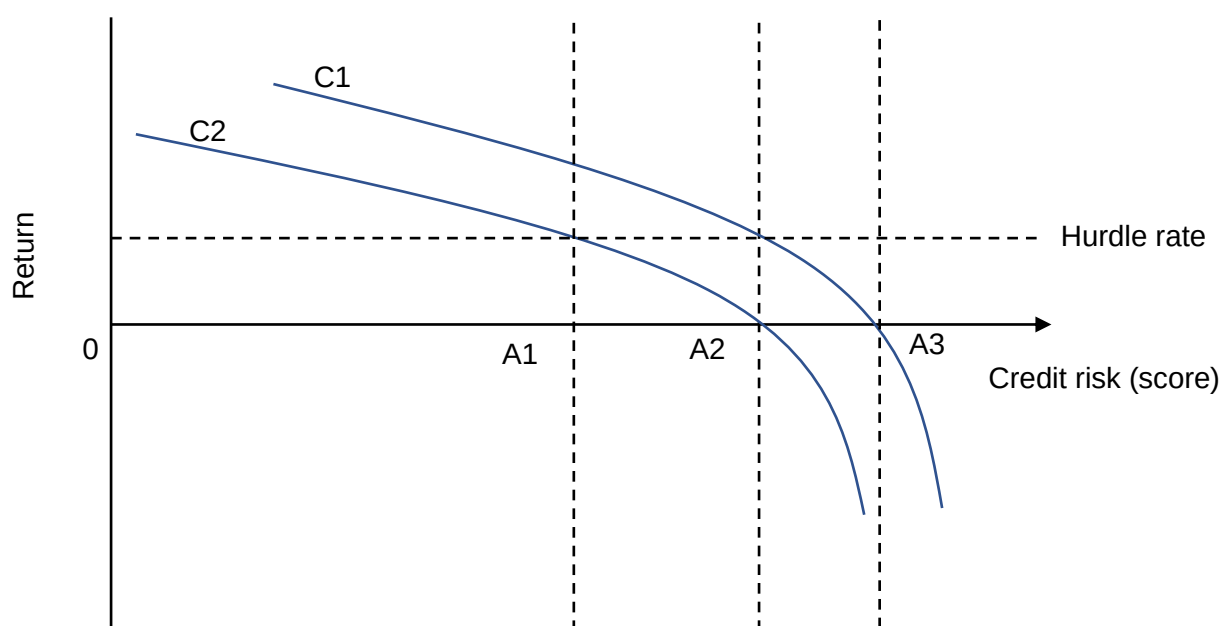


Figure 1: Credit risk and return profile

- In order to determine the impact on Bank TP's portfolio, each curve is analysed in turn:
- Before the rate hikes (cohort C1):
 - For all scores less than or equal to A2, the bank is likely to approve the customers on the basis of achieving a return of greater than the hurdle rate.
 - The bank may decide to exercise discretion between scores of A2 and A3 as although the return is lower than the hurdle rate, it is greater than zero.
 - This may be done for strategic reasons such as cross selling, gaining market share against competitors, or as part of product bundling. However, there will be limited buffer to cover other aspects of income should experience turn out to be worse than expected.
 - For scores of greater than A3, the bank is unlikely to approve a new loan as the return is less than zero.
- After the rate hikes (cohort C2):
 - For all scores less than or equal to A1, the bank is likely to approve the customers on the basis of achieving a return of greater than the hurdle rate. As A1 is further to the left than A2, the bank is expected to approve fewer new customers (all else being equal) as the credit cut off is now more stringent.
 - This is expected given a lower level of expected return and higher level of expected credit loss.
 - This may affect the bank's ability to maintain new business volumes.

- The bank may decide to exercise discretion between scores of A1 and A2 as although the return is lower than the hurdle rate, it is greater than zero. The bank's appetite to exercise this discretion may be reduced as compared to the pre-stress scenario.
- For scores of greater than A2, the bank is unlikely to approve a new loan as the return is less than zero.
- The above situation assumes that the Bank's credit risk model is able to reflect increasing default risk under worsening economic conditions.
- Should this not be the case, the bank may continue to originate customers on the basis of C1, with actual experience more closely resembling C2. This would affect the bank's income over the year.
- Bank TP may be able to maintain curve C1 if it is able to increase the rate charged on its loans for new customers. This would mean that the hurdle would be achieved for higher risk customers as the extra default risk is priced into the loan interest rate.

[Total 5]

[Total 15]

This question was answered generally well by majority of candidates.

Part (i) was bookwork and was generally answered well, with many candidates able to outline the relevant points.

Part (ii) was answered well, with the factors that a bank would consider in its pricing well understood.

Part (iii) was not as well answered. Most candidates were able to demonstrate an understanding of the concept of credit cut-off decisioning. However candidates generally failed to provide sufficient detail on the analysis process and the link to risk-based pricing to gain all the marks on offer..

Part (iv) was answered poorly. It appears that many candidates misread the graph and incorrectly interpreted the return metric as the interest rate charged to the customer as opposed to the return earned by the bank (even though the hurdle rate indicated on the graph should have made it clear). Using the concepts discussed in the previous answers and the information provided in the graph would have helped candidates demonstrate how a change in credit cut-off level would be evaluated in practice.

QUESTION 2

- i. Define and briefly outline the components that make up the following regulatory ratios: Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR).

[4]

Liquidity Coverage Ratio

$$\frac{\text{Stock of high quality liquid assets (HQLA)}}{\text{Total net cash outflows over the next 30 calendar days}}$$

- High quality liquid assets (HQLA) are defined assets that can be easily and immediately converted into cash in capital markets at no (or little) loss of value to meet the liquidity needs of the bank.
- These assets need to be unencumbered and have the following fundamental characteristics:
 - Low risk
 - Ease and certainty of valuation
 - Low correlation with risky assets
 - Listed on a developed and recognised exchange
- Total net cash outflows are defined as the total expected cash outflows minus total expected cash inflows in the specified stress scenario for the subsequent 30 calendar days.

Give credit for any additional information on LCR components.

Net Stable Funding Ratio

$$\frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}}$$

- Available stable funding (ASF) is measured based on broad characteristics of the relative stability of an institution's funding sources.
- The amount of ASF is calculated as the sum of the weighted amounts of the institution's capital and liabilities, using weights prescribed (ASF factors) by the regulator.
- Required stable funding (RSF) is measured based on the broad characteristics of the liquidity risk profile of an institution's assets and off-balance-sheet exposures.
- The amount of RSF is calculated as the sum of the weighted amounts of the institution's assets and off-balance sheet activity, with weights prescribed (RSF factors) by the regulator.
- The LCR and NSFR ratios are normally required to be greater than 100%.

[Max 4]

ii. Discuss the difficulties a bank may face trying to maintain LCR and NSFR in uncertain and stressed economic conditions.

[5]

- Economic or idiosyncratic volatility often triggers a flight of funding, leading to a surge in deposit withdrawals from affected banks.
- Individuals and corporations may seek to secure their funds, causing liquidity demands to spike.
- Banks must be prepared to quickly meet these heightened withdrawal requests while maintaining their operational stability.
- Volatile conditions will create a reduction in stable deposits assumptions, this will reduce the ASF, impacting the NSFR.
- Economic shocks can result in market turmoil, causing assets' values to fluctuate dramatically.
- This poses challenges for banks holding assets that may become illiquid or decline in value.
 - Banks may need to sell assets at unfavourable prices to access cash, potentially impacting their liquidity position.
- Declines in asset values could affect both the LCR and NSFR.
 - It could affect the underlying assets of the HQLA portfolio – although this is less likely for level 1 or 2 assets.
 - Devaluation of company Tier I/II equity would reduce the ASF, impacting the NSFR.
- Volatile economic conditions make it difficult to forecast cash inflows and outflows accurately.
- Changes in consumer behaviour, interest rates, and economic indicators can all affect deposit flows and loan repayments.
 - This uncertainty complicates the task of estimating liquidity needs and optimising the allocation of liquid assets.
- Regulators may impose further restrictions on items such as level 1 or 2 HQLA during economic volatility.
- Banks would need to assess their resilience under various scenarios, considering simultaneous disruptions across markets and sectors. Managing these complex scenarios demands advanced risk modelling capabilities.
- Banks need to consider various potential stressors, such as sudden changes in interest rates or credit market freezes. Effective contingency planning includes securing access to emergency funding sources and outlining strategies for maintaining liquidity during times of crisis

[Total 5]

You are an actuarial analyst working at BankOne, a full-service retail bank.

iii. Discuss ways in which the bank could improve its LCR position. Focus only on improving the denominator of the LCR.

[4]

- Greater focus on stable deposit customers, these include:
 - Encourage customers to hold their primary banking account with the bank.
 - Ensure that these deposits that are covered by deposit insurance.
- Reducing contingent obligations, these include overdraft or credit card limits. This would reduce the potential for further outflows.
- Discourage breaking fixed-term deposits that reduce risk of outflow in stress, this may mean creating a bigger charge for breaking certain fixed term deposits.
- Improve pricing in order encourage customers to invest in longer-term products.
- Deter customers from holding borrowing limits that: they do not utilise and/or are higher than their borrowing requirements.
- Greater targeting towards longer-term fixed deposits, which fall outside a 30-day maturity bucket for the purpose of the LCR.
- Discourage less than 30-day notice accounts, possibly by offering lower interest rates or higher chargers.
- Where possible, re-price fixed-term deposits to reduce costs and/or volumes.
- Target specific sectors, e.g. universities, trade unions with a package, to attract stable deposits from growing customer sectors.
- Standalone customers: minimise the number of customers that are stagnant and generate no income.
- Many of the possibilities would need to take into consideration, including competitors and legislation around product.

[Total 4]

A colleague has suggested the bank should hold only cash for its High Quality Liquid Asset (HQLA) portfolio.

iv. Outline the advantages and disadvantages of this suggestion.

[3]

Advantages

- Cash is the most liquid asset, so the bank will have a strong liquidity position.
- Cash is not as risky or volatile as other asset types.

- Cash maintains a stable value and does not face price volatility, providing certainty in assessing the value of the HQLA portfolio.
- Cash is transparent to regulators which make it easier to comply with HQLA requirements.
- Managing a cash-only HQLA portfolio is straightforward, requiring minimal monitoring and valuation complexity compared to other assets.
- The RORWA or ROE of the bank could improve if assets held under HQLA have lower risk weights associated with it.
- Diversifying across HQLA types reduces concentration risk, however, cash may not bring in a concentration risk.

Disadvantages

- Cash brings in lower returns than compared to other assets.
- While cash itself doesn't have interest rate risk, an all-cash portfolio means the bank is unable to benefit from liquidity premium, missing potential income.
- The bank's profitability may be eroded as the return on cash may be lower than the cost of deposits.
- During periods of financial turmoil, cash might not be as readily available due to counterparty concerns or operational disruptions.
- Over the long term, cash holdings can lose value due to inflation. If the inflation rate exceeds the nominal interest rate on cash holdings, the real value of the cash decreases, eroding the bank's purchasing power.
- Regulatory requirements can change over time. Relying solely on cash may expose the bank to regulatory risk if future regulations reduce the acceptability of cash as a HQLA asset or impose stricter requirements.
- A cash-only HQLA portfolio is concentrated in a single asset class. This means that the bank is exposed to the risk of losses if the value of cash falls.

[Total 3]

[Total 16]

This question was answered well.

Part (i) definitions were generally well-addressed, with students demonstrating a strong understanding of the study material. However, some lost marks for not thoroughly elaborating on the components contributing to these metrics.

Part (ii) yielded high scores, especially among well-prepared students. Those who systematically examined the numerator and denominator separately and delineated the impact on each component tended to outperform those who lacked a structured approach.

Part (iii) was not answered as well as the others. The primary challenge in this question appeared to be the insufficient expansion on product features in students' responses. Those who incorporated a comprehensive analysis covering various aspects such as term, interest rates, penalties, etc., received higher scores compared to those who focused on only one or two features.

Part (iv) was answered well by the majority of candidates. However, some lost points due to not generating a sufficient number of unique points in their responses.

QUESTION 3

The Basel Committee on Banking Supervision (BCBS) is a global standard-setter for the banking industry, and its Basel reforms are designed to ensure that banks are able to withstand financial shocks and continue to operate as going concerns.

- i. Outline how the Basel reforms and updates introduced by the BCBS have strengthened capital adequacy requirements for banks in recent years.

[3]

- Basel requires banks to hold a higher proportion of CET1 capital, which includes common shares and retained earnings. CET1 is the highest-quality capital and provides the most substantial loss-absorbing capacity.
- Banks are required to maintain a capital conservation buffer on top of their minimum capital requirements. This buffer acts as a cushion during economic downturns and is designed to avoid capital depletion.
- Basel introduced the concept of a countercyclical capital buffer, which allows regulators to require banks to hold additional capital during periods of excessive credit growth to dampen systemic risks.
- Banks must comply with the LCR, which ensures that they hold sufficient high-quality liquid assets to cover their expected net cash outflows during a 30-day stress scenario.
- The NSFR mandates banks to maintain a stable funding profile over a one-year horizon to reduce their reliance on short-term funding sources and enhance their liquidity risk management.
- Basel introduced a non-risk-based leverage ratio that sets a minimum level of capital to total exposure, preventing banks from becoming excessively leveraged.
- Basel requires banks to include Credit Valuation Adjustment risk in their regulatory capital calculations, requiring them to hold regulatory capital as a buffer against potential losses due to CVA risk, reflecting the counterparty default risk in their derivative portfolios

[Total 3]

You are an actuary working for a newly established bank in a developing country which has been slow to implement the Basel regulations as they are announced.

- ii. Outline the main challenges and opportunities the bank may face when implementing the Basel regulations.

[5]

Challenges

- The bank may face difficulty in meeting the Basel capital adequacy requirements due to the difficulty to issue high-quality capital instruments domestic markets of developing countries, which can impact its ability to absorb losses effectively.

- Implementing Basel regulations may involve substantial costs for the bank, including upgrading technology, enhancing risk management systems, and hiring skilled professionals to ensure compliance.
- Basel III's focus on risk-based capital requirements demands more sophisticated risk modelling techniques. Developing and implementing these models requires specialized expertise, which might be scarce in a developing country's banking sector.
- Developing countries may have different regulatory environments, and the bank may encounter challenges in obtaining the necessary regulatory support and guidance to navigate the Basel III framework.
- Stricter regulations could lead to a decrease in the bank's return on equity, as higher capital requirements could restrict its ability to leverage its capital for profit generation.
- If the bank is systemically important in the developing country's financial landscape, Basel III's requirements for systemically important banks might necessitate additional capital buffers, adding to challenges in capital allocation.

Opportunities

- Basel adoption presents an opportunity for the bank to strengthen its risk management processes, which can lead to better risk identification and mitigation, thereby reducing potential losses.
- Full compliance with Basel can enhance the bank's credibility and attract international investors who value transparency, risk management, and adherence to global standards.
- Basel compliance can set the bank apart from its peers, providing a competitive edge by demonstrating its commitment to financial stability and prudent risk management.
- Basel encourages banks to diversify their funding sources. This can stimulate innovation in product offerings and funding mechanisms, fostering growth.
- Adapting to Basel can drive the bank to specialise in certain sectors or products, optimising risk-return profiles in a way that aligns with its capital position.
- Early adoption of Basel positions the bank to adapt more easily to future regulatory changes, mitigating the impact of subsequent shifts.

[Total 5]

iii. Discuss potential strategies that the bank can implement to overcome these challenges and also ensure preparedness for future Basel updates.

[5]

- The bank can explore diversification strategies to manage capital more effectively. It can seek foreign partnerships, tap into international capital markets, and consider investments in other financial institutions with higher capital adequacy.

- Employ risk transfer mechanisms, such as insurance or securitisation, which would bolster the bank's capital adequacy position by decreasing its risk-weighted assets, as well as potentially lowering the capital required to be held against these assets.
- Focus on improving the quality of assets by conducting robust credit assessments and avoiding high-risk borrowers. This approach can help reduce the need for higher capital reserves.
- Engage in proactive dialogue with regulators to address challenges specific to the country's regulatory environment and seek support in implementing Basel III requirements effectively.
- Leverage technology to streamline compliance processes. Implement risk management software, data analytics tools, and automated reporting systems to enhance efficiency and accuracy.
- Provide ongoing training and education to employees to ensure they understand the intricacies of Basel III regulations and their implications on various banking operations.
- Seek guidance from external consultants or experts in regulatory compliance. Their insights can help navigate complexities, interpret regulations accurately, and implement best practices effectively.
- Maintain an adaptable organisational structure that can quickly adjust to changes in regulations. As Basel III evolves, the bank should be prepared to implement new requirements while minimising disruptions.
- Develop a robust liquidity risk management strategy to meet Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) requirements. Maintain a diversified portfolio of high-quality liquid assets and establish contingency funding plans.
- Invest in advanced data management systems to aggregate, validate, and report accurate data for regulatory reporting. This ensures transparency, reliability, and consistency in reporting, reducing the risk of errors and penalties.
- Establish a team or department responsible for monitoring and ensuring compliance with Basel III regulations. This team can stay up-to-date with evolving requirements, interpret guidelines, and implement necessary changes across the organisation.
- Clearly define and segregate assets that fall under the trading book boundary. This ensures proper risk management, accurate risk assessment, and regulatory compliance for trading activities.
- Utilise mark-to-market valuations for assets in the trading book to reflect their current market values. This leads to more accurate risk-weighted asset calculations.

- Implement effective hedging strategies for assets in the trading book to mitigate market risk. Properly executed hedges can reduce overall risk exposure and capital requirements.

[Total 5]

iv. Outline how the Basel III capital requirements have shaped and continue to shape the credit risk decision-making processes within banking institutions.

[4]

- Implementation of Basel has fostered a stronger risk-aware culture among banks, aligning lending practices with the need for stability.
- Banks are prompted to allocate resources toward advanced credit risk modelling and assessment tools to ensure accurate risk quantification.
- Due diligence processes have become more rigorous, with banks conducting in-depth analysis of borrowers' business models and market dynamics.
- Basel's emphasis on liquidity ratios has led to greater scrutiny of borrowers' cash flows and repayment abilities.
- Enhanced disclosure requirements have led banks to provide more transparent information on their credit risk profiles, benefiting both regulators and investors.
- Banks are now more inclined to collaborate with external credit rating agencies to ensure objective credit risk evaluations.
- The regulations have sparked innovation in risk management technologies, leading to the development of more sophisticated credit scoring models and processes.
- In response to capital requirements, banks are optimising their loan portfolios by diversifying risk exposure across various sectors and industries.
- The focus on stress testing and scenario analysis has elevated banks' ability to assess potential credit losses under adverse economic conditions.
- Small businesses benefit from a more structured credit risk evaluation, as banks assess not only the business itself but also the borrower's personal financial stability.
- Basel has prompted banks to improve their credit risk management governance and internal controls to meet regulatory compliance.
- Credit risk decision-making processes now often involve cross-functional collaboration between risk management, finance, and business units.

- Banks are increasingly incorporating environmental, social, and governance (ESG) factors into credit risk assessments, aligning with sustainability goals.
- The impact is not limited to loan origination but extends to ongoing credit monitoring and management.
- Basel III introduces more stringent credit capital requirements such as: capital and model output floors, and fewer portfolios eligible for the IRB approach. This may require banks to hold more capital and may influence the pricing of loans, where banks may charge higher interest rates or fees to compensate for the increased capital cost.

[Total 4]

[Total 17]

This question was answered generally well by well-prepared candidates.

Part (i) was answered well. This question was intentionally crafted with a broad scope, acknowledging the non-uniform implementation of Basel regulations across countries. Candidates generally demonstrated satisfactory performance, and credit was awarded to those who offered insights into regulatory developments that may not have been covered in the core reading.

Part (ii) was answered well. The responses to this question exhibited a range of perspectives, with candidates generally articulating sensible challenges. Notably, candidates who presented a well-balanced discussion encompassing both challenges and opportunities tended to achieve higher scores than those who overly focused on specific points.

Part (iii) was answered poorly. The responses displayed considerable variability in quality, with a noticeable trend indicating that students who excelled in the preceding question also performed better here. Rather than incorrect responses, inability to generate a sufficient number of unique ideas in answers appeared to be the primary factor leading to low number of points being awarded marks for many students.

Part (iv) was answered poorly. Many candidates approached it with a tendency to emphasise book knowledge rather than practical application. A significant number of answers concentrated on the credit risk requirements of Basel, neglecting to elucidate how these requirements impact the decision-making processes of banks.

QUESTION 4

i. Briefly explain the underlying mechanics of a Credit Default Swap (CDS).

[4]

- A credit default swap (CDS) provides a form of credit insurance. It is an OTC derivative agreed between two parties and is the most common form of credit derivative.
- A CDS contract specifies a financial asset (the reference entity), such as a bond or a bank loan.
- The buyer of a CDS (protection buyer) pays the seller (protection seller) an agreed premium (or more commonly ongoing premiums) for an agreed period.
- If the reference entity defaults during this period, the buyer of the CDS is compensated. This allows credit risk to be transferred without the need to sell the underlying financial asset.
- The contract specifies how long the credit insurance will last for, what credit event will trigger the agreement, the regular premiums due and how the seller of the CDS will compensate the buyer.
- If the financial asset is a bond, the credit event could be the bankruptcy of the bond issuer, or payment default when it fails to meet the coupon payment, or debt restructuring.
- When a bond credit event is triggered, the seller of CDS will pay the buyer par value of the bond plus the interest payments that were due up to maturity.
- The seller will receive either the reference entity (e.g. a bond, which it can sell or hold in the hope that some credit payments will be recovered), or the market price of the reference entity, which indicates the market's view of the likely debt recovery.
- The buyer of a CDS is “short” the reference entity's credit, while the seller is “long”. The credit spread indicates how much the seller of a CDS needs to receive to justify taking on the credit risk.

[Total 4]

Credit default swaps (CDSs) were widely condemned in the aftermath of the 2008 global financial crisis. Despite the passage of 15 years, many national regulators remain wary of CDSs and the use of these by banks.

ii. Discuss the advantages and disadvantages of using a CDS for credit risk management.

[5]

Advantages of using CDSs for risk management

- Risk transfer: CDS allows banks to transfer credit risk to parties willing to assume that risk. This can help diversify and distribute credit risk among market participants.
- Hedging: a CDS provides a tool for hedging credit exposures. Banks who hold credit positions can use a CDS to protect themselves from potential losses due to default events, reducing overall portfolio risk.

- Liquidity enhancement: CDSs can increase liquidity in the market by allowing banks to buy or sell credit protection without directly transacting in the underlying bond or loan market.
- CDSs can enhance market liquidity by enabling banks to acquire or divest credit protection without engaging directly in transactions within the underlying bond or loan market.
- Customisation: CDS contracts can be tailored to specific credit exposures, allowing banks to choose the reference entities and maturity dates, providing more flexibility in risk management strategies.
- Price discovery: The pricing of CDS contracts can offer insights into market participants' perception of credit risk, which can be valuable for assessing overall market sentiment.
- By mitigating credit risk through CDS, banks might be able to optimize capital allocation, resulting in lower RWA requirements.
- Large exchange traded CDS markets exist for certain name counterparties.

Disadvantages of using a CDS for risk management

- Counterparty risk: The effectiveness of a CDS depends on the creditworthiness of the counterparty providing protection. If the protection seller defaults, the bank may still face significant losses.
- Complex valuation: The pricing and valuation of CDS contracts can be complex, making it challenging for banks to fully understand and assess the associated risks accurately.
- Speculative use: Speculative CDS trading can distort the bank's risk profile by creating exposures that are disconnected from its core business operations. This could impact the bank's overall risk management strategy and risk-weighted asset calculations.
- Lack of transparency: The over-the-counter (OTC) nature of CDS trading means that transaction details are not always transparent, which can lead to concerns about market manipulation or inadequate regulatory oversight.
- CDSs could be more costly than other approaches depending on how it gets executed, which would negatively impact the bank's cashflow (reverse can be stated as advantage).

[Total 5]

iii. Outline alternative approaches to credit risk management.

[3]

- Credit analysis and fundamental research: Conducting thorough credit analysis and fundamental research on potential borrowers can help identify creditworthy investments and avoid higher-risk assets.
- Diversification: Diversifying a credit portfolio across different industries, sectors, and geographies can help reduce concentration risk and lower overall portfolio risk.

- Sale of assets: A direct management approach is the outright sale of loan and bond positions. Selling has the advantage of immediacy and avoids the risk that a hedging instrument does not perform as expected (basis risk).
- Securitisation: securitisation involves transforming assets into securities. Assets are sold to a special purpose vehicle, which issues securities backed by the assets. Benefits include enhanced liquidity, balance sheet management, diversification, and risk management.
- Collateral and covenants: Requiring borrowers to post collateral or imposing strict covenants can provide additional protection against credit risk.
- Credit insurance: Credit insurance policies can be used to protect against specific credit events, such as default or bankruptcy.
- Credit spread strategies: Instead of using CDS, investors can implement credit spread strategies in the bond market, taking advantage of price discrepancies between bonds of varying credit qualities.
- Credit default options: Using credit default options, investors can gain credit protection without the need for a bilateral CDS contract.

[Total 3]

Credit was given for alternative approaches.

[Total 12]

This question was answered generally well by majority of candidates.

Part (i) was answered well. Many candidates were able to clearly describe the mechanics of a CDS.

Part (ii) was answered poorly. Most candidates struggled to generate a sufficient number of points to score well in this question. Candidates who performed poorly failed to provide both advantages and disadvantages. Many failed to point out that CDSs are complex and making pricing and valuation of these an additional constraint.

Part (iii) was generally not answered well given the number of responses available. Many lacked a breadth of answers. Credit was given for a wide range of alternatives.

QUESTION 5

- i. Define the term Exposure at Default (EAD) and outline the two broad approaches to calculating EADs under Basel regulatory capital guidelines.

[4]

- Expected exposure at default (EAD) is the gross exposure upon default, defined as an estimate of the amount outstanding (drawn amounts plus likely future drawdowns of yet undrawn lines) in case the borrower defaults.
- Under the Basel methodologies, the following approaches are outlined:
- Foundation approach – For fixed credit facilities (such as term loans), EAD is simply the amount outstanding (although EADs slightly above 100% are not uncommon given interest accrual).
- For revolving facilities (such as lines of credit, liquidity facilities, and overdrafts), EAD is the drawn amount plus an estimate of the amount of the remainder of the commitment likely to be drawn at the time of default.
- These estimates are often referred to as either the credit conversion factor (CCF) or loan equivalent.
- The estimated amount added on for revolving facilities can differ between banks, given their respective approaches to managing clients going into stress during ongoing risk management (i.e. can proactively cut undrawn limits or more actively manage limits with distressed clients to lower EAD).
- EADs under the foundation approach are usually calculated with prescribed regulatory CCFs.
- Advanced approach – Banks may use their own internal estimates of EAD for revolving facilities, with fixed facilities' EADs being calculated as above or with further advanced model estimates.
- These advanced approach EADs, however, are subject to floors.

[Max 4]

You are an actuary working at ABC Bank. The CRO has asked for a rough estimate of the Credit Conversion Factor (CCF) of the overdraft portfolio. An analyst in your team has suggested that a CCF of 60% would be a good estimate as it is the CCF calculated for 2022.

The following information is given, with amounts being in Local Dollar (L\$):

Default population	2018	2019	2020	2021	2022
Number of defaults during the year	150	200	70	60	50
Average starting drawn balance (L\$) at the beginning of the period	20 000	21 000	19 000	22 000	24 000
Average starting limit (L\$) at the beginning of the period	30 000	33 000	29 000	37 000	39 000
Average balance at default (L\$)	27 000	31 000	27 000	32 000	33 000

ii. Discuss whether a CCF of 60% would be a good initial estimate for the portfolio and provide a final estimate for the CRO. Support your reasoning with any relevant calculations.

- It would be good to receive more information from the CRO, for example, the use of the estimate before making a further decision.
- If the CRO would like an estimate for the most recent period, then a point in time 60% may be reasonable.
- Also note that the least defaults occurred in 2022, and therefore this estimate may be optimistic since it may not have been a time of economic stress.
- EADs are typically a TTC measure.
- Further information, such as any changes to default definitions or high-risk/stage 2 processes over the period would be beneficial.

- Using the equation from the notes:

$$EAD = Exposure_{drawn} + CCF \times Exposure_{undrawn}$$

- Therefore,

$$CCF = \frac{EAD - Exposure_{drawn}}{Exposure_{undrawn}}$$

	2018	2019	2020	2021	2022
CCF	70.00%	83.33%	80.00%	66.67%	60.00%

- Recommendation
- The CCFs vary over the last 5 years, with an absolute difference of over 20%.
- The straight average over the period is 72.0%
- The default weighted average is 75.0%
- The balance weighted average is 71.3%
- It may be conservative to suggest the highest CCF of 83%, and an estimate of 60% might be too optimistic.
- Therefore, a CCF of 75% is a suggested estimate.

Credit was given for alternatives with appropriate calculations. Another way of approaching this question is to apply 60% CCF throughout the years.

[Total 6]

An actuarial student stated that he read that EADs for personal unsecured term loans are usually estimated as 100% of the outstanding loan balance. He suggests that would be a good estimate for the unsecured personal loan portfolio.

The unsecured personal loan portfolio is made up of three products, as shown in the table below:

Product	Description	Percentage of portfolio (balances)
L1	Unsecured term loan with monthly instalments. The term of the loans is on average 60 months.	40%
L2	Unsecured term loan with monthly instalments. After 6 months, customers can automatically finance an additional amount equal to 50% of the original loan amount.	30%
L3	A mobile application based short term unsecured loan. The term of the loan is 3 months. Interest and fees are charged upfront and included in the loan amount.	30%

iii. Discuss the appropriateness of estimating the EAD of the personal loan portfolio as 100% of the outstanding balance.

[6]

- Ideally, more data and information would be required to give a more accurate answer.
- EADs for term loan products are usually close to 100%, as prior to default some amount would have probably been paid back by the customer.
- Simple term loan products do not have the ability to draw more than the current balance, and hence 100% would be a fair estimate.
- Sometimes EADs can be greater than 100%, depending on the treatment of interest and fees accrued due to missed payments.
- Product L1 would fall into this category and may be appropriate to apply a 100% of outstanding balance.
- Product L2 however, has different features. Customers can automatically increase their financed amount, and to a substantial 50%.
- This would infer that estimating EAD at 100% of current outstanding balance may not be the best solution.
- An estimate of 150% may be a better figure. However, this may be too high an estimate.
- As this would imply that all customers exercise the option.
- An estimate of the number of customers who exercise the option would be beneficial.
- Given that 30% of the portfolio consists of product L2, the estimate of 100% of EAD would not be the most accurate.

- Product L3 also has different characteristics in that it is very short term and fees are charged upfront. This is included in the loan amount and would imply an EAD estimate of 100% would be appropriate.
- Arguably, a larger estimate, which is closer to $70\% \times 100\% + 30\% \times 150\% = 115\%$ would be more realistic.

Credit was given for discussing that options make it more difficult to estimate CCFs, and these can range to much higher than 150%, depending on the observed starting balance and default balance.

[Total 6]

The regulator is proposing a move away from internal models for EAD estimates to a standardised calculation for the Business Bank (SME) portfolios.

- iv. Outline the advantages and disadvantages of the bank moving from an advanced approach to a standardised approach to calculating EADs in the Business Bank portfolio.

[4]

Advantages

- Reduced complexity in model build which this bank (and others in the industry) have been struggling with.
- A standardised approach could improve understanding and application of the model.
- A standardised approach could reduce further costs such as staff for model build and validation.
- For example, less frequent calibration, rebuilds of the models, and monitoring than compared to advanced models.
- Reduced time and effort spent on model governance.
- For example, less time required on model approval, possibly even time spent with regulator on approving the model.
- If the bank has a relatively small business bank portfolio or fewer products, it may be a beneficial change to the bank.

Disadvantages

- Could result in less differentiation in EADs, which could affect pricing and strategic decisions.
- May create a larger impact in EADs, which could increase capital requirements.
- Could increase costs, possibly in the short term, to align to new regulations.
- Business banking is a complex portfolio with multiple types of products, a standardised approach may not be appropriate for all the types of products. Business banking may include SME Retail and SME Corporate portfolios. (and may include specialised asset classes such as IPRE and HVCRE).
- For example, an overdraft facility may behave very differently depending on the type and industry of the customer.

- A change could result in disruptions in business operations, such as the requirements of training staff, changing systems and processes.

[Total 4]

[Total 20]

This question was answered poorly.

Part (i) was bookwork and was generally answered well..

Part (ii) was generally answered poorly. Better candidates considered a range of possible weighting approaches for calculating the CCF for the portfolio, and commented on the appropriateness of the selected approach in the context of the use of the CCF calculated.

Part (iii) was answered very poorly. Few candidates considered the proportion of the portfolio made up by each product in order to put forward an overall EAD.

Candidates that did not understand that EAD is a measure conditional on default did not score well, nor did candidates that considered the presence of security for EAD determination (this would be considered in calculating LGD). Better candidates had a working knowledge of EAD calculation for regulatory capital purposes and applied this knowledge to produce sensible responses.

Part (iv) was generally well-answered, with most candidates able to list sensible advantages and disadvantages to applying the standardised approach. Better candidates included advantages and disadvantages related to application to the SME portfolio in particular.

QUESTION 6

- i. Define a Deposit Insurance Scheme (DIS), and outline the main considerations from a regulator's point of view when establishing a DIS. [3]

- Under deposit insurance schemes, banks pay premiums, based on the amount of their deposits.
- In the event of a bank failure, the scheme pays out to meet claims by depositors who have lost their savings as a result of the bank failure.
- Deposits could be covered in full or in part.

The main considerations include:

- The amount that would be covered and the covered population.
- The institutions that will fall under the DIS, versus those that would not be covered.
- The premium and premium structure charged to the banks.
- The regulatory process and legislation changes required in order to enact a DIS.
- The administrator of the scheme and setting up of administration/systems/staff/board of directors.

Give credit for other valid considerations.

[Total 3]

- ii. Discuss the advantages and disadvantages of a DIS from the perspective of the participating banks.

[6]

Advantages

- A DIS may promote confidence in the industry, resulting in:
 - More customers trusting banks and therefore using banks to hold their money,
 - Banks may therefore be able to reduce their COF
- Credit rating agencies and international investors may view the banks more favourably.
- There may be a reduced risk of bank runs, reducing risks on each bank.
- Improved liquidity, and improved liquidity metrics, as potentially more customers would be saving with banks.
 - Banks may see an improvement in their LCR metrics
- Customers may be more willing to shop around for banks, thereby giving the customer more choices. This could mean more competition for customers from smaller banks. *(this can be framed as an advantage or disadvantage)*

Disadvantages

- The deposit insurance will come at a cost to the banks, as they would have to pay premiums.
- Banks would need to setup new functions/systems to ensure that it is administered correctly.
- A bank would need to consider any compliance requirements, and this would come at a cost.
- Staff would need to be trained or new staff would need to be hired adding an additional cost.
- There would probably be an increase in competition between banks for deposits, given deposits are safer.
- Arguably a DIS could create a form of “moral hazard”, in that the banks may pursue risky strategies without the market discipline that might be generated by the threat of customers withdrawing their deposits.

[Total 6]

iii. Outline some of the factors a regulator would need to consider when pricing the premiums of a DIS.

[4]

- Any history of bank failures and sizes of these failures.
- The number of banks participating and the size of the banking population.
- Amounts covered and the types of covered deposits.
- Whether amounts in local currency are covered exclusively.
- Premium type: will this be based on the riskiness of the bank, or will it be a fixed amount based on the balance sheet.
- Premium frequency: will this be collected monthly, quarterly, in advance or arrears.
- Government guarantees: whether there are any government guarantees implicit or explicit.
- Cost of administration of the scheme, including staff and systems costs.
- Co-insurance: whether depositors would be covered for a proportion of their deposits.
- Cost of paying out depositors in the event of a banking collapse.

[Total 4]

The regulator of Actuarial is considering implementing a Deposit Insurance Scheme (DIS).

XYZ Bank has the following set of accounts on its balance sheet:

Segment	Number of customers	Average credit balance (deposits) (L\$)
Corporate Banking	2 000	100 000
Business Banking	10 000	150 000
Retail Banking (high net worth)	5 000	100 000
Retail Banking (middle income)	50 000	30 000
Retail Banking (low income)	100 000	2 500

The DIS would cover all retail deposits of up to L\$60 000. The regulator proposes premium equal to a 0.1% per annum charge on all retail deposits on participating banks.

iv. Outline various ways in which XYZ Bank could include this cost in their product pricing.

[2]

XYZ Bank could consider a mix of the following:

- Fixed fee increases per account
- This fixed fee could be differentiated per product/account type/segment type
- Increase transaction fees on certain transactions or accounts
- Could reduce savings interest rates on certain accounts
- Could increase interest charges for loan type products or overdraft products
- The Bank could look at absorbing charges in other segments (e.g. Corporate/Business Banking), and would need to consider the pushback or competitive aspects of this.
- The Bank could look at absorbing charges as an overhead cost.

[Total 2]

The CRO has suggested that the bank should not increase the cost of banking products for the low-income segment.

v. Discuss reasons as to why the CRO has made this suggestion.

[5]

- The CRO is possibly concerned around the affordability, and price sensitivity of the lower income segment.
- The bank could have exhausted its pricing increases options around this segment.
- This could be with the intent to bring in more low-income segment customers with savings into the bank.
- Any increase deposits could improve overall liquidity and COF of the bank, which could be more beneficial than charging the additional deposit insurance costs.

- More customers, and more savings, may increase also increase transaction revenues of this segment.
- The CRO may want to improve social protection, in order to reduce inequalities in the financial services industry.
- The CRO may be concerned about competitors, and may be wanting to push a competitive advantage to gain market share, or want to be in line with competitors.
- The lower income segment has lower average deposits, L\$2 500 compared to the covered amount of L\$60 000, that would need to be covered under the DIS than compared to the middle and high net worth segments.
- The lower income segment makes up the lowest portion of the deposit book. The lower income segment accounts for a total of L\$0.25bn worth of deposits, compared to L\$1.5bn and L\$0.5bn in the middle and high net worth segments respectively.
- Given the above proportion of deposits and lower cover required, the CRO may have felt that these other segments could more easily absorb such a charge.

[Total 5]

[Total 20]

This question was answered generally well.

Part (i) was answered well, and provided a fair summary of definitions and considerations.

Part (ii) was answered generally well. Most candidates were able to list sensible advantages and disadvantages, but did not include sufficient points in their responses to have scored well.

Part (iii) was generally answered poorly. Better candidates were able to apply general principles for setting of premiums to the context of the question. Some candidates approached the question from setting a risk-based premium for an individual bank rather than setting premiums in general, which limited the marks they were able to obtain. Poorer candidates did not include sufficient detail in responses, or misunderstood the fundamentals of DIS.

Part (iv) was answered very well.

Part (v) was answered relatively poorly. Most candidates were able to list sensible reasons for the CRO's suggestion. Where candidates performed poorly on this question, this was largely due to insufficient points being captured to have scored well. Many did not attempt to use any information provided in the question and lost out on easily available marks.

END OF EXAMINERS' REPORT