

EXAMINERS' REPORT

June 2024

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 fifth 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.

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.

Candidates seem to have run into time constraints and many did not attempt the last question with sufficient rigour.

QUESTION 1

Oak Bank is a corporate and investment bank that currently determines its market risk regulatory capital using the Standardised Approach (SA) and is considering applying to the local regulator for approval to use the Internal Models Approach (IMA).

- i. Outline the advantages and disadvantages for Oak Bank of moving from the Standardised Approach to the Internal Models Approach for market risk regulatory capital calculation.

[6]

Advantages

- Adoption of the IMA would allow Oak bank to use internal models to estimate market risk, which should result in more accurate and risk-sensitive capital requirements that are tailored to the bank's market risk profile.
- IMA adoption could also reduce the amount of capital required for market risk, as it may capture lower risk or lower correlation than the SA, which is based on fixed and broad assumptions.
- Use of the IMA should provide incentive for the bank to innovate and optimise its trading portfolio, as it can benefit from lower capital charges for lower risk or more efficient hedging positions.
- The IMA can enhance the bank's internal risk management and governance, as it requires the bank to develop, implement, and maintain robust and reliable risk models, data, systems, and controls, and to conduct regular back testing and stress testing.
- If the bank already has models in place that are used for economic capital calculation or internal risk management purposes, leveraging of these models for regulatory capital calculation could create efficiencies and improve alignment between approaches.

Disadvantages

- The process of applying to the regulator for approval to use the IMA is intensive and requires the bank to demonstrate to the regulator that its risk management system is sound, that it has sufficient staff skilled in the use of sophisticated models, that the trading desk risk management model has a proven track record of accuracy and that stress tests are regularly conducted.
- Making sure that the requirements are met and compiling sufficient evidence for the application and approval process is a resource-intensive and costly once-off exercise.
- The IMA can be more complex and costly to maintain, as it requires the bank to have sufficient expertise, resources, and infrastructure to support the risk modelling process, and to comply with the regulatory standards and expectations.
- Reliance on internal models introduces the risk of model inaccuracies or model errors, which can lead to misestimation of market risk and associated capital.
- Internal models can be more volatile and sensitive to changes in the risk factors, market data, or model inputs, which may lead to significant fluctuations in the capital requirements and affect the bank's capital planning and adequacy.

- Implementation of the IMA will result in Oak Bank being more exposed to regulatory risk and scrutiny, which can increase compliance burdens and operational risk, increasing costs. A cost-benefit analysis would be beneficial in determining whether moving to IMA is ultimately worthwhile.

[Total 6]

The Fundamental Review of the Trading Book (FRTB) is a set of proposals by the Basel Committee on Banking Supervision for a new market risk-related capital requirement for banks.

ii. Outline the key changes introduced by the FRTB.

[2]

- FRTB introduces a more rigorous boundary between the trading book and the banking book, which seeks to reduce incentives for a bank to arbitrage its regulatory capital requirements between the two regulatory books.
- FRTB also introduces changes to the treatment of credit, with securitised and non-securitised products treated differently.
- A revised approach to risk management, with a move from VaR to expected shortfall, is introduced to better capture tail risk.
- FRTB introduces a revised standardised approach, which provides a market risk calculation method for banks that do not require a more sophisticated measure of market risk.
- Large differences have been observed in the capital calculations between banks using the IMA approach versus the standardised approach. FRTB seeks to align the two approaches so that the difference between them is not as large.

[Total 2]

iii. Discuss the impact that the Fundamental Review of the Trading Book (FRTB) could have on Oak Bank's decision to pursue IMA application, considering likely FRTB implementation timelines.

[2]

- The implementation deadline for most jurisdictions is approaching, with UK and EU deadlines set to 1 January 2025, and the deadline for South Africa and the US being 1 July 2025.
- Assuming that Oak Bank intends to start the process of preparing its application now, it will likely need to evidence compliance with IMA requirements based on FRTB.
- This could require significantly more upfront investment of time and resources.
- FRTB seeks to align the SA and IMA more closely. Oak bank would need to consider whether the benefits of moving from the SA to the IMA would still be sufficient given the costs.

- FRTB also includes revisions to the standardised approach. Any investment that Oak Bank has made in preparing for implementation of these revisions would need to be considered, and the extent to which they could be leveraged in the context of IMA would need to be understood.

[Total 2]

A proprietary trading desk is a unit within a corporate and investment bank that trades financial instruments with the bank's own money, rather than on behalf of its clients.

iv. Outline possible reasons why a bank would want to operate a proprietary trading desk.

[2]

- Oak Bank could be operating a proprietary trading book to generate profits from market movements and arbitrage opportunities.
- This could help to diversify the bank's revenue streams and reduce its reliance on fees and commissions from clients.
- Oak Bank could be operating a trading desk to gain insights and expertise on various markets and asset classes, which can enhance the bank's ability to serve its clients and offer competitive products and services.
- Oak Bank could be acting as a market maker, providing liquidity to the market by quoting bid and ask prices and facilitating smoother trading for clients. Whether such activity is proprietary will depend on the risk appetite of the bank. If the bank hedges all transactions and merely secures flow margin, it would not be proprietary in nature.
- Trading could also be conducted to hedge the bank's exposure to market risks arising from its other activities. Though such activity would not be deemed proprietary trading.

[Total 2]

This question was answered generally well.

Part (i) was answered well. Many candidates were able to generate sufficient points.

Part (ii) was answered well.

Part (iii) was answered poorly. Many did not tie this back to the IMA application.

Part (iv) was generally answered well.

QUESTION 2

Dandelion Bank offers a broad range of Retail, Commercial and Wholesale lending products across multiple jurisdictions. The bank has recently embarked on a process to classify credit exposures according to their impact on carbon emissions. These classifications will be used to regularly assess the composition of their loan portfolios, which will enable the understanding of and assist with decision making related to their financed emissions.

i. Define financed emissions and explain why Dandelion Bank may want to understand the emissions-based composition of their loan portfolios. [3]

- Financed emissions refer to the emissions arising from activities that were made as a result of funding provided by a bank.
- Banks face climate change risk indirectly through their loan exposures. Even though the carbon footprint of banks tends to be low, they also face significant risk of emission related policy change through financed emissions. These are often referred to as scope 3 emissions.
- Hence, it is not enough for a bank to understand the emissions they are directly generating – they also need to understand of how their activities impact emissions in the wider economy.
- Dandelion Bank may want to understand the emissions-related composition of their loan portfolios to support measurement and monitoring of the associated risks described above.
- Understanding the balance sheet composition would enable Dandelion Bank to identify actions that can be taken to improve its indirect carbon footprint, such as reducing the extent of funding provided to carbon-intensive industries.
- Dandelion Bank may need to determine their emissions-based balance sheet composition to meet external reporting requirements, such as TCFD (Task Force on Climate Related Financial Disclosures) requirements.
- Dandelion Bank may need to determine their emissions-based balance sheet composition to meet investor demand for green funding instruments backed by zero emission assets.

[Total 3]

The “Principles for Effective Risk Data Aggregation and Risk Reporting” published in the Basel Committee’s BCBS 239 standard sets out principles that banks are required to comply with when aggregating and reporting on risks. The 11 key principles that banks need to comply with under BCBS 239 relate to governance, technology infrastructure, integrity, completeness, timeliness, adaptability, accuracy, comprehensiveness, clarity, frequency, and distribution.

Dandelion Bank is fully compliant with BCBS 239 across its existing risk universe.

ii. Discuss factors that Dandelion Bank should consider when setting up BCBS 239-compliant risk data aggregation and reporting processes for financed emissions, referencing the BCBS 239 principles and relevant examples for each principle. [12]

General considerations

- While reporting on climate risk in general and financed emissions in particular is a new requirement, Dandelion Bank has existing BCBS-239 compliant risk data and aggregation processes in place for other risk types. The approach followed for these risk types could be leveraged when setting up the required processes for financed emissions.
- Financed emissions data will be closely linked to credit risk data as the data used for financed emissions assessment relates directly to credit exposures, so leveraging of risk data and aggregation processes for credit risk should be considered.
- More mature risk types, such as credit risk, would have had legacy processes in place that would have needed to be adjusted to be compliant to BCBS-239 when the standard came into effect.
- This could have resulted in sub-optimal processes being followed to avoid significant rework on legacy systems and approaches. This should be taken into account when setting up processes for financed emissions, and opportunities to implement optimal processes rather than leveraging sub-optimal processes should be identified.
- This could include, for example, specifying metrics, the way these metrics are derived and the way that data is captured to support determination of these metrics upfront to be in line with best practice, and doing so in a way that enables flexibility to adapt as best practice evolves.

General considerations as set out above is not required to score full marks.

Governance

- The governance structures through which financed emissions will be reported should be established.
- Since financed emission is closely linked to credit risk, the bank will need to decide whether credit risk governance structures will be leveraged or whether separate climate risk governance structures should be established.
- The charters of the relevant governance structures will need to clearly articulate their responsibilities related to risk data aggregation and reporting for climate risk.

Technology infrastructure

- The bank will need to determine whether it can leverage existing technology infrastructure for financed emissions data aggregation and reporting, or whether investment in new infrastructure will be required.
- If the bank intends to invest in new infrastructure, consideration will need to be given to how this new infrastructure will integrate with existing infrastructure and risk data aggregation and reporting processes.

Accuracy and integrity

- The bank will need to consider how it will ensure that reports produced are accurate and reliable. Depending on the approach followed to classify loans, a degree of judgement may be

required. Appropriate oversight and controls should be put into place to ensure that data captured is correct.

- If the classification process relies on external data, controls should be put into place to ensure that this external data is reliable and accurate, such as benchmarking between multiple external data providers. The bank will wish to track greenhouse gas (GHG) emissions and ensure that the numbers are duly verified.
- Incorrect disclosures carry significant reputational risk.

Completeness

- Dandelion Bank operates across multiple jurisdictions and offers a broad range of lending products. The process implemented should cater for assessment of financed emissions across all geographies, for Retail, Commercial and Wholesale banking, and across products.
- Where there is a lack of suitable data available to determine key metrics for some geographies, such as green building ratings for property finance, the approach followed should allow for this.

Timeliness

- Dandelion will need to ensure that data that is required for financed emissions reporting is timely and up to date. Data relating to new loans should be captured at the point of origination to ensure that it is available for reporting.
- The process will also need to cater for any changes to relevant data, such as changes in the green rating of financed properties, or GHG emissions.
- Such updates could be difficult to obtain if clients are not incentivised to provide up-to-date information or if the process of providing updates is cumbersome.
- Where there is existing climate-related data, processes would need to be put into place to assess and improve the quality of this data to be consistent with new data captured.

Adaptability

- Financed emissions data is likely to be required for internal and external reporting and at various levels of aggregation, given the nature of Dandelion Bank's operations.
- Climate risk reporting best practice is still evolving. Dandelion Bank should ensure that its approach is sufficiently adaptable to cater for evolutions in best practice and regulatory requirements.

Accuracy

- Data used in financed emissions reporting should be reconciled and verified. Existing processes in place for credit risk data reconciliation can likely be leveraged as the financed emissions data will be linked to credit exposures.

Comprehensiveness

- Dandelion Bank has a complex structure and, although its size is not stated, it can be assumed that it is a large institution given the breadth of its geographical reach and product range. Its approach should be comprehensive to reflect the size and complexity of the organisation.

Clarity

- Dandelion bank will need to ensure that its financed emissions reports are designed to be clear and to provide the required insights to enable decision-making without being overly complex. Stakeholders should be engaged and draft report designs taken through challenge and approval processes prior to implementation to ensure that reporting formats are fit-for-purpose.

Frequency

- The frequency of financed emissions reporting should reflect the needs of report recipients and the nature of the underlying risk. The frequency of external report production will be determined by regulatory requirements (e.g. Climate Reporting under Basel pillar 3, TCFD reporting, IFRS reporting).
- As the balance sheet composition is likely to be slow to change and actions to shift the composition are likely to be longer-term in nature, it is unlikely that high-frequency reporting will be required. The frequency of reporting should be determined by consulting key stakeholders and governance forums that will consume the reports.

Distribution

- Financed emissions reports should only be distributed to stakeholders that require the reports. The stakeholder group that reports should be distributed to will need to be defined, and will likely include members of the credit community, the climate risk community and the board risk committee.

[Total 12]

This question was answered poorly.

Part (i) was answered very well. Most candidates demonstrated knowledge of funded emissions and reasons as to why a bank would want to measure these emissions.

Part (ii) was answered poorly. Many candidates made generic remarks on other activities. Stronger candidates were able to tie BCBS239 guidelines to emissions data and made good comments around frequency of reporting, governance and completeness of data.

[Total 15]

QUESTION 3

- i. Explain the concept of behavioural tenor as it applies to both deposits and loans, highlighting the importance of stable and non-stable deposits.

[3]

- Behavioural tenor in the banking industry refers to the estimated time horizon over which customers are expected to retain their deposits or repay their loans based on actual experience observed.
- For term loans, the behavioural tenor is typically less than the contractual tenor as customers are allowed to prepay their loans. Customers will typically aim to do this to reduce the amount of interest they have to pay overall.
- For deposits, instant access deposits will not have a contractual tenor as they can be dipped into and out of at any time. However, customers will typically keep a certain amount in their deposit accounts, especially for retail customers
- The Basel III framework categorises customer deposits into "stable" and "non-stable" based on their contractual maturities as well as likelihood to be called.
- Stable deposits are those with longer contractual maturities, or deposits covered by a deposit insurance scheme. Therefore, a large portion of retail deposits are deemed stable even though their contractual maturity may be overnight.
- Non-stable deposits include those with shorter contractual maturities, such as instant access accounts or deposits. The majority of overnight wholesale funding falls within this classification.
- This categorisation is crucial for liquidity metrics as it allows banks to differentiate between funds that are likely to remain stable during times of stress and those that may be subject to sudden withdrawals.
- By considering the behavioural tenor of deposits, banks can better manage their liquidity risks and comply with regulatory requirements.

[Total 3]

- ii. Explain the significance of determining the behavioural tenor of deposits and loan products in managing liquidity risk for a bank.

[3]

- Behavioural tenor provides insight into how quickly deposits can be withdrawn or loans repaid which in turn affects the bank's ability to meet short-term funding needs.
- Understanding this thus helps banks forecast cash flows more accurately, allowing them to maintain sufficient liquidity buffers to cover potential outflows during periods of stress or unexpected withdrawals.

- Furthermore, anticipating potential shifts in deposit and loan behaviour allows banks to adjust liquidity management strategies accordingly.
- Behavioural tenor assessment allows banks to identify potential mismatches between the maturity profiles of their assets and liabilities, helping them mitigate liquidity risk by aligning funding sources with the expected cash flow patterns of their loan portfolio. This is key as banks are generally shorter funded and therefore can, in extreme events, run out of liquidity.
- Cohort-based analysis assists in identifying specific segments of the loan portfolio that may exhibit different behavioural characteristics, enabling targeted liquidity risk management strategies for each segment.
- Setting credible behavioural tenors based on statistical observation helps banks price their products accurately, reflecting the associated liquidity risks, and ensures they maintain adequate liquidity reserves to support ongoing operations and withstand adverse market conditions.

[Total 3]

You have been tasked with conducting an analysis to determine the behavioural tenor of a bank's deposit and loan products.

- iii. Describe your methodology step-by-step, addressing potential challenges in interpreting the data and ensuring credibility and conservatism in the resulting estimates.

[6]

- Start by gathering historical data on deposits and loans, including month-end balances and repayment schedules, ensuring a comprehensive dataset.
- Organise accounts and loans into groups based on factors like when they were opened, the type of product, or the customer segment they belong to, aiming for homogeneity within each group.
- Inspect the data to spot any trends or patterns in how customers behave over time, utilising statistical analysis techniques such as trend analysis or regression modelling.
- Take into account periods of financial stress or crises, such as economic downturns or market disruptions, to understand how deposits and loans behave under different economic conditions.
- Pay attention to any unusual spikes or dips in the data that could skew the results, conducting outlier analysis to determine the impact of anomalies on the overall analysis.
- Calculate run-off rates for deposits and track repayment patterns for loans to quantify the rate at which balances diminish or are paid off over time.
- Based on all this data, forecast how customers will behave in the future, incorporating insights from behavioural economics and customer segmentation analysis.
- Test different scenarios to assess the sensitivity of the results to changes in assumptions or market conditions, conducting stress testing or scenario analysis to evaluate the robustness of the behavioural tenor estimates.

- Furthermore, conservatism can be incorporated by applying conservative assumptions or buffers in the modelling process to account for uncertainties or unexpected events
- Document the methodology used, detailing the data sources, analysis techniques, and assumptions made during the analysis process, to ensure transparency and reproducibility.
- Document a clear report summarising the findings, including key insights, trends, and recommendations for decision-makers within the bank.
- Review the analysis with other experts, such as risk managers, actuaries, or regulatory compliance officers, to validate the results and incorporate additional insights or feedback.
- Particular scrutiny has to be given to feedback and insights that would suggest more conservatism as these could help focus on more essential areas.
- Consider external factors such as regulatory requirements or industry best practices, ensuring that the analysis aligns with relevant standards and guidelines.
- Implement any necessary adjustments or refinements to the analysis based on feedback from stakeholders or changes in market conditions, maintaining flexibility and adaptability.
- Monitor ongoing changes in customer behaviour and market dynamics, regularly updating the analysis to reflect new data and insights, and ensuring that the bank's strategies remain aligned with its risk management objectives.

[Total 6]

A colleague has read about the introduction of a Deposit Insurance Scheme by the regulator. He suggests that due to the introduction of the scheme, banks may take on more risks in expanding their loan portfolios.

- iv. Discuss any potential impacts on the behavioural tenors of the deposit and loan portfolios with the introduction of a Deposit Insurance Scheme and whether your colleague's comment is valid.

[4]

- The introduction of the scheme may make customers feel more comfortable in depositing their funds and keep funds in savings for longer. This could increase the behavioural tenor of certain deposits.
- Banks may reduce interest rates on shorter term products (due to these being perceived as less risky with the introduction of the deposit insurance) and therefore customers may move toward longer term deposit products. Certain shorter-term products may then see a reduction in behavioural tenors.
- Due to increased competition, banks may be offering newer products and competitive rates. The movement of customers could decrease the behavioural tenor of certain deposits. Weaker banks will also be advantaged compared to stronger banks.
- Or the bank could be ahead of the market, innovating with products, encouraging more deposits thereby increasing the average tenor.

- Banks might perceive deposit insurance as a safety net, leading to a higher appetite for risk-taking.
- If banks thus increase their appetite and take on more ‘riskier loans’, then the loan portfolio could experience:
 - Increase in behavioural tenor as newer customers would have a lower tendency of repaying earlier.
 - Increase in behavioural tenor as riskier customers may take out longer loans than an average customer.
- With an increase in appetite, banks may also offer longer term periods for their loans.
- Your colleague's suggestion that banks may take on more risks and expand their loan portfolios holds validity.
- However, other factors such as regulatory oversight and market conditions also influence behavioural tenors.

[Total 4]

[Total 16]

This question was answered generally well.

Part (i) was answered very well as it was based on bookwork

Part (ii) was answered well as it was based on bookwork.

Part (iii) was generally answered well. Stronger candidates managed to set out a logical approach to the solution. Few candidates made points around documentation and back testing of results. Many candidates ignored the instruction around ensuring conservatism in their responses.

Part (iv) was not as well answered. Candidates struggles to generate sufficient points to score well. Very few spoke about impacts on the overall banking industry. Many candidates did not comment on the colleague's comment and disregarded that banks still have to follow strict lending guidelines.

QUESTION 4

- i. Define the term Net Interest Margin (NIM) and explain its significance in the context of a bank's operations.

[2]

- The net interest margin (NIM) of a bank is calculated as its total net interest income, which is the interest received from assets minus the interest paid on deposits (liabilities), divided by the average interest-earning assets.
- NIM serves as a measure of the bank's profitability derived from its core lending and borrowing activities.
- A higher NIM suggests that the bank is effectively earning more from its interest-earning assets compared to the interest it pays on its liabilities. This can be as a result of changes in portfolio construct or product pricing.
- This higher NIM implies stronger profitability and efficiency in managing its funds in terms of mix and volume.
- Conversely, a lower NIM may indicate that the bank's interest expenses outweigh its interest income or that there is not a high enough differential between the two.

[Total 2]

- ii. Explain the main revenue streams for banks, focusing on net interest income, non-interest income, and trading income.

[3]

Net Interest Income from Banking Book Operations:

- Net interest income, the primary revenue source for banks, is derived from the spread between the interest earned on loans, mortgages, and investments, and the interest paid on deposits and borrowings.
- Banks aim to fund themselves at lower rates relative to the prevailing interest rate environment and lend money at higher rates, enabling them to generate positive net interest income.
- While generally stable, net interest income can come under pressure for various reasons, such as competitive pressures leading to reductions in loan prices without equivalent decreases in deposit prices during periods of economic expansion. Banks therefore need to pay close attention to their balance sheet construct.

Non-interest Income from Banking Book Operations:

- Non-interest income includes revenue earned from various fees charged on banking operations, serving as an additional source of income alongside net interest income.
- These fees encompass a wide range of services, including account maintenance fees, transaction fees, asset management fees, insurance fees, and other charges.

- Customers may incur these fees at different stages of their banking relationship, including account initiation, ongoing transactions, or account termination.

Trading Income from Trading Book Operations:

- Trading income comprises gains and losses resulting from marking assets and liabilities to market on a daily basis, representing revenue generated from banks' trading activities.
- Assets and liabilities in the trading book are subject to continuous valuation adjustments, with gains and losses recognised accordingly.

[Total 3]

iii. Analyse the impact of changing interest rates on a bank's net interest income, considering the following scenarios:

- rising interest rates, and
- a sustained high or low interest rate environment.

[4]

Impact of Rising Interest Rates:

- Higher interest rates increase the interest income banks earn on loans and securities.
- Banks with a significant portion of variable-rate loans or investments may see an immediate boost in interest income.
- Banks may need to offer higher interest rates on deposits to remain competitive.
- If deposit rates rise faster than lending rates, it could compress the net interest margin, reducing net interest income.
- Initially, rising interest rates could increase net interest income as higher interest income from loans and securities outpaces increased interest expenses.
- However, if deposit rates rise faster or if the bank's loan portfolio has many fixed-rate loans, the net interest margin may decrease, negatively impacting net interest income.
- Banks may choose to hedge some of its interest income, either to provide stability in its net interest income or to take advantage of the rising interest rate environment.

Impact of Sustained High or Low Interest Rate Environments:

- In a sustained high-interest rate environment, banks may earn more interest income but may face reduced demand for loans.
- In a sustained low-interest rate environment, banks may struggle to maintain interest income as yields on loans and securities remain low.
- Persistent high or low interest rates may lead to pressure on the net interest margin.
- High rates could lead to higher deposit costs, while low rates could compress the margin between lending and deposit rates.

- Banks may need to diversify revenue streams beyond net interest income to maintain profitability.
- Adaptation may involve optimising balance sheet management, adjusting pricing strategies, and exploring new business opportunities to mitigate the impact on net interest income.

The second scenario could be split out into two separate components.

[Total 4]

- iv. Discuss how technological advancements and changes in regulatory requirements could affect a bank's cost ratios and overall profit margin.

[8]

Technological Advancements:

- Automation and digitisation can streamline processes and reduce operational costs, positively impacting the bank's cost structure and profitability.
- For instance, automated transaction processing and digital banking platforms can lower transaction costs and decrease the need for physical infrastructure, improving the overall cost ratios.
- Furthermore, digitisation can improve customer experience which could increase customer retention, lessening any future acquisition costs and attract new customers from competitors who aren't as advanced.
- The implementation of AI tools can further streamline back office tasks reducing acquisitions costs.
- If this AI implementation is successful, it could lead to an increase in new customer sign-ups.
- Adoption of artificial intelligence and machine learning can enhance risk management and improve operational efficiency, leading to potential cost savings.
- Improved risk management may reduce loan defaults and associated costs, pushing up overall profit margins.
- Collaboration with fintech firms or the development of proprietary fintech solutions can offer innovative, cost-effective solutions, optimising the bank's cost structure, improving the overall cost ratios
- Overall technological changes can significantly decrease costs to the bank due to the automation of processes and the impact on customer interactions.
- However, the initial costs of the implementation of any new technology should be properly considered, for e.g. the cost of running two systems in parallel as a new one is introduced.
- Digitisation may increase the risk of significant liquidity flows that will increase associated frictional costs.

Changes in Regulatory Requirements:

- Compliance costs associated with regulatory requirements can increase the bank's cost base.

- This could be due to the cost of training staff and the implementation of new processes required to comply to regulation.
- There could be an increase in costs from internal audit or compliance functions, including costs from external sources such as consultants or external auditors.
- Stricter capital adequacy requirements may require banks to allocate more capital to meet regulatory standards, increasing capital requirements.
- Stricter regulatory requirements may decrease the risk appetite of the bank or decrease the innovation in the bank, reducing the ability to improve income from various new products.
- Operational changes mandated by regulatory reforms may involve additional expenses in the short term but could lead to long-term benefits in terms of improved risk management and governance practices. The directional change would be highly impacted by the success of any new practices implemented.
- Generally, regulatory changes may have an initial negative impact on the cost structure of a bank. However, if the opportunity is seized and the correct processes are put in place, supported by new technologies, the bank should be able to improve its cost ratios and profit margins.

[Total 8]

[Total 17]

This question was answered well.

Part (i) was answered very well.

Part (ii) was answered very well.

Part (iii) was answered very well. Credit was given for a wide variety of responses.

Part (iv) was generally answered well. Strong candidates were able to generate sufficient points and considered both upside and downside impacts. Candidates who gave equal focus to technology and regulation generally scored better as a wider range of answers could be generated.

QUESTION 5

You work for a reputable audit and consulting firm. The Chief Risk Officer of Polaris Bank has engaged your firm to provide assurance that the bank's anti-money laundering processes are effective and compliant with relevant regulatory requirements.

i. Define money laundering and outline the main phases of money laundering.

[2]

- Money laundering can be defined as acts that acquire, transfer, or conceal proceeds of a certain criminal act.
- Money laundering typically consists of three main phases:
- Illegally obtained funds are brought into the financial system, e.g. by depositing cash received from drug trafficking into a bank account;
- The true origin of funds is concealed, e.g. by moving bank account balances, often across national borders;
- The disguised funds are used for other legal purposes of investment or consumption.

Comments on placement, layering, integration were accepted.

[Total 2]

ii. Explain the role that the Financial Action Task Force (FATF) plays in combatting money laundering.

[3]

- The FATF is an independent inter-governmental body set up to combat money laundering, terrorist financing, and the financing proliferation of weapons of mass destruction.
- It focuses on three main areas:
- Setting anti-money laundering (AML) and countering the financing of terrorism (CFT) standards through regularly updated FATF Recommendations.
- Assessing progress as member countries mutually evaluate one another's jurisdictions against compliance with the FATF Recommendations.
- Identifying trends and engaging with high-risk, non-cooperative jurisdictions.
- FATF issued a list of 40 recommendations ("The FATF recommendations") to combat money laundering, terrorist financing, and the financing proliferation of weapons of mass destruction.
- All member countries should implement these recommendations, considering their specific circumstances, as not all jurisdictions are identical in construct.
- Any member country that fails to implement these controls risks being subjected to enhanced due diligence by the FATF body, or worse, being grey listed for non-compliance.

[Total 3]

Polaris Bank follows a risk-based anti-money laundering approach, using a combination of rules-based approaches and statistical models to assign clients and transactions to risk categories. The bank applies enhanced due diligence processes to clients and transactions rated as high risk.

- iii. Outline risks that could result in Polaris Bank's anti-money laundering approach being ineffective or non-compliant with regulatory requirements and suggest ways in which these risks can be mitigated.

[8]

Model risk

- Models used may, for example, track counterparties that require to be sanctioned and money flows that may be associated with those counterparties. The models may also track irregular payments.
- The statistical models may not be robust or accurate enough to capture the complex and dynamic patterns of money laundering behaviour.
- The models may rely on outdated or incomplete data, leading to inaccurate risk assessments or misclassification of clients.
- The rules-based approaches may not be calibrated to appropriate thresholds, and could generate false positives or false negatives, leading to inefficient resource allocation or missed detection.
- The bank could enhance its statistical models by using more sophisticated and diverse techniques and by incorporating more relevant and timely data, such as transactional, behavioural, or social network data.
- The bank should also monitor its models and rules periodically and adjust them according to the changing trends and risks of money laundering.
- Models should also be subject to robust model governance and validation processes to ensure that they are fit-for-purpose.
- The bank should use a combination of qualitative and quantitative methods to validate and optimise its rules and reduce false alarms or errors.
- The bank should review and update its rules-based approaches regularly and ensure that they align with the latest regulatory guidelines and best practices.

Operational risk

- The effective application of rules and models to identify money laundering requires automated processes to consume data and produce results. There is a risk that data feed or model run processes can break down.
- Models or rules that are too sensitive could result in an excess of clients or transactions being rated as high risk and requiring enhanced due diligence (EDD). The volumes of legitimate high-risk clients or transactions could also be higher than normal during certain periods.

- Operational staff capacity could be utilised incorrectly, investigating lower risk rather than higher risk clients and transactions, if there is misclassification.
- As EDD is typically a manual and resource-intensive process, this could put strain on resources or could result in the bank not having sufficient resources to complete the required investigations.
- If the bank relies on external vendors or third parties for any components of its approach, it will be exposed to third party risks.
- The bank should ensure that its implementation of automated processes is robust, and that data feeds and model runs are monitored for breakdowns.
- The bank should monitor and recalibrate models and rules frequently to ensure that they are not too sensitive, and should have plans in place to pivot in additional resources where required to deal with higher-than-normal volumes needing to go through EDD.
- Any third party risk should be managed through third party due diligence processes and appropriate service level agreements.

Compliance risk

- The enhanced due diligence processes may not be consistent or comprehensive enough to verify the identity, source of funds, and purpose of transactions of high-risk clients and may fail to detect red flags or suspicious activities, leading to potential facilitation of money laundering or violation of sanctions.
- The bank should standardise and streamline its enhanced due diligence processes and ensure that they follow the principles of proportionality, risk-sensitivity, and transparency.
- The bank should also train and educate its staff on how to identify and report suspicious activities and how to apply the appropriate measures and sanctions to high-risk clients.
- The bank should establish and maintain a strong anti-money laundering governance structure and culture.
- The bank should also implement and document its anti-money laundering policies, procedures, controls, and systems and conduct regular audits and reviews to assess its performance and compliance.
- The bank may be non-compliant with conduct or privacy regulations if the models and rules-based approaches are biased or discriminatory or if they violate the privacy, confidentiality, or consent of the customers or stakeholders.
- The bank should have appropriate policies and governance structures in place to ensure that AML models and processes are also compliant with relevant conduct and privacy regulations.

[Total 8]

iv. Outline the information that you would request from Polaris Bank to support your review.

[7]

- Policies and procedures related to AML, including the banks Know Your Customer (KYC) policy, customer due diligence procedures and suspicious transaction monitoring and reporting processes.
- Relevant governance frameworks and governance process documentation, covering model risk, information governance, conduct risk, privacy risk and third-party risk.
- Documentation of the models and rules-based approaches used to assign clients and transactions to risk categories.
- The both internal and external data used to develop and calibrate the models and rules.
- The results of any monitoring performed on the models and rules.
- Details of any internal validations performed on the models and rules-based approaches and the corrective actions taken in case of any deficiencies or weaknesses identified.
- Information regarding the systems used for AML monitoring and reporting, including details of software used and system configurations.
- Documentation evidencing the specific due diligence measures applied to high-risk clients, such as verifying their identity, source of funds, and purpose of business relationship.
- Samples of transaction monitoring reports and suspicious activity reports filed with the relevant regulatory authorities.
- Details of the training and awareness programmes provided to the bank staff on anti-money laundering and countering the financing of terrorism (AML/CFT) issues, and the mechanisms for evaluating their effectiveness and performance.
- Details of external reviews or assessments conducted by regulators, supervisors, or independent experts on the bank's anti-money laundering approach, and the feedback and recommendations received.
- Evidence of the due diligence performed on any third parties involved in the process.
- Service level agreements concluded with any third parties involved in the process.
- Data regarding the volumes of high-risk clients or transactions flagged and the time taken to conclude EDD on these.

[Total 7]

[Total 20]

This question was not answered well. Candidates may not have appreciated the importance of AML.

Part (i) was answered very well.

Part (ii) was answered well. Weaker candidates did not appreciate the role of the FATF.

Part (iii) was answered generally well. Some candidates often repeated or contradicted points. Stronger candidates identified a risk then used these risks to identify risk mitigants.

Part (iv) was generally answered poorly. Candidates often quoted requiring information from regulator/competitors. Though these are valid points, they won't necessarily be provided by Polaris as they are paying a consultant who is supposed to be an expert in this. Furthermore, the instruction was to provide information that would be requested, not to provide advice/procedures on how to build these models/processes.

QUESTION 6

You are an actuarial student working in the business banking (small to large businesses) analytics team. You have been assigned to develop loss given default (LGD) models.

LGDs may be expressed as “ $1 - \text{Recovery Rates}$ ”.

i. Describe the factors that could impact recovery rates for a business banking portfolio.

[4]

- Type of lending: Secured lending will generally have a higher recover rate than compared to unsecured lending. This is due to the bank being able to recover on asset secured over the loan.
- Unsecured lending is usually based on ability to repay from cash flows and profits and therefore the level and ability of recovery rates are lower.
- Type and value of collateral: Different types of collateral (e.g. property versus cash) will have different recovery rates associated with it. Some collateral may have more liquidity associated with it and may have a larger recovery rate associated.
- Specialised types of collateral may be harder to sell or may require larger haircuts and larger length of liquidation (court processes).
- Type of customer: Smaller business customers such as smaller self-employed businesses may have less potential to recover versus a larger business customer with many businesses or branches.
- Loan terms: Types of loans and conditions such as: interest only, specified drawdown, interest moratoriums, ability to drawdown to a limit, may also influence the ultimate recovery of that particular loan.
- Loan covenants: Stronger loan covenants with stricter conditions and higher collateral requirements can potentially lead to better recovery rates.
- Ranking of debt: If other debt obligations of the customer are ranked higher than the chances of recovery for a bank is lower.
- Hedging: if a customer has any hedging instruments or strategies in place it could impact the recovery. For example, an agriculture customer may make use of derivatives to lock in prices and amount of crop sold. This could improve the recovery prospects of the loan.
- Guarantees: Any type of guarantee could improve recovery expectations. For example, government backed guarantees may be more reliable.
- Industry: Recovery rates can vary significantly depending on the industry of the borrower. Businesses in cyclical industries (e.g., construction) might experience higher default rates and lower recovery rates during economic downturns.
- Similarly, businesses in stable industries (e.g., healthcare) might have more consistent performance and potentially higher recovery rates.

- Macroeconomic conditions: In economic downturns, customers are more likely to default, and asset values (e.g., property) might decline, leading to lower recovery rates from collateral sales. Conversely, strong economic conditions generally favour higher recovery rates.
- Jurisdictional legal efficiency: the efficiency of the legal process may also impact timing and costs related to legal proceedings.

[Total 4]

ii. Outline the data required to estimate recovery rates for a business banking portfolio.

[2]

- Any loan related data: e.g. type of loan, type of credit product, secured vs unsecured, term
- Type of customer: small business, agricultural, industry of customer
- Cash flows and dates: e.g. cash flows in, cash flows out, description of cash flows legal costs, etc.
- Dates of default curing or written off and amounts associated with it.
- Collateral details: e.g. type of collateral, latest valuation amount and date, estimated haircuts
- Historical performance of collateral based on sales previously in the bank, including any recovery profiles and trends.
- Covenants: details of any loan covenants and covenant breaches
- Guarantee details: type of guarantee, guarantee conditions, guarantor details
- Direct and indirect costs relating to default activities
- Customer financial statement data: details of other borrowings, ranking of debts

[Total 2]

Commercial Property Finance (CPF) refers to bank lending to acquire, develop, or refinance commercial real estate properties. These could include: office buildings, retail shopping malls, industrial facilities, warehouses, and other property types.

The CPF management team has contacted you to assist them with their LGD modelling. The team has noted that CPF deals from the last 3 years are being originated at 75% of LTV (loan to value), therefore, LGD estimates for the portfolio should be 0%.

iii. Discuss the appropriateness of the comments made by the management team.

[5]

- Lower LTVs usually mean a larger expected recovery if a loan defaults, for example, an LTV of 75% means that the value of the collateral is 33% higher than the loan amount.
- Generally, property portfolios are expected to appreciate and therefore LTVs may decrease at a larger rate over time.
- However, there are other items that can influence the ultimate recovery rate and final LGD.

- At the time of recovery, the value of the collateral may be heavily discounted to conclude the sale.
- The value of the collateral may reduce given the state of economic cycle.
- The type of property may be highly specialised and therefore not easily marketable or reusable.
- The type of property may not have large potential later on, e.g. tenants for office parks or malls due to general decline in the region.
- The time to recovery may be long and the LGDs may take into account a time value of money.
- Recoveries also comes at a cost to the bank to facilitate, for example:
- Direct costs: legal fees such as professionals, lawsuit and legal proceedings. These could be larger on more complex types of recoveries.
- Indirect costs: staff time and resources, such as the time spent by employees managing defaults. Staff costs may be higher on a CPF portfolio than compared to a vanilla product.
- Regulatory requirements: different LGD estimates may be subject to a floor value, e.g. for regulatory capital purposes.
- In conclusion, an LGD estimate of 0% is not reasonable.

Comments for discussion on LTVs at origination vs those that are close to default are accepted.

[Total 5]

The following default data is available for the CPF portfolio:

	2019	2020	2021	2022
Number of defaults	27	34	24	20
Balances at default (L\$)	730 000	800 000	680 000	460 000
Number of defaults written off	20	18	9	4
Balances written off (L\$)	328 500	400 000	204 000	82 800
Number of cures	5	12	9	8

The CFO has been doing some research on LGDs. She has suggested that the LGD be estimated using the following approach and assumptions:

$$LGD = P(W) \times LGW + P(C) \times LGC$$

Where

$P(W)$: probability of an account in default eventually being written off

$P(C)$: probability of an account in default eventually curing

LGW : expected loss given a default being written off

LGC : expected loss given a default curing

- $P(W) + P(C) = 1$
- $P(W) = \text{number of write-offs} / (\text{number of write-offs} + \text{number of cures})$
- LGW should be greater than 0%.
- LGC is to be fixed at 5% for all periods.

The CFO has also asked you to check the data as the total defaults do not add up to the number written off and number cured.

iv. Discuss the assumptions and data issues highlighted by the CFO.

[4]

- As this is a two state/ stage model then the $P(W) + P(C) = 1$ seems reasonable.
- LGW should not be negative so that overall LGDs are floored at 0%, as one would want LGDs to be greater than 0%.
- $P(W)$ as a number weighted average could be reasonable, however, a balance weighted approach may be tested.
- As this is a low default portfolio using a number or balance weighted approach could have some volatility in probability measures.
- LGC fixed at 5% may represent losses taken at curing. Generally, curing would expect to be closer to a 0% loss rate.
- However, there may be losses associated with getting into a cure state including some costs and hence the requirement for a 5% assumption. This may not be an optimal approach to bring in costs into the overall LGD.
- The CFO may also want to include some conservatism in the estimate.
- There may be no issue in the data as the discrepancy in the number of defaults may mean that accounts have not fully cured or written off as yet (i.e. still in the collection process).
- These unresolved (or still in collection) accounts have the ability to impact overall LGD levels. This should be a factor to consider when estimating LGDs.

[Total 4]

The CFO has asked for an estimate for LGD for the CPF portfolio given the data available. She has also queried what a stressed LGD level could be in an economic downturn.

v. Estimate the LGD for the portfolio and comment on an appropriate range for a stressed LGD estimate. State your assumptions and show workings.

[5]

Item and assumptions	2019	2020	2021	2022
LGW: Balances written off / Balances at default	45.0%	50.0%	30.0%	18.0%
P(W): formula given	80.0%	60.0%	50.0%	33.3%
P(W) * LGW	36.0%	30.0%	15.0%	6.0%
LGC: estimate given	5.0%	5.0%	5.0%	5.0%
P(C): 1-P(W)	20.0%	40.0%	50.0%	66.7%
P(C) * LGC	1.0%	2.0%	2.5%	3.3%
LGD: formula given	37.0%	32.0%	17.5%	9.3%

Average		24.0%
Balance weighted		25.8%

- A good estimate for the portfolio LGD will be 24.0%/25.8% which is the average/balance weighted average over the periods.
- For a stressed LGD, a few factors may be considered:
- 2019 has the highest LGD estimate,
- 2020 has the highest number of defaults, the largest balances defaulted, and the highest LGW rates.
- Therefore, a suggested estimate for a stressed LGD range could be 32% - 35%.

[Total 5]

[Total 20]

This question was answered poorly with many candidates seem to have run into time pressure.

Part (i) was answered well. Poor candidates did not generate enough points for the marks on offer. Weaker candidates did not use the information around business banking and stated generic points.

Part (ii) performance was average. Some candidates just listed data components, whereas the instruction was to outline.

Part (iii) was answered relatively poorly. Candidates struggled to generate sufficient points to refute the statement, did not comment on the appropriateness of the comment and only listed arguments. It was essential for candidates to discuss the shortcomings of the statement and though some credit can be given in support of the statement, some candidates wasted too much time in support of the statement.

Part (iv) was answered very poorly. Many candidates did not appreciate the nuance of probabilities associated with a 2-decrement model. Many did not comment on the assumptions listed. Many marks were on offer given the number of assumptions put forward in the scenario. Stronger candidates picked up on a reason as to why accounts could be not cured or written off.

Part (v) was answered very poorly. A significant number of candidates suffered from time pressure, did not provide conclusions to their answers/calculations and did not justify ranges chosen.

END OF EXAMINERS' REPORT