

Actuarial Society of South African

19 May 2016 (am)

**Subject F206 – Banking
Specialist Applications**

Marking Schedule

QUESTION 1

The question was largely business-oriented, and required very limited technical knowledge. Candidates should have scored higher given that they could have drawn from a range of possible ideas. Better candidates were able to provide a wider range of considerations. Overall, question 1 was relatively well answered.

You are the head of the Retail division within a large bank. A customer complaint has come across your desk stating that there are no banking services in a prominent town to the East of Johannesburg. After investigation, you discover all of the other large banks have some presence in the area (ATMs or branches, but most have both).

- i. Explain the items you would consider when deciding whether or not you should create a presence in the area.

[6]

Generally well answered. Most candidates failed to discuss where the branch should be located, and that analysing where competitors are located would be a sensible starting point. Better candidates provided commentary on the Bank's existing customer base in the area, and whether setting up a branch / ATM would meet their longer term and strategic goals. Candidates also generally failed to expand on the idea of considering the LSM characteristics of the town's population, and corresponding product / service features required.

- One of the most important considerations is the volume of potential business that may be added to the banking book by opening up some sort of presence in this area, and whether or not this will cover the costs of creating that presence in the area.
 - This could be done by approaching one of the Credit Bureaus to see how many accounts (with the other big banks) are held by customers in that area. (This would assist with understanding the available credit market)
 - The bank could commission additional research (for example making use of census data) to obtain a good understanding of the demographics of potential customers within the area in order to more fully understand the types of products and expertise these clients may require from the bank.
 - The bank must also look to see how many clients they currently have within this area, as the bank may have the “appropriate” relative market share in any case (without opening up a presence specifically).
- Investigate the volume of competitor ATMs and branches within the town already so that the bank has a gauge of the potential levels of “presence” that would be required.
- The bank must also consider whether or not the business available in the area is the type of business aligned to its strategy and risk appetite. It may be an area where there is a heavy reliance on particular industry (e.g. a mining town) or may be within a

specific LSM group that the bank is considering to expand into (similarly the bank may already be proportionately over-exposed to specific industries causing concentration risks).

- Depending on the outcomes of the investigation the bank may realize that full service banking i.e. a branch may not be warranted, perhaps simply an ATM or two in strategic areas may make the most sense to ensure that some simple transactions for customers already with the bank can be performed.
- The bank must also review the distances between this town / city and the nearest ATMs / branches that are already open. If they are reasonably close it may be better to direct clients already banking with the Bank to use these facilities.
 - If the bank has a fairly comprehensive online banking facility then it may not even be necessary to augment this with facilities “on the ground” in the area as clients can access full service banking in any case.
- The bank needs to determine if there are any available suitable areas for either ATMs / branches to be built / installed and where exactly they should be located relative to the competitors branches and ATMs
 - Typically Bank’s presence, especially branches, are located close to each other, in a banking “sector” within big shopping centres and it may be best to do the same in this instance if there are large shopping centres in the vicinity. Likewise there may be benefits to differentiating where these new branches or ATM’s are placed, provided there is sufficient foot traffic in those areas.
- Social media analyses and surveys may also provide further insight into the need to create a presence in the area.

After investigating your considerations, the bank decides to open a branch in a large prominent local shopping centre and install three ATMs across the town (one ATM is installed in the same shopping centre as the branch that has been opened, but is located in a different area within the shopping centre). After several months of operation, sales volumes (general customer volumes) are particularly low at this branch, however, usage of all three ATMs are in line with expectations.

- ii. As part of an investigation to assess the continued viability of the branch, you are tasked to investigate potential issues leading to the lower than required sales and to suggest possible solutions. Explain the potential issues and possible solutions you may find.

[5]

Most candidates missed out on the first key point – as the ATMs are performing as expected, there is confirmation that there is a need for a presence, and hence the reason for the underperforming branch should be investigated. Many candidates assumed that this indicates there is no need for a branch, and hence this limited the length and depth of their answers. Better candidates understood that a number of possible factors need to be considered, including that if the branch may simply need more time to meet the targets set.

- The ATM usage (including the one within the prominent shopping centre) is at expected levels. This indicates that a presence is required in the town, and perhaps there is something wrong with the branch itself that could be causing the lower than required / anticipated sales / service volumes:
 - Is the location of the branch ideal? So is it within the same section as the other branches, and if so is it badly located relative to the others? Is the level of customer exposure / footfall sufficient to support the branches?
 - Is it possible that the branch should be moved to next to the ATM which is currently doing well.
 - Are the staff trained in all the bank's products, do they know how all the systems work and specifically are they selling the correct products for the local market place (for instance, if it is a farming town, do they have the right expertise to assist these clients).
 - If there are any customer service stats available for the branch these would be worthwhile reviewing in order to see if these reveal anything specific that is lacking in the branch experience.
 - Is the branch look and feel appropriate for the clientele in the area (lower LSM clientele will want a simple look and feel).

- The required sales / services provided to make the branch viable (either break even or profit generating) should be relooked to ensure they are correct and can be used as targets for the branch. One also needs to review how the sales / services have changed over time since the branch opened. It is possible the branch is slowly increasing all required volumes and within say 12 months may become viable without any further actions.

- Review the cost structures of the branch, to understand if there are any efficiencies or cost reduction that could be implemented to improve the viability and profitability of the branch (for instance reviewing the rental agreement, branch re-sizing). Another consideration is the term of the lease – the bank may not be able to break the current lease agreement without incurring additional costs.

- The current product mix and services rendered within the branch should be reviewed and compared with the bank's other branches to see if it is in line with other typical similar branches (in similar LSM / industry sector areas). This will allow the bank to see if there are any peculiarities within this branch that require attention.

- It is also possible that the branch requires more advertising or airtime within the centre (or the surrounds) to encourage clients to do business within the branch (there are several ways of doing this – billboards, SMS's to existing clients for example).

[Total 11]

QUESTION 2

Overall, candidates could have scored more marks by making sure they covered a sufficient breadth of distinct ideas. Many candidates provided too narrow answers, and so failed to score a sufficient number of marks.

You are the head of Transactional Banking for a large commercial bank. You are investigating your current account offering to customers specifically earning less than R150k per annum. This product has two pricing options - a flat monthly fee of R11 (with pay as you go transactions and benefits) and a flat monthly fee of R55 (which includes unlimited ATM withdrawals, internet banking and unlimited debit orders).

The profitability of the product has reduced significantly over the last year (please see the income statement for the current account product below for the 2014 and the 2015 financial years).

Rand	Book information	
	2014	2015
Active Accounts	1 200 000	1 250 000
Average Debit Balances for the Year	R 750 000 000	R 823 000 000
Average Credit Balances for the Year	R 2 000 000 000	R 2 194 666 667
Average Client Limits for the Year	R 1 700 000 000	R 2 250 000 000
CPI	4%	4.5%

Rand	Financial information	
	2014	2015
Interest income	R 145 000 000	R 146 000 000
Fee income	R 401 000 000	R 376 000 000
Cost of Funding	R 45 000 000	R 55 000 000
Branch Costs	R 125 500 000	R 135 000 000
ATM Costs	R 77 500 000	R 89 000 000
Debit ordering processing costs	R 22 500 000	R 30 000 000
Direct Costs	R 11 000 000	R 12 100 000
Opening Provision balance	R 50 000 000	R 52 500 000
Closing Provision balance	R 52 500 000	R 57 225 000
Write offs	R 32 300 000	R 36 499 000
Additional Provisions / overlays		R 10 000 000
Total Capital Required	R 235 000 000	R 310 000 000

- i. a) Define and calculate the following measures for this product: interest margin percentage, bad debt charge percentage, profits per annum and return on equity (ROE) for each financial year.
 b) Briefly describe the information value of each of these measures.

[6]

Part (a) was generally well answered, with most candidates able to define the ratios. A number of candidates made errors in the calculation of the ratios using the information provided. Most candidates failed to answer Part (b) of this question.

- Interest rate margin = {Interest income – Cost of funding} / average debit balances.
- Bad debt charge percentage = {provision @ end of year – provision @ start of year + write-offs + additional provisions} / average debit balances
- Profits = Net interest income + Fees income – Bad debt charge – Total costs (Service Level Agreement Charges and direct costs)
- ROE = Total profits / Total capital required

Calculated Results	2014	2015
Bad Debt Charge %	4.6%	6.2%
Interest Margin %	13.3%	11.1%
Profit	229 700 000	149 676 000
ROE	97.7%	48.3%

- The interest rate margin ratio shows the NII margin and allows one to see if there is any contraction / increase in this ratio which will talk to changes in either the funding costs / interest rate pricing of the book.
- The bad debt charge percentage shows the change in bad debts for the year, allowing the bank to understand how the credit risk of the portfolio has changed.
- Profit is a key metric in performance management of the book and understanding yearly financials overall.
- Return on Equity allows one to view the return of this book, compared to the capital employed, relative to other books across the bank and allows one to give a risk adjusted comparison of the books profitability.

- ii. Discuss and explain the main contributing factors to the changes in profitability and ROE.

[15]

Most candidates were able to provide a number of different points, however, candidates could have scored more marks by providing more depth in the discussion. In order to have scored well on this part of the question, candidates were required to provide a wide range of ideas (covering each key metric), as there were limits imposed on the number of marks available per metric (for example costs were limited to 1.5 marks).

- *Candidates failed to identify that bad debt provisions were largely stable, and the main reason for the change was due to the overlay.*
- *The discussion on capital was generally inadequate.*
- *The discussion on NII and Cost of Funding was generally inadequate.*
- *Fee income and costs were generally discussed in sufficient detail.*

There are several ratios that could be calculated to understand what has changed and there are many points available to candidates to discuss here.

- Firstly it is worth understanding whether or not the income statement and financials supplied reflect just the portion of the book under review (i.e. customers earning less than R150k p.a.) or are they for the entire transactional banking book. If the financials relate to the entire book, one needs to determine the percentage of the book (or the individual financials) for the portion in question so that a relevant review can be performed. The details of the FTP process should then be provided to conduct an appropriate analysis.
- The profits have dropped overall. This is both in rand terms, as a percentage of total average balances drawn down, as well as per customer. This is as a result of many potential factors which have been discussed in more detail below:
- NII as a percentage has decreased in total as calculated above as a result of two things:
 - Firstly the average interest earned dropped from 19.3% to 17.7% which could result from:
 - Given that prime lending rate has increased over this period, this results is not intuitive. Prime increased from 8.5% to 10.25%
 - Generally lower risk customers making use of their facilities (assuming they are priced more favourably)
 - The book may have been re-priced during the year (as a result of more competition in the market, or a change in strategy to grow limits), resulting in the lower interest earned
 - It is possible there have been court pronouncements made impacting fee maximums which could have led to the reductions seen in both of these income statements lines
 - There may have been a change in mandates given to staff allowing concessions on pricing (manual rate reductions / overrides), or there may have been more of these adjustments over the recent year than in the past, that may have led to average interest rates decreasing (may even be as a result of an operational gap).
 - Secondly the cost of funding increased from 6% to 6.7% which could be as a result of the following:
 - The bank may have been recently been required to re-finance some of the larger wholesale funding they have in the market place (at higher rates as a result of for instance the dislocation of the funding market in December 2015)
 - The bank may have decided to alter its funding strategy (or model) to target more stable long term funding (in lieu of NSFR introduced under Basel III) which may be more costly than the funding used

- during 2014 (possibly short term funding as well as lower levels of liquid asset cost)
 - Competition for deposits (especially Retail deposits) may have increased, forcing the bank to offer more competitive rates across several product ranges
 - There may be general pressure (increases) on the liquidity premium and Treasury running costs which have been passed onto the business / product line following the dislocation of the market in early December 2015
 - It is possible that the underlying FTP rates for this product specifically were amended (as a result of modeling updates / enhancements)
 - The prime lending have increased over the period, which translates directly into an increase in funding costs
- The bad debt charge has increased from 4.6% to 6.2%:
 - This is actually not necessarily as concerning as would be thought at first glance since this increase in the bad debt charge is largely due to the overlay of R10m that was raised during the financial year.
 - Ignoring the overlay the bad debt charge increased from 4.6% to 5% (which perhaps demonstrates the book is seeing a little performance strain, but it depends on how this movement compares to what was expected within the financials). If this change was out of line with expectations then this may be a concern that requires some further actions (scorecard adjustments)
 - Write-offs as a percentage of the book are reasonably flat and the coverage ratios (ignoring the overlay) were basically flat year on year (looking at the year-end provisions versus average balances).
 - However it would be good to understand the reason for creating the overlay (is it due to large limit growth during the year with a view that the bank will experience more bad debts in the coming year, or is it due to the bank having concerns around the accuracy / validity of their current provisioning methodology).
- The fee income has decreased:
 - This is both in total rand terms, as well as per customer (or account). All else being equal this would not be expected as with a growing number of accounts, increased limits and balances one would probably expect the fees to at least remain flat (if not increase slightly).
 - Debit order processing costs and ATM costs increased well above inflation, which leads one to believe that the utilization of the banks products has increased (yet fee income decreased).
 - So the fee income has reduced per customer due to:
 - Customers banking smarter – moving to bundles when they have high transaction usage and moving away from bundles when they have low utilization
 - This could also be a deliberate strategy of the bank to move customers onto the correct product (client retention)
 - The bank may have decreased some of its pricing either for individual transactions or bundles (due to competition)
- Total costs have increased:

- Internally allocated costs as well as the direct costs (albeit a small value) all increased above inflation (in some instances well in excess of inflation). Specifically ATM and Debit Order processing costs increased significantly year on year.
 - This could be either due to increased customer utilization (typically a good thing if usage is priced correctly), but could also be due to inefficiencies and perhaps misallocation of the internally allocated costs to this product (either model used was amended or was incorrect).
 - There were also large increases in limits during the year, and the costs of these sales would have resulted in some costs to generate the sales. Again not a bad thing provided the increased numbers of customers and limits offered are ultimately utilized.
- The total capital required to be held by the bank has increased fairly significantly over the prior year. Capital as a percentage of average balances increased from 31% to 38%, however as a percentage of limits the capital has remained flat at 13.8%. This shows that some of the underlying model inputs or the model itself must have changed as the Credit Conversion Factors is unlikely to be 100%)
 - The following are possible reasons for the changes in the total capital required:
 - Any one (or more) of the contributors to the products overall capital requirements may have increased (credit / market / operational capital risk), but individual reasons for increases in any of the above are possible as a result of:
 - Credit Risk:
 - The underlying capital models could have been adjusted (for instance to a different approach e.g. Advanced from standardized approach) as the relative capital increase in one year was quite large
 - However, if there was a change made to the model approach, and this caused the capital requirements of this specific product to increase, then presumable this approach was only adopted as it was a new regulatory requirement or it reduced capital for the bank overall
 - There are several parameters that are estimated for the capital models in use (PD / LGD / EAD / CCF) for retail products and it is possible that in the most recent calibration of these parameters that they moved in a direction that caused the credit risk capital to increase
 - Operational Risk:
 - The operational risk model in use may have been amended / updated during the year (for instance moving to AMA)
 - There may have been an operational loss / risk identified that was previously not accounted for within the operational risk framework. Now that this has been included there is an additional capital requirement that has been created.
 - Market Risk:
 - There are multiple risks encompassed within the market risk framework (liquidity / interest rate / currency / volatility / equity price), any adjustments to the underlying models or assumptions used within these models (or stress tests thereof) could have resulted in the need for larger amounts of market risk capital

- The approach to managing interest rate risk in the banking book may have changed resulting in a higher capital allocation.

iii. Discuss ways in which this financial situation can be improved in the coming financial year.

[9]

Better candidates read that the question asked for ways in which the financial situation can be improved in the current year. Some candidates gave answers which would be much longer term in nature. Again, in order to have scored well on this part of the question, candidates were required to provide a wide range of ideas (covering each key metric), as there were limits imposed on the number of marks available per metric. Manipulating provisions did not receive any marks.

There are several points that could be raised here as there are many reasons for the reduced profits and ROE's.

- One of the first considerations would be to understand what constitutes an “improved financial situation”, i.e. does the bank wish to improve specific metrics (ROA, ROE) or is it looking to merely increase profits in rand terms, or a combination thereof.
- Possible actions to generally improve profitability (depending on the actual reasons mentioned above some or all of these actions are possible responses to turn things around):
 - Certainly an option is to increase the pricing (either fees for bundles, per transaction [especially for the transactions that are more costly for the bank to process e.g. branch transactions] and possibly to increase the interest rates charged on debit balances.
 - Whether this is possible is always hard to determine without more details especially market pricing and competition. The market conditions may not allow the bank to increase pricing too significantly (the bank would need to compare their pricing with that of their peers for similar products)
 - However certainly trying to drive customers to make use of more cost effective channels is something the bank should seriously consider (as this will result in cost reduction without necessarily costing the client more). So increasing pricing on high cost channels or transactions is a good starting point
 - To reduce funding costs:
 - This could be achieved by looking to switch more to retail deposits as opposed to commercial and wholesale deposits (as these are generally more expensive), however it may require the bank to offer even more favourable rates on retail deposit accounts
 - A full analysis of the bank's current funding model should be performed to ensure it is as efficient as possible (so it is as closely matched “as required” to meet Basel III requirements, plus afford the bank a buffer, as well as matches the behavioural tenure of the transactional product in question).

- The bank (or product line) should look to reduce costs in general:
 - This could be achieved by improving automation, efficiencies, reducing staff numbers where there is excess capacity (although staff reductions are tricky for many reasons)
 - As a product line itself the internally allocated charges (the products “share” of central costs) should be closely reviewed to ensure it is equitable and fair (to ensure that as a product line costs are not being spread unfairly between them)

- Look to encourage more limit utilization (as the percentage utilized dropped significantly year on year – probably due to new account growth or limit increases). If this can be achieved then more interest in rand terms will be earned, and possibly any fees linked to limit utilization which will assist to at least grow one of the income lines
- Reducing the bad debt charge is something always worth reviewing, however since the increase in this charge is largely due to the overlay raised it is probably most important to understand why it was raised, and if there is any reason to believe it could be worse (or too large) for losses in the coming year. So risk cuts are an option for new sales (and for limit reduction strategies) – but if the risk has been sufficiently priced for then adjusting this will not add much margin specifically

- It would be worth reviewing the model used to allocate capital (credit / operational / market risk) to this specific product to ensure the allocation makes sense. While this does not improve profits or ROE for the entire bank, it may give a more realistic view of the relative profitability of the product itself.

- Possible actions to improve / reduce the total capital required once again really do depend on the reasons for the increase, however there are mitigating actions that could be taken to assist in reducing the requirements:
 - Credit Risk Capital:
 - Decreasing unutilized limits would assist in reducing the total capital requirement
 - Reviewing the credit parameters to ensure that the models used to estimate them are as accurate as possible / as efficient as possible to ensure there is no additional capital being held unnecessarily (this is a good exercise that should be performed regularly in any event)

 - Operational Risk Capital:
 - During the next financial year look to implement more operation risk mitigants (e.g. KRI's / KPI's) to allow the bank to reduce the operational risk capital currently held in place, or move to the AMA approach (if the bank is not already using this approach) as there should be an opportunity to save on some of the capital held
 - The bank can also review the current risk events (size, frequency, probability of occurrence) that are being used within the Operational Capital model to ensure these are still relevant and are not overly conservative to ensure unnecessarily large levels of capital are being held for this specific risk element.

- Market Risk Capital:
 - Potentially the bank could hedge out some of its market risk that has contributed to total capital requirements (for instance by adjusting its funding model, making use of financial instruments e.g. swaps). It could also improve its monitoring of all the factors affecting its market risk (valuation fluctuations for instance) in order to reduce its downside exposure to some of the potential risks, and as such may be able to hold reduced levels of capital for these risks

[Total 30]

QUESTION 3

This question was the most difficult question in the exam, as it required candidates to understand counterparty credit risk, as well as provide answers in the context of the Bank's rates business.

The following definitions, with reference to counterparty credit risk exposure in the trading book, are provided from the Bank for International Settlement document *International Convergence of Capital Measurement and Capital Standards* (2006):

Expected Exposure is the mean (average) of the distribution of exposures at any particular future date before the longest-maturity transaction in the netting set matures. An expected exposure value is typically generated for many future dates up until the longest maturity date of transactions in the netting set.

The Peak Exposure is a high percentile (typically 95% or 99%) of the distribution of exposures at any particular future date before the maturity date of the longest transaction in the netting set. A peak exposure value is typically generated for many future dates up until the longest maturity date of transactions in the netting set.

Consider a netting set containing the following derivative instrument:

Interest rate swap

- Pay floating receive fixed
- R1bn nominal
- Effective date 31 January 2016
- Termination date 31 January 2021

- i. Explain the Expected Exposure and Peak Exposure of this netting set in an increasing yield curve environment as well as an inverting yield environment.

[8]

Most candidates were able to demonstrate that they understood the cashflows under the swap under the two different yield curve environments, however most struggled to extend this to the value of the swap over time, as well as the peak and expected exposure metrics.

- This interest rate swap exchanges a fixed interest rate for a floating interest rate over the term of the contract
- The present value of the two cash streams are equal at issue date and the contract will have a nil value at issue.
- The answer describes a situation before the consideration of margining.
- In a normal upward sloping yield curve environment, forward rates are expected to increase. As a result the fixed rate received under this contract is expected to exceed short term rates and be lower than long term forward rates.
- Under this contract in the upward sloping yield curve environment the bank pays floating (initially the lower amount) and receives fixed (initially the higher amount)
- While the present value of both the fixed and the floating leg will reduce over the term of the trade, the present value of the floating leg will increase in comparison to the present value of the fixed leg initially and reverse once the floating rates start to exceed the fixed rates.
- As a result the bank will become increasingly out of the money on this trade until roughly half way through the trade when the value will start to increase back to zero.
- Under an inverted yield curve scenario the situation is reversed. As the rates of inversion tend to be more severe for short durations after which yield curves tend to flatten out.
- As the bank pays floating it will initially pay more than it receives and the swap will therefore increase in value but the turning point back to zero is expected to be at a shorter duration than for the upward yield curve scenario.
- The Peak Exposure is a high percentile of the distribution of exposures over a range of potential yield curve scenarios to a specific counterparty to which the netting set refers.
- The exposure under consideration is out of the money most of the time because yield curves are upward sloping in most scenarios. This indicates that credit exposure to the counterparty is zero most of the time.
- The Peak exposure will therefore be closely aligned to the inverted yield curve scenario described above as an extreme case where the bank will be in the money for this trade

You are the actuary working on a credit portfolio desk at a large Pan-African bank. One of the senior managers has approached you regarding the profitability of the rates business in light of the regulatory changes implemented under Basel III. She has asked you for an assessment of the impact and the mitigating actions you would propose to manage the sustainability of the business going forward.

- ii. Discuss the points you would make to her under the following headings:

- (a) Capital supply
- (b) Capital demand
- (c) Leverage
- (d) Liquidity

This part of the question was generally poorly answered. Most candidates provided generic answers, not specific to the Rates business. Candidates failed to provide a sufficient number of points under the 4 different categories. In particular,

- *Candidates did not provide a sufficient range of points under Capital Supply and Capital Demand.*
- *No candidates provided any points on Market Risk.*
- *Most candidates were able to describe Leverage well.*
- *Candidates generally failed to discuss Liquidity beyond describing LCR and NSFR.*

These changes have cost implications which vary by line of business, the regulatory approvals provided to the bank, jurisdiction and counterparty. The impact on the rates business is highlighted where relevant.

Capital supply

- On 1 January 2013, Basel III came into effect in South Africa.
- The capital supply requirements are currently subject to transitional arrangements.
- Fully loaded capital requirements will be effective 1 January 2019.
- The capital adequacy requirements will increase in volume and cost as a result of:
 - a new minimum common equity tier of 4.5% of RWA
 - plus a capital conservation buffer of 2.5% of RWA
 - plus a countercyclical buffer of between 0% and 2.5% of RWA (currently 0%)
 - plus a buffer for domestic systemically important banks which will vary from bank to bank
- The Board will consider the minimum capital requirements and set appropriate capital targets in line with risk appetite.
- New requirements have also been introduced for Tier 1 and Tier 2 eligible capital instruments
 - Over and above equity, Tier 1 instruments are replaced with new style Additional Tier 1 instruments. The cost of these instruments have increased substantially from the previous preference shares that were permissible under Basel II.
 - New style Tier 2 instruments replace the existing sub debt instruments.
- The new style capital instruments are particularly problematic as they require intervention (potential conversion or write off of the instrument) at a Point of Non

Viability. This point is subject to regulatory discretion which is still unclear to the market resulting in higher pricing than under Basel II

- The cost of these instruments have increased considerably especially after the curatorship of African Bank.
- These new capital requirements will impact all businesses, including the rates business. The increased cost is allocated to business based on their capital demand.
- Basel III has not been rolled out in other jurisdiction across the African Continent yet. Rates business conducted in country are subject to the standardised approaches effective in each jurisdiction.

The mitigation of the new capital requirements for rates business will be driven by the manner in which capital demand is managed. This is discussed below

Capital Demand

- Only some credit risk requirements have changed under Basel III
- The standardised requirements of the BASEL II text as well as the advanced approaches to calculate probability of default and loss given default remains the same.
- However, two regulatory dispensations will exist to assess the counterparty credit risk exposure going forward:
 - 1) A Standardised approach to replace the current exposure method and standardised approach
 - 2) An Internal Model Method.

Credit was also given if candidates referred to the non-internal model method under point 1 above

- In addition BASEL III introduced the requirement for a credit value adjustment (CVA) capital requirement to allow for rate migration implication on capital.
- This arises due to the difference in accounting treatment in the trading book. Daily marks to market can lead to significant changes in capital requirements long before a jump to default of the counterparty.
- In order to mitigate the impact of CVA it is key to enhance credit risk mitigation,
 - through netting discussed below,
 - reduced exposure to poorer quality credit where netting is not possible or
 - alternatively reducing the exposure to such counterparties in the portfolio.
 - Shortening the term of the trades should also be considered.

- Under both the standardised method and the internal model method approaches, the importance of netting will remain key to reduce exposure. Further netting opportunities will be available under the standardised methods.
- For all in the money netting sets, the existence of credit support annexures in the ISDA agreements will ensure margining can occur, thus reducing the exposure significantly.
- Netting is more difficult for some clients. Where clients can execute daily margin calls an opportunity will exist to reduce exposure.
- In all instances, the business should consider reducing the number of trades with the client.
- The current exposure method gross exposure up in line with the number of trades. By simply consolidating trades into one trade, the exposure can therefore be reduced.
- Additional capital requirements are also introduced for wrong-way risk exposures. In particular the netting benefits highlighted above are not allowed in such instances.
- Wrong-way risk arises where the exposure is directly correlated to the probability of default of the counterparty.
- For the rates business such exposures should be limited but all exposures should be tested prior to trade for wrong-way risk.
- Additional capital requirements were also introduced for exposure to financial counterparties, implemented as an increase in the asset value correlation (AVC) by a factor of 1.25.
- As many of the rates business counterparties are financial companies, the business will be impacted in this regard.
- Rates business which is long term in nature will now have an increased capital requirement once the day one profit and loss has been recognised. The business should consider limiting the capacity on long term trades as a result to a certain proportion of the portfolio to limit significant capital drag on future business performance.
- The cost of such capital and appropriate pricing thereof has been discussed as KVA by some market commentators. (referring to the K factor in the Basel formula)
- Trades conducted through an exchange instead of over the counter (OTC) will also incur reduced capital demand requirements.
- An alternative mitigation is therefore to encourage clients to trade exchange traded products. The scope of application will be limited given current market capacity.
- Further benefits are possible when the bank receives approval for the internal model method, this needs to be balanced with the cost of maintaining such an approach.
- If internal mitigation is not possible business will be compelled to reconsider its pricing or alternatively its viability.

Market Risk

- BASEL III introduced a stressed Value at Risk measure.

- This is effective prior to the fundamental review of the trading book.
- The stressed VAR is in effect a double charge of VAR using a stressed period over and above the current VAR calculation.
- In order to mitigate the risk, the desk needs to limit its VAR exposure to acceptable limit. [½]

Leverage

- The leverage measure evaluates the Tier 1 capital of the bank compared to the on balance sheet exposure. This exposure includes the exposure for derivative instruments as calculated under the current exposure method.
- This ratio must exceed 4%.
- In order to manage the leverage exposure, the same mitigating actions as listed in the management of credit risk should therefore be pursued.
- Exposure is the key metric here. All methods that reduce exposure are key and as such the impact will be different to credit risk mitigating actions.

Liquidity

Over and above the requirement for liquid asset reserves, Basel III introduced the

- 1) Liquidity coverage ratio
 - 2) Net stable funding ratio
- Under the first requirement banks are required to hold sufficient high quality liquid assets (HQLA) to meet cash outflows over a thirty day period. The outflows are calibrated in the regulations.
 - Under the second requirement banks are required to hold sufficient levels of available stable funding to cover required stable funding requirements. These requirements are linked to the tenor of assets and liabilities to ensure closer asset liability matching by term.
 - For rates business the on balance sheet exposure of the portfolio is therefore important.
 - On balance sheet netting is required to reduce exposure. To the extent that netting is not possible the following should be considered:
 - In the money portfolio exposures (assets) will need to be funded. As these exposures will be funded with overnight money, this will increase the HQLA. The cost of these HQLA will need to be incorporated in all trades where on balance sheet netting is not available for the duration of the in the money position.
 - Out of the money portfolio exposures (liabilities) are a source of funding. In such instances the term of the funding will be longer than overnight money and therefore demand a premium. These lines of business will provide a benefit to the management of liquidity.
 - These exposures are subject to the collateral agreement. For bank exposures it is likely that exposures will be closed through margin calls while some less sophisticated counterparties will be impacted as outlined above.

- The business can critically evaluate its portfolio and optimise for the different liquidity costs outlined above. *Any rates* examples ½ mark per point

[Total 34]

QUESTION 4

Overall, this question was relatively well answered, with most candidates demonstrating some knowledge of operational risk in the context of a bank.

A large South African bank is considering moving from the Basic Indicator Approach to the Advanced Measurement Approach for the calculation of Operational Risk Capital (under Basel II). It currently offers a wide range of lending products, however, its primary exposure is to Retail Mortgages, Credit Cards and Vehicle Finance. The Bank currently only operates in South Africa.

- Explain the 3 approaches for calculating Operational Risk capital under Basel II.

[9]

Bookwork. Most candidates did not provide a sufficient number of points under each approach, or comment on which approach is likely to be most appropriate to the bank in question.

- There are 3 main approaches for calculating Operational Risk capital under Basel II requirements:
 - The basic indicator approach (BIA);
 - The standardized approach (TSA); and
 - The advanced measurement approach (AMA).

Basic Indicator Approach

- Most simplistic of the three approaches, and does not require the Bank to have its own internal models for Operational Risk.
- The BIA has been recommended for banks without significant international operations.
- This approach would therefore currently be recommended for this Bank. However it may wish to consider more advanced approaches as it may consider expanding across borders in future.
- This sets the operational risk capital equal to the bank's average annual gross income over the last three years multiplied by 0.15.
- Figures for any year in which annual gross income is negative or zero should be excluded from both the numerator and denominator when calculating the average.
- This method requires more limited investment in systems and controls which would not be supported by the SARB for a large bank such as this one.

The Standardised Approach

- More advanced than BIA, but less advanced than AMA.
- Under the Standardised Approach, banks' activities are divided into eight business lines: corporate finance, trading & sales, retail banking, commercial banking, payment & settlement, agency services, asset management, and retail brokerage.
- Within each business line, gross income is a broad indicator that serves as a proxy for the scale of business operations and thus the likely scale of operational risk exposure within each of these business lines.
- The capital charge for each business line is calculated by multiplying gross income by a factor (denoted beta) assigned to that business line.
- Beta serves as a proxy for the industry-wide relationship between the operational risk loss experience for a given business line and the aggregate level of gross income for that business line.
- The total capital charge is calculated as the three-year average of the simple summation of the regulatory capital charges across each of the business lines in each year.
- In any given year, negative capital charges (resulting from negative gross income) in any business line may offset positive capital charges in other business lines without limit.
- In order to qualify for use of the standardised approach, a bank must satisfy its regulator that, at a minimum:
 - Its board of directors and senior management, as appropriate, are actively involved in the oversight of the operational risk management framework;
 - It has an operational risk management system that is conceptually sound and is implemented with integrity; and
 - It has sufficient resources in the use of the approach in the major business lines as well as the control and audit areas.

The Advanced Measurement Approach

- Most advanced of the three approaches, and requires the Bank to have its own internal models for frequency and severity of operational risk losses
- Banks can use this approach only subject to approval from their local regulators. Once a bank has been approved to adopt AMA, it cannot revert to a simpler approach without supervisory approval.
- Capital results are dependent on the actual riskiness of the exposures underlying them, as opposed to being based on standardized risk weights.
- To use the "IRB" approach, a bank must:
 - Its board of directors and senior management, as appropriate, are actively involved in the oversight of the operational risk management framework;
 - It has an operational risk management system that is conceptually sound and is implemented with integrity; and
 - It has sufficient resources in the use of the approach in the major business lines as well as the control and audit areas.

The Bank's CFO has indicated that she is concerned that moving to a more advanced approach could be difficult for the Bank to achieve, and has asked you to provide her with more information on the potential implications of the change to the Bank. She has specifically requested a brief report discussing the main advantages and disadvantages of moving from the Basic Indicator Approach to the Advanced Measurement Approach.

ii. Discuss the points you would make in your report.

[12]

Candidates were generally able to provide advantages and disadvantages, but failed to generate a sufficient number of points to score full marks. Candidates could have scored well on this part by ensuring that a breadth of ideas.

ii. Advantages:

- There is a potential reduction in capital for Banks under the AMA approach.
- The reasons is that the internal estimates are supposed to be a more accurate reflection of the Bank's Operational Risk, and therefore lower than the more prudent standardized Risk Weights. Therefore, the Rand value of required capital may decrease.
- This approach allows the Bank to allocate appropriate amounts of capital to business units. This allocation will be a more accurate reflection of the riskiness of the different business units, and therefore reward / penalize good / bad behaviours. This is in contrast to SA where the capital allocation is only dependent on the business line and specified risk weights.
- The Bank can use the results of the AMA models to make strategic decisions on portfolio growth and direction.
- For example, the Bank may find that certain portfolios are capital consumers, whilst others contribute relatively little to the Bank's overall capital requirement. As a result, the Bank may wish to write more business which does not require significant amounts of capital. Conversely, the Bank may wish to reduce its exposure to portfolios which consume large amounts of capital without commensurate returns.
- The model parameters (frequency and severity) also give the Bank insight into the effectiveness of its risk management and control processes.
- Banks which have good controls and risk management procedures in place, will generally have low loss frequencies. Similarly, where the Bank has put in place procedures to limit losses, or identify them quickly, loss severities will be relatively lower.
- By producing internal estimates of frequency and severity, the Bank is able to take corrective actions faster than under the BIA approach.
- Under AMA, the Bank is required to monitor and validate its model, and hence will be more aware of operational risk deterioration. Capital will also automatically take account of any deterioration in the riskiness the underlying businesses. Under the BIA, the Bank's capital does not change as the underlying riskiness of the businesses changes.

- Banks intending to use the AMA approach require approval from their local regulator, the SARB in this case. Obtaining this approval is a sign that the Bank has invested in managing its operational risks more accurately, and hence obtaining a more realistic estimate of their capital. Furthermore, this sends positive messages to market analysts and customers, which enhances confidence of investors in Banks that are under AMA.
- AMA rated banks are able to raise additional capital easier, and at more affordable rates. This is because AMA accredited banks are viewed as more sophisticated takers of risk, by credit agencies such as Moody's and S&P.
- In order to produce internal estimates of frequency and severity, the Bank will be required to invest in their systems and processes (data and risk), which means that the Bank will have place a better risk governance framework, reducing overall risk to the organization arising as a result of operational risks.

Disadvantages

- The Bank will need to develop its own estimates of frequency and severity, which requires investment in people, systems and data. Obtaining AMA accreditation is therefore an expensive and time consuming exercise, often requiring significant expenditure in data and specialist skills (operational risk modelers, consultants, validators etc.).
- Under the BIA and TSA, the bank is only required to be able to produce the estimates of gross income under the relevant business lines, and apply the standardized factors.
- As the Bank will obtain a more accurate reflection of its underlying operational risk, it may be the case that there is an increase in the capital required.
- For some business lines, the Bank's own experience may be significantly worse than that implied by the BIA or TSA. In addition, the Bank would have invested significant resources in obtaining AMA accreditation resulting in increased capital cost in addition to the investment made.
- Furthermore, a Bank is not able to choose whether some business units remain on BIA or TSA, and whether others move to AMA. Once AMA is sought, the Bank needs to be able to produce internal estimates of capital for each of its business units.
- AMA accreditation requires significant additional documentation – both in terms of models and processes.
- In order to remain AMA accredited, the Bank is required to perform annual validation of its models and estimates. This process is expensive and time consuming, often requiring the establishment to set up a separate model validation unit, or relying on the use of external consultants.
- Even after significant investment in the development of models, systems and processes, their Models may not be approved. Banks seeking AMA accreditation often do so over a number of years, and hence there is a risk that the benefits associated with AMA accreditation may not be realized (or realized as soon as expected).
- The SARB also caps the level of difference between the AMA and BIA.
- The Bank may not have sufficient data available to develop accurate model estimates.

- AMA accreditation requires the Bank to make use of internal loss data. This is an onerous requirement and many Banks have been unable to meet this requirement due to system and process changes.
- In addition, operational risk events are relatively rare, and hence many banks rely on external loss data (which may be expensive to obtain).

The Bank's Operational Risk Management department has not traditionally modelled operational risk. The department have approached an external consultancy to understand the potential modelling options.

- iii. Explain the common methodologies for calculating the frequency and severity of the operational risk loss model.

[4]

This part of the question was generally well answered, with most candidates recognising the need to determine a frequency and severity of the events, and combining these.

- Given that data sufficiency is a major challenge for the industry, annual loss distribution cannot be built directly using annual loss figures. Instead, a bank will develop a frequency distribution that describes the number of loss events in a given year, and a severity distribution that describes the loss amount of a single loss event.

The frequency and severity distributions are assumed to be independent. The convolution of these two distributions then give rise to the (annual) loss distribution.

Frequency Distribution:

- The frequency distribution aims to capture the number of operational risk events that are expected to occur in a fixed time horizon, usually one year.
- One common methodology for estimating the frequency is to develop a Poisson distribution (which assumes the inter arrival times between loss events are exponentially distributed) which aims to count the cumulative number of events that occur.
- Similarly, the Bank may also make use of a Negative Binomial model to count loss events where the mean and variance of the number of loss events per time period are not the same.
- The model parameters will need to be estimated, using a combination of internal and external loss data or expert judgement based on expected return periods.

Severity Distribution:

- The severity distribution aims to measure the ultimate losses on operational risk events.
- The severity estimate is usually a positively skewed distribution such as a LogNormal, Weibull or Gamma distribution.
- For extreme losses above a certain threshold, losses converge to the Pareto distribution.
- The majority of operational risk loss events will occur within a middle range of the distribution, but since capital is required to be set at the tail of the distribution, the Bank may choose to use a spline to obtain a fatter tail for the distribution.

- Loss data at the tail of the distribution will be rare, and the Bank is likely to be required to substitute their internal loss data with external data.
- The bank may also consider applying expert judgement to estimate the tail losses.

[Total 25]

[GRAND TOTAL 100]