

Actuarial Society of South Africa

28 October 2015

**Subject F206 – Banking
Fellowship Applications**

MARKING SCHEDULE

Note:

The Banking Fellowship Application is new to the Actuarial Society of South Africa. As a result, more detail has been provided in this marking schedule to support future candidates. However, this marking schedule provides more detail than required to achieve a pass.

Candidates were not sufficiently prepared for the paper. Many answers provided were not to the question asked. Some candidates ran out of time.

Question 1:

You are the Head of Retail Credit at a prominent bank in South Africa. Your portfolio includes Credit Cards, Overdrafts, Home Loans and Personal Loans for all retail customers. One of the responsibilities of your team is to review the provisioning results obtained from the centralized area that calculates the provisioning requirements monthly.

- i. Explain why a bank should raise credit provisions, why it is important to determine the value of credit provisions accurately and what types of credit provisions exist.

This question was well answered. Some candidates spent too much time providing commentary on what the requirements under IFRS9 would be. Better candidates provided an analysis of what over or under provisioning would result in.

- Provisions are calculated or raised for anticipated bad debts or losses on banking products. Provisions allow a bank to correctly allocate profits in the appropriate reporting periods by making an allowance for bad debts that may (or may not) have emerged during the reporting period in question.
- Provisions impact your capital requirements as they can be used to offset the expected loss portion of the capital requirements to some extent.
- If the incorrect provisions are calculated a bank may report:
 - Higher losses (for bad debts) than they should within a reporting period and could as a result show lower profits than they should. This could have several negative repercussions including lower share prices, incorrect risk decisions being made on risk appetite for a specific product and the incorrect pricing thereof.
 - Lower losses (for bad debts) than they should within a reporting period (or several periods) and could as a result show higher profits than they should. This may result in over distribution of profits over time (as a result of under-providing) and inevitably when the losses have to be realised several years down the line the bank could be in serious financial trouble (and in extreme cases may even run into solvency issues).
- Provision coverage ratios on the book are often compared to those of competitors by analysts and shareholders. If they differ significantly (either up or down) there needs to be good justification for this otherwise both parties may have serious concerns around the running and performance of the bank.
- Typically for Retail provisioning the principles of IAS39 are used for determining the provisioning methodology and types of provisions that are in place. Typically there needs to be some objective evidence of impairment for full provisions to be raised on a specific sub segment of the portfolio. Different types of provisions typically found within the industry are as follows:

- IBNR (General or Book provision): Provisions typically raised on the book that is not yet in default or arrears
 - Portfolio provisions: Provisions raised on the book that is in arrears (objective evidence of impairment can be shown)
 - Interest in suspense (ISP): These are provisions raised for interest charged to an account where the account is in default (so the expectation is that there is little chance of receiving this interest down the line).
 - Specific Provisions: These are provisions raised for accounts that are in NPL / default.
 - The provisions typically get larger as a percentage of the outstanding balance as the account falls further into arrears.
- Overlays are an additional provision that can be raised in times when:
 - The banks bad debt performance is better than expected (for instance if the bank is in a particularly good point in the economic cycle the bank may wish to provide now for when the bad debt experience returns to normal expectations)
 - There is an anticipation of weaker bad debt experience in an upcoming period (due to economic / legislative changes that are expected to impact the future ability of customers to repay debt).
 - The extent to which a bank has the ability to do this will depend greatly on the accounting principles being used for determining provisions.
- ii. Over the last quarter you have noticed that the provisions held for the Retail Credit Card and Overdrafts portfolios have increased significantly in rand terms (please see the table below for recent financial information on the retail portfolios). Explain how you would evaluate and compare these results. Include details how you would establish possible causes for the results in your answer.

2015 Quarter 1 Account Information (Rm)

Product	Provision	Outstanding Balance	Total Credit Facilities
Credit Card	510	8 500	28 333
Personal Loans	700	7 000	
Home Loans	4 500	150 000	
Overdrafts	315	4 500	12 857

2015 Quarter 2 Account Information (Rm)

Product	Provision	Outstanding Balance	Total Credit Facilities
Credit Card	666	10 235	30 104
Personal Loans	728	7 210	
Home Loans	4 790	154 500	
Overdrafts	442	5 529	13 821

This question was very poorly answered. Candidates failed to construct a table of summary ratios by product, which meant that their answers were generally unstructured and failed to cover all the points. Candidates also failed to comment on the fact that the increase in provisions are very large in

light of the short period that has passed since the previous calculation (one quarter). Better candidates considered the state of the economy and that unsecured products react faster. Some went on to comment on Home Loans and Personal Loans products.

- The table below is a set of ratios that is worth calculating in order to better understand some of the movements and trends seen in the financials.

Product	Provision Coverage Ratio: Q1	Facility Utilization: Q1	Book Growth Over Quarter	Provisions Growth Over Quarter
Credit Card	6.0%	30%	20.4%	34.5%
Personal Loans	10.0%		3.0%	4.0%
Home Loans	3.0%		3.0%	6.4%
Overdrafts	7.0%	35%	22.9%	40.4%

Product	Provision Coverage Ratio: Q2	Facility Utilization: Q2
Credit Card	6.7%	34%
Personal Loans	10.1%	
Home Loans	3.1%	
Overdrafts	8.0%	40%

[1 mark for ratios or some direct links made to ratio movements]

- The period over which this large change has occurred is particularly short (3 months) – which leads one to suspect this is a system error or as a result of a change in the provisioning methodology or assumptions used in the model.
- It would be worth checking the following to understand from a pure calculation point of view what caused the provisions to move in the different products:
 - How do the arrears / NPL's compare quarter on quarter (to see if these moved up or down)
 - Do these movements make sense with expectations / past experience
 - How do the coverage ratios compare quarter on quarter
 - Typically these should be consistent quarter on quarter unless underlying model assumptions (PD / LGD) have changed
- It would be worth discussing the results with the Heads of Credit of the different products as well as the Operational areas (for instance Collections) to see if they have any thoughts on the reasons for the increases and the reasons for the strange dichotomy of movements.
 - These colleagues will be able to give insights on the product and systems that should assist with either backing up the differences or assisting to find reasons for the numbers being incorrect.
- There could have been some system issues (so for instance payments not correctly allocated) that may cause the accounts to move into arrears despite clients actually making their payments. It could also be purely a data error (depending on how the bank systems work one could make use of the provisions movements for other products sitting on the same systems to see if similar increases for specific products are seen).
- It would be worth requesting the provisioning team to double check the numbers and assumptions used in case there was merely a numerical error.

- The Card and Overdrafts portfolios could have the following differences to the Home Loans and Personal Loans portfolios which may have caused the differing experience:
 - These portfolios may have been growing rapidly over the last year (and hence as the book ages so the arrears and hence provisions would increase) while Home Loans and Personal Loans may have been flat or shrinking in size.
 - This increase may be a seasonal occurrence (so it may have occurred in prior years).
 - However it is possibly unusual that only 2 out of the 4 retail type products would have differing seasonal trends as they relate to the same type of client base
 - It is also unusual that 2 of the 3 unsecured products moved negatively and not all 3
 - It is however noticeable that the 2 products that experienced the jump in provisions have facilities and hence undrawn exposures. So there is the possibility that there was a recent large draw down of these limits (which may be seasonal or could be a sign of other strains in the Retail market)
 - The Home Loans and Personal Loans portfolios may have tightened risk appetite, hence the books are growing less (or are decreasing in size) and as a result the arrears as a percentage of those portfolios may be higher but the provisions in rand terms are reasonably flat.
 - Likewise both the Card and Overdrafts portfolios may have deliberately written higher risk business and this business is now starting to fall into arrears.
 - Writing different risk levels in the different portfolios would also slowly result in different portfolio performance (arrears / bad debts wise – this could contribute towards the provisions movements in this instance but probably not explain them all over such a short period)
 - The bank may have changed PD / LGD assumptions for some of the products (up or down) and as a result this could have caused provisions to move in opposite directions (even if the arrears moved consistently between the products).

The Head of Credit for the Credit Card product suggests that the risk needs to be drastically reduced as a result of these increases in provisions on Credit Card product. He suggests cutting new facilities 25% by increasing the risk cut-off on the application scorecards and by reducing maximum facilities offered across all risk buckets.

- iii. Explain how you would validate his suggestion. Include different courses of action available to the bank in your answer.

Most candidates only focussed on increasing the cut off on the scorecard, and very few went on to analyse underlying causes of the increase in provisions which would not be addressed by a change in policy. Candidates also failed to provide meaningful examples of alternative courses of action.

- Firstly one would need to identify the exact reason for the increase in the provisions for this product. If there is a general deterioration in the Card performance then adjusting risk or pricing should be considered, otherwise if the increase is due to other reasons then cutting back on sales may be a hasty and unnecessary move.
- If it is due to the following reasons then there may not be a need to cut back on risk at application stage as the changes are not a sign of worsening risk (or experience):
 - Changes in assumptions used in the model (perhaps they were too light previously – it does not necessarily mean the limits written are bad / unprofitable)

- The format of the model or calculations used within the model could have been modified
- System issue (in which case once it is resolved the numbers will return to normal)
- Seasonal change (in which case the numbers will revert back to normal shortly)
- Data or calculation error
- The provision increase is due to special overlays created over the latest period
[½ mark each – 2 marks max]
- The Head of Credit should analyse the vintages for this book (or default rates) and validate if:
 - The defaults per risk / pricing bucket are within expectations (if so – perhaps no need to change risk cut offs)
 - It is possible that the default experience previously was lower than expectations (within scoring). So the new provision levels are actually at the correct level now that the book has matured to some extent
 - The limits written are still profitable (or at least achieving the required hurdle rate of return) per risk segment. If so – do not cut risk necessarily. If not – perhaps cut back on limits offered just in the pockets where the business is not as profitable as the business would like.
 - Increasing pricing to ensure they do achieve the required returns in those risk segments where bad debts are worse than expected is an alternative option as opposed to cutting risk, however one will need to consider the market / sales implications of doing so, as well as take into account any regulatory maximums (on fees or rates allowed)
 - Unilaterally reducing limits will not fix the situation necessarily as the product will be reducing the limits or exposure across both the good and bad risk segments and in fact may cause the product to lose out on some profitable business, so ideally the focus needs to be on limits that are not making enough return.
 - It is worth investigating the Collections area to see if there is anything that can be done operationally to improve the recoveries made. This could be done in place of cutting risk (and may highlight weaknesses in the current processes within this product or the systems used).
 - It would also be worth analysing the risk on the back book (for facilities already loaded) and working to reduce or remove undrawn facilities for higher risk and underpriced customers on the book.
 - The application scorecard must be checked to ensure the ranking (gini's) and actual experience versus expected is still accurate enough. If not, then risk cuts may be required in the interim until this can be improved (so a model recalibration or rebuild may be required).
- It is possible that the increases in arrears may be a sign of strain in the Retail space (so customers are struggling to repay their debts in general) – and the increases in arrears in 2 portfolios may be a lead indicator for all Retail products taking strain down the line. So it may be worthwhile obtaining industry comparisons to see if the bank and its results are out of line with the industry or if this is a sign of economic difficulty (and confirming the resulting hypothesis with the banks economics department).
- Ultimately once all these analyses have been completed, and analytical solutions and proposals have been drafted to respond to the changes in book performance, buy in will need to be obtained from either the CEO or the relevant EXCO's.

Question 2:

A multinational bank calculates the economic capital requirement for the following year with a probability of adequacy of 99.9% (1 in a 1000 likelihood of inadequate capital). The company has an internal control framework that allows it to identify and quantify the risks to which it is exposed.

- i. Discuss the following sources of risk and how these may be controlled:
 - a. Credit risk
 - b. Market risk
 - c. Operational risk

This is predominantly a bookwork question. Candidates did not cover the 3 types risks in sufficient depth. Candidates' responses to how to control the risks lacked breadth and depth, and most candidates failed to cover a sufficient number of points.

(a) Credit risk

Credit risk can be described as follows:

- Credit risk is simply the risk that, having extended a loan to another party, it is not repaid as agreed. Therefore, techniques can be examined that can be used to assess the probability that third parties default (i.e., fail to repay as well as the loss given default. These techniques can be applied to individual third parties (known as counterparties) or the industry within which they operate, or even the country within which they are based. This is because the likelihood of a counterparty defaulting is strongly correlated with the success of their industry, and the economic state of their home country.
- Concentration risk in credit portfolios arises through an uneven distribution of bank loans to individual issuers or counterparties (single-name concentration) or within industry sectors and geographical regions (sectorial concentration).
 - If a bank is overly dependent on a small number of counterparties – single-name concentration risk – then, if any of those counterparties default, the bank's revenues could drop by a significant amount.
 - Over-concentration at the country, sector or industry levels also holds risk for a bank – if, for example, the country in which it is overly concentrated suffers an economic downturn, then its revenues will again be adversely affected compared to competitors who are better diversified.
- Larger counterparties are credit-rated by firms known as ratings agencies: the higher the rating the better the credit risk – or to put it another way, the lower the likelihood of default. Smaller firms are not rated by an agency, and so lending institutions have to perform their own assessment of the likelihood of default. This is also true for retail customers.
- Another important consideration when assessing credit risk is the quality of any assets that have been used as collateral in the event of default. The higher the quality, the less concerned the lending institution is about default because the underlying security (perhaps the house of one of the borrowing company's directors) can be sold to recoup the loss.
- For most banks, loans are the largest and most obvious source of credit risk. However, other

sources of credit risk exist throughout the activities of a bank, including in the banking book and in the trading book, and both on and off the balance sheet.

- These sources include:
 - The extension of commitments and guarantees;
 - Inter-bank transactions;
 - Financial instruments such as futures, options, swaps and bonds;
 - The settlement of these and other transactions.

Banks manage credit risk in multiple different ways:

- Loan underwriting and approval
 - The bank may set approval limits, and require the customer to provide information such as their income etc. to help them assess the riskiness of the loan. Only loans which meet their approval criteria are originated.
 - Where the Bank changes its underwriting criteria over time, the Bank is exposed to different cohorts of risk. These will then need to be managed separately from a credit risk point of view.
- Incentives for Credit Control officers
 - The bank may design reward schemes for its credit control officers which incentivises credit control officers to pro-actively manage credit risk in their portfolios.
 - This can be done through ensuring high quality loans are originated, good quality collateral is required, and deterioration in credit performance (e.g. late payment of instalments) is identified and acted upon early.
- Collateralisation
 - The Bank may require the customer to put down collateral as security against the loan. This reduces the risk of loss, as the bank has recourse to the customer's assets in the event of customer default. Collateral can consist of non-financial assets (such as property or vehicles), or financial collateral (such as cash, bonds or equities).
 - The bank may also require the bank to put up additional collateral in the event of significant deterioration of credit risk, or where the value of the original collateral pledged has decreased since origination.
- Portfolio monitoring
 - The credit risk management team will be responsible for monitoring credit risk behaviour over time. This will include factors such as delinquency (days past due and number of payments missed), average loan to value, average behavioural score, etc (model and credit risk driver behaviour) over time. Where the Bank identifies a worsening trend, it will be able to take corrective action sooner rather than later, and hence limit potential credit risk losses.
 - This is dependent on the availability of data at the right level of granularity. For example, it is only possible to track loan-to-value over time where this information is captured for each loan / group of loans on a regular basis, which would require a model for the revaluation of collateral

- Provisioning
 - Provisions can be set aside for expected credit losses (depending on the local accounting standards). By setting aside provisions for bad debts, the bank will ensure that it does not prematurely recognize income and profits, and hence limit volatility in its P&L.
 - Where the Bank expects credit risk to deteriorate, larger provisions can be set aside.
 - This control can only be used once deterioration has already occurred.

- Capital Management & Stress testing
 - Additional funds can be set aside for credit losses over and above those expected under local provisioning rules
 - The Bank will assess credit losses based on economic scenario forecasts and models linking these to credit losses.

 - These models assume that the historic loss behaviour based on the position in the economic cycle will be reflective of future loss behaviour. I.e. the past financial crisis is a good indicator of the next one. This is not necessarily a realistic assumption.

(b) Market risk

Market risk can be sub-divided into the following types:

- Volatility risk: the risk of price movements that are more uncertain than usual affecting the pricing of products. All priced instruments suffer from this form of volatility. This especially affects options pricing because if the market is more volatile, then the pricing of an option is more difficult and options will become more expensive.

- Liquidity risk: in the context of market risk, this is the risk of loss through not being able to trade in a market or obtain a price on a desired product when required. This can occur in a market due to either a lack of supply or demand or a shortage of market makers.

- Currency risk: this exists due to adverse movements in exchange rates. It affects any portfolio or instrument with cash flows denominated in a currency other than the base currency of the business underpinning the financial instrument and/or where an investment portfolio contains holdings in investments priced in non-base currencies.

- Interest rate risk: this exists due to adverse movements in interest rates and will directly affect fixed income securities, loans, futures, options and forwards. It may also indirectly affect other instruments.

- Equity price risk: the returns from investing in equities comes from capital growth (if the company does well the price of its shares goes up) and income (through the distribution by the company of its profits as dividends). Therefore, investing in equities carries risks that can affect the capital (the share price may fall, or fail to rise in line with inflation or with the performance of other, less risky investments) and the income (if the company is not as profitable as hoped, the dividends it pays may not keep pace with inflation; indeed they may fall or even not be paid at all. Unlike bond coupons, dividend payments are not compulsory.).

Banks manage market risk in multiple different ways:

- The bank may set approval limits for taking on market risk.
 - Limits which are documented and approved by the board
 - Limits which are regularly reviewed and reassessed by taking into account the latest market conditions and business strategies
 - Clearly communicated with the relevant units and staff engaged in risk-taking, risk management and control units
- Hedging
 - The Bank may be able to hedge certain positions using financial instruments.
 - Valid example of a hedge
- Measurement of Market Risk and Monitoring
 - By monitoring the extent of exposure and risk driver behaviour over time, the Bank will be able to take corrective action sooner rather than later.
 - Value-at-risk limits – A type of sensitivity limit designed to restrict potential loss to an amount equal to a board-approved percentage of projected earnings or capital.
 - Loss control limits – A type of limit that requires specific management action if they are approached or breached. The limits setting documentation should require closing out of position or special approval from designated management or committee in order to maintain the exposures. They are usually used to foster communication, rather than limit the risk-taking unit's ability to maintain a position.
 - Tenor or gap limits – A type of limit designed to reduce price risk by limiting the maturity and/or controlling the volume of transactions that matures or re-prices in a given time period.
 - Notional or volume limits – A type of limit that is effective for controlling operational capacity and, in some cases, liquidity risk.
 - Options limits – A type of limit specific to option exposure for banks with sizable option positions. Such limits should consider the sensitivity of positions to changes in delta, gamma, vega, theta, and rho. Generally, this type of analysis requires modelling capabilities.
 - Product concentration limits – A type of limit useful to ensure that a concentration in any one product does not significantly increase the price risk of the portfolio as a whole.
- Banks should have adequate systems and capability to measure the sensitivity of valuation, profit and loss or other risk measurement against a change in one or a combination of risk factors (e.g., exchange rate and equity prices).
- Banks should also conduct stress tests to:
 - Identify remote but plausible market events or changes that may be adverse to the overall risk profiles and financial positions of the banks
 - Address existing and potential risk concentration
 - Facilitate the development of risk management tools and risk mitigating measures or contingency plans across a range of stressed conditions

(c) Operational Risk

- Operational risk arises from the potential that inadequate information systems, operational problems, breaches in internal controls, fraud, or unforeseen catastrophes will result in unexpected losses.

- Although operational risk does not easily lend itself to quantitative measurement, it can result in substantial costs through error, fraud, or other performance problems. The growing dependence of banking organizations on information technology emphasizes one aspect of the need to identify and control this risk.
- There is very little commonality between people or processes or IT systems or external events (such as bomb threats or power cuts). The techniques used to understand and manage operational risk are therefore very diverse.
- In addition to managing expected operational risks, firms also need to hold capital against unexpected losses. Firms can choose between one of three regulatory methods for calculating their operational risk capital requirement.
- The methods are associated with increasing levels of risk management sophistication, and moving up the levels results in firms having to hold less capital. The three method levels are called:
 - The basic indicator approach (BIA);
 - The standardized approach (TSA); and
 - The advanced measurement approach (AMA)

Banks manage operational risk in multiple different ways:

- As well as working out the known risks and holding capital for the unknowns, firms also need to remain vigilant to changes in their risk profile. The two common methods of achieving this are the creation of key risk indicators, and the capture and analysis of loss data.
- Firms also have choices to make on how to keep their operational risk exposure within their operational risk appetite.
 - This can be achieved firstly by avoiding the risk altogether, for example by choosing to withdraw a product which has proved too complex to administer at an acceptable cost without repeated processing errors.
 - A second method for reducing the risk profile to within appetite is to transfer the risk to a third party. This can take several forms including:
 - Outsourcing an area of the company, such as back office administration, to another company who specializes in this type of business;
 - Taking out insurance against certain events such as fraud or loss of premises through flooding.
- The ability of a firm to bear operational risk is linked to a certain extent to the amount of capital it possesses and the losses it can absorb. Basel II requires banks to keep capital for operational risk. This is the risk of losses from situations where the bank's procedures fail to work as they are supposed to or where there is an adverse external event such as a fire in a key facility. The impact of the Basel II credit risk calculation is to reduce the credit risk capital requirements for most banks and the capital charge for operational risk has the effect of restoring the total capital level to roughly where it was under Basel I.
- Control processes and procedures should include a system for ensuring compliance with policies. Examples of principle elements of a policy compliance assessment include:

- (a) top-level reviews of progress towards stated objectives;
 - (b) verifying compliance with management controls;
 - (c) review of the treatment and resolution of instances of non-compliance;
 - (d) evaluation of the required approvals and authorisations to ensure accountability to an appropriate level of management; and
 - (e) tracking reports for approved exceptions to thresholds or limits, management overrides and other deviations from policy
- Effective use and sound implementation of technology can contribute to the control environment. For example, automated processes are less prone to error than manual processes. However, automated processes introduce risks that must be addressed through sound technology governance and infrastructure risk management programmes.
 - Operational risk can also be mitigated through the use of disaster planning and recovery planning (including detailed and enforced policies and procedures)

The last economic capital calculation was performed a year ago, since then there has been an economic downturn. In the main markets in which the company operates Gross Domestic Product values have fallen by 3% to 6%, unemployment has risen by 6% and property prices have fallen by 20%.

- ii. Discuss how the credit risk to which the bank is exposed is likely to have changed during the year, including the potential impact on the Bank's capital.

Candidates failed to follow a structured approach to answering this question. Good candidates should have broken down the problem by discussing the 3 macroeconomic variables separately, and linking their effects on the different types of portfolios and products in turn. Almost all candidates failed to recognise that Bank's calculate capital using downturn scenarios, and so the effect on the Bank's capital is likely to be minimal, unless there is misalignment between the downturn used for calibration, and the latest experience.

- Risk of default of counterparties significantly increased during the year, reflected in worsening macro-economic conditions, though there may be arguments put forward that these effects may not be applicable to the Bank in question (depending on the exact profile of their customers).
- Consider back book vs front book, different products and different geographies. Each of these may behave differently. Sovereign exposures for example may only be affected where the change in scenario relates specifically to that country.
- In some instances, an argument could be made that no change is applicable for Sovereigns. [Could provide some discussion on Greek economy]
- Some counterparties may already have defaulted, and it could well be that actual default experience has been in excess of that estimated in the economic capital calculation a year ago.
- There will also likely have been downgrades within the portfolio. e.g. an overall portfolio that was on average A rated at the end of previous year, may now have a far lower average e.g. BBB- depending on the downgrades experienced by the portfolio.
- This is particularly true for Corporate Loans which would be affected by changes in GDP (a

key driver for Corporates). This should also be considered by industry.

- The Bank should consider the extent to which changes in the unemployment rate will affect its Retail portfolios, which will be less affected by GDP, and more affected by unemployment.
- Unsecured lending is likely to be significantly more impacted by changes in unemployment. This is because once a consumer loses their income, they are more likely to default on these types of obligations as they do not rely on these to sustain their lifestyle (as one would for a house or car).
- The Bank will need to give due consideration to lags in these variables and default experience. For example, resulting defaults on secured portfolios may be significantly more lagged, as consumers use their revolving facilities (such as credit cards) to make payments and continue with their usual day-to-day living. These customers may only show signs of stress once they've exhausted these facilities.
- Changes in property prices will mainly affect the Bank's mortgage and commercial property portfolios. These changes indicate that there is an increased risk of default on these portfolios, as customers are less likely to be able to afford the same properties as they would in an economic boom. Depressed prices are therefore a strong indication of a reduction in disposable income, and demand for property.
- In addition, depressed property prices are also to result in higher losses in the event of default. This is because the Bank will not be able to sell the property for the same value in a depressed economy. Often these properties may need to be disposed of at significant discounts (haircuts), resulting in higher losses.
- The Loan-To-Value (measure of the outstanding balance to the property value) is also likely to increase as a result, and any models in the bank using this as a risk driver, will indicate a deterioration in credit risk, assigning higher provisions or capital to these portfolios. Therefore, in a downturn, the bank will set aside additional monies reflecting this deterioration in credit risk. This is only true for provisioning, as capital is already calculated on a downturn basis.
- Further, depending on the Bank's capital position, the regulator may have required the Bank to hold additional capital buffers.
- There may also be an impact on the Bank's origination strategy as well as potential pricing changes required.
- The extent to which these factors are included in the Bank's credit risk models for capital purposes will also affect its capital. The Bank's stress testing models may already have captured the above movements in macro-economic conditions as stressed scenarios, and hence the total capital allocation may have been sufficient.
- It is also possible that the Bank's capital model's need to be updated to reflect the above conditions, resulting in an additional capital charge to the bank. This will also depend on the calibration period used in the model, and the extent to which it already incorporated deteriorated conditions.
- A further point is that the credit component of the economic capital engine may need to be re-calibrated if the bank deems that the existing calibration is not reflective of the likely downturns.

You are the Actuary in charge of the Bank's ICAAP process. The company uses one-year stress tests in the calculation of credit risk capital at each year-end.

- iii. Discuss the factors that you would take into account when setting the stress tests for credit risk.

The question was generally poorly answered. Most candidates failed to discuss that the starting point for this year's ICAAP would be last year's ICAAP. Candidate's also failed to provide discussion on the need to assess concentration and counterparty risks, and the need for economic scenarios to be consistent.

Factors to take into account:

- The stress test process requires input from the Bank's economic team to ensure the different economic factors aren't dislocated and make sense in terms of linkages expected between them.
- This also requires a good governance process and Board/senior management input.
- First the Bank will need to define the stress tests likely to be included in economic capital calculation for credit risk. e.g. x% fall in GDP, y% increase in Unemployment, z% fall property prices.
- Need to define these for each of the geographic locations in which the Bank operates, although the Bank is likely to concentrate on those territories where the economic capital is material in size (in relation to the whole group of companies).
- Need to consider whether the size of the shocks should change from those used at the previous year end.
- This might depend on the relationship between the stress tests carried out at last year end compared to the market movements.
- If last year's experience was worse than the "1 in 1000 stress" used in last year's economic capital calculation then the company might have to consider that a 1 in 1000 year event may be worse than had previously been allowed for.
- Alternatively, if it believed that what occurred was in fact a 1 in 1000 year event, then the Bank will have to consider the likelihood of another 1 in 1000 year event occurring again this year. It may therefore be suggested that lower shocks should be used this year, on the basis that the base capital currently contains an element of shocked capital.
- The Bank will need to consider which credit risks are now its most significant exposure, since the value of the Bank's exposure to credit risk may have changed significantly in the last year.
- Looking at management information regarding credit exposures will help to identify the most important credit shocks for the Bank at this year end.
- The Bank may need to consider management actions and the extent to which these are adequately reflected during the shock, For example the Bank may change underwriting policies and business mix dynamically with macroeconomic movements.

- Given the economic downturn and the combination of events that occurred over the last year, the Bank may want to consider whether calculating shocks for each type of credit risk in isolation and aggregating them is sufficient, or whether multiple variables should be shocked during a single run, which may give a more realistic picture of the impact on the Bank.
- In either case, the correlations between the credit risk on different portfolios (and other types of risk) need to be reconsidered.
- As would the relationships between stresses extreme situations. It may also be possible to demonstrate that the aggregation of certain events provide a higher answer for credit risk capital than an aggregated run.
- Stress testing will depend heavily on the stressed scenario determined by the bank, and if there is reliable, relevant and a large enough volume of data to use to stress test credit risk. Therefore, data requirements should be a significant consideration for the Bank; in particular the bank should review:
 - if adequate data over a long enough period is available (i.e. data covers a downturn or stressed scenario)
 - if data outliers should be removed to prevent the risk of over fitting a model
 - if the data is only reflective of one specific economic downturn event (e.g. 2008 financial crisis) and the reliability of the stressed results will depend on how similar the financial crisis projected is to the historical event
- There are also regulatory requirements and guidance around credit stress testing and the bank should be using these to guide their approach and interpretation of results.
- The bank should also specify thresholds for reviewing stress testing results and matching thresholds to certain types of management actions.

The Bank's total regulatory capital is currently calculated at a group level as the sum of the regulatory capital required for each country in which it operates. A director has seen an initial report, which suggests that the amount of economic capital required under the Bank's total internal economic capital model for the group is well in excess of the regulatory capital. The director has suggested that the Bank should ensure that it has sufficient capital to meet the greater of the capital requirements shown by the company's internal capital model and the total required under the local solvency regulations.

iv. Discuss this suggestion.

Most candidates failed to follow a structured approach to the problem and didn't consider regulatory and economic capital in parts. The better candidates recognised that regulatory capital is the minimum allowed. Candidates generally failed to discuss the fungibility of capital, peers comparisons, and that the Bank's may use capital to target a certain credit rating.

- Regardless of the outcome of any economic capital calculation, a Bank has to meet its regulatory capital requirements – so in each country in which this Banking group operates, the local entity will need to hold sufficient capital to meet the local regulatory capital requirements.
- Hence the director's suggestion, to hold the greater of economic and regulatory capital will

generally result in either no change to or an increase in capital requirements at the local country unit level.

- In some countries in which the banking group operates, the capital regulations may closely mirror an economic capital type calculation. The director's suggestion would have little impact on the overall capital requirements in those countries.
- For example if the group operates in South Africa then the internal economic capital may be similar to the regulatory capital requirement, since it is calibrated similarly.
- However, in other countries it is likely that the regulatory capital rules are based on fairly crude factor based approaches, which are not sufficiently sensitive to the macro-economic risks that the Bank is running.
- In these countries, it is likely that the economic capital required may be quite different to the capital required under the local capital rules – the economic capital may be substantially higher or lower than the capital required by the local regulatory rules. If the former then this would imply a need to increase capital held under this suggestion.
- However, for Banks in some countries (where they've not yet adopted AIRB models) this might simply be pre-empting an increase in regulatory capital requirements that will be necessary under Basel II, and hence the proposal might help those companies prepare for the implementation of this.
- One factor the Banking group may wish to consider, in response to the director's suggestion, is the measure of security (and level of security) that the Bank is targeting when setting its economic capital compared to the level of security targeted under the local regulatory capital regimes.
- The extent to which diversification is allowed for within the Banking group's economic capital results must be considered. E.g. the Bank is likely to have considered the impact of diversification between country units, within country units across products etc. At a group level, the diversification allowance for diversification of risk across country units will have acted to reduce the economic capital overall. It is not clear whether, at a group level, the economic capital is greater than regulatory capital, especially after taking diversification into account.
- The group will consider issues around fungibility of capital, and how the group's total economic capital is calculated. For example, in calculating the total economic capital requirement across the group, the Bank may look at the relationship between economic capital and regulatory capital in each country and use the difference between economic capital and regulatory capital, in those units where economic capital is greater, to offset the difference between regulatory capital and economic capital in those countries where the economic capital is less than the regulatory capital.
 - i.e. $\text{Max}\{0, [\sum (\text{economic capital} - \text{regulatory capital})]\} + \sum \text{regulatory capital}$
 - across all country units across all country units
- This may still lead to the economic capital requirements of the group being greater than the solvency capital requirements of the group, but not to the extent that may be anticipated if the following formula had been used:
 - $\sum \text{max} (\text{economic capital}, \text{regulatory capital})$
- The Banking group will consider e.g. to what extent rating agencies and analysts expect the

company to tie up capital in excess of regulatory capital – and whether taking such action would e.g. have a favourable/unfavourable impact on the credit rating and share price.

- The Banking group will consider what its peers are doing in setting capital requirements. It may be possible to get this information from published reports (e.g. annual report or Pillar 3 disclosures) – if peers are simply holding regulatory capital requirements, then the company is unlikely to want to put itself out of line by increasing its capital requirements compared to its peers.
- In considering the director’s suggestion, the Banking group is likely to consider the current basis on which capital is held. The Banking group may target holding sufficient capital to achieve a particular credit rating e.g. AA, from the credit rating agencies (S&P, Moody’s etc). It may target holding capital at a set percentage in excess of local regulatory requirements in order to provide an additional cushion to ensure that the minimum regulatory requirements are met at all times. Hence comparisons of the current capital requirement versus the director’s suggestion are likely to be done.
- In considering whether to adopt the director’s suggestion the company needs to understand the current extent of free capital in the Bank and the size of the additional required capital that this suggestion would generate. Whilst the director’s suggestion is sensible, in that it will allow the Bank to withstand the macroeconomic shocks included in the economic capital calculation, it is unlikely to be feasible if the company has limited free capital.
- The Banking group may consider raising additional capital, if required, to implement the director’s suggestion, but this is likely to be difficult currently given the recession and the tightening of the credit markets.
- The group also needs to take into account the practical difficulties in ensuring that the economic capital calculation is performed consistently across each of its companies. It would not be realistic for the group to prescribe a fixed calibration basis (both for “shocks” and correlation coefficients) for all companies, since the risk conditions and volatilities in each country will differ.
- It will therefore be difficult to ensure that the level of security is the same across all countries.

The Bank’s subsidiaries operate in South Africa, Nigeria, Kenya and the United Kingdom.

- v. Explain the steps the Bank would follow in allowing for diversification between risks in the aggregation of capital across the different countries.

This question was also very poorly answered. Candidates failed to follow a structured approach to answering this question. Candidates did not break down the problem to identify the need to determine a correlation matrix split by type of risk and by country and as a result failed to make sufficient points.

- When aggregating capital across different countries, the bank needs to allow for diversification and correlation between the different countries, as well as the three different types of risk (credit, market and operational).
- The Bank would need to build a multi-dimensional correlation matrix which consists of the risks above, as well as the different countries.
- For example, market risk between each country would be made up of country specific risk,

and global systemic risk (particularly given the impact of globalization). The correlation between market risk across countries would therefore need to be determined.

- Furthermore, Market risk and Credit risk may be correlated within a single country, and hence the correlation between these two components would need to be determined.
- In order to determine correlation, the Bank would require a time series of risk / country level data across the two risks / countries being assessed. This time series can then be used to calculate the correlation values.
- In order to do this reliably, the Bank will need a sufficient amount of data (quantity and over a long enough period). Furthermore, the data points need to have moved sufficiently over time to calibrate a reliable correlation factor. In the case where market risk and credit risk (for example) have shown no change over the calibration period (say 5 years), it will be difficult to assess the extent to which they are related.
- There could be data limitations across the different African countries, and data may not be captured reliably in each territory. Furthermore, the same type of data may not be captured in each territory.
- The Bank could therefore follow one of four approaches in determining the total capital required allowing for diversification
 - Firstly, the Bank could determine the total capital required within each country. This would involve determining the correlation between credit, market and operational risk, and then aggregating the capital within each country. The Bank could then look to determine a correlation factor between the total capital held in one country and the total capital held in another country. This can then be used to aggregate total group capital.
 - Secondly, the Bank could determine the correlation between country level risks first, and calculate a total Market Risk capital requirement across all countries. This would involve determining how market risk is correlated between country one and country two. . The Bank could then look to determine a correlation factor between the total market risk capital held in all countries and the total credit risk capital held in all countries. This can then be used to aggregate total group capital.
 - Thirdly, the Bank could perform a multi-dimensional simulation across risk and country to obtain a single view for group capital. This approach would require significantly more data.
 - The final approach is to use industry or benchmark data to obtain estimates of the correlation factors, and to aggregate the capital using this information. This approach may require management to exercise some judgement in assessing the appropriateness of the final capital amount.
- Diversification is not a solution for all risks faced by banks. Banks that diversify by lending to sectors and regions where they have limited expertise, insufficient ability to monitor transactions and competitive disadvantages may find that there are other risks which arise as a result. This issue would be greater for smaller banks with limited resources. In short, banks must focus on both individual risks and the overall portfolio.
- Diversification is not a substitute for quality lending. Although banks have put in place mechanisms, such as credit provisions and risk capital, which allow them to absorb losses up to a certain point, and only those within their estimation of their risk exposure, badly

considered diversification can lead to diminished returns or even large losses. Diversification of a portfolio for the purpose of investment returns must be viewed very differently from diversification for credit risk management. Managing the portfolio in terms of investment returns will be more focused on the “up-side”, while credit risk management is concerned with the “downside” risk. Default correlation increases significantly in deteriorating market conditions, while asset return correlation is less sensitive.

[marks can only be awarded if the candidate discusses capital aggregation]

Question 3:

Bank A is a large South African Retail Bank looking to expand its product offerings to include Corporate products in the rest of Africa. Bank B is a large United Kingdom based bank and currently offers both Retail and Corporate Banking products in several countries around the world. Bank B's African subsidiaries only offer Corporate products.

Bank A is considering purchasing Bank B's African Corporate Loan portfolio. Management of Bank A is concerned that it would need to be able to ensure that its financial statements, as well as its capital submissions to the South African Reserve Bank, are compliant with South African regulations.

Discuss the key considerations for Bank A in determining whether or not to go ahead with this transaction.

The answers to this question were surprisingly poor given that it should have been one of the more straightforward questions in the exam, with candidates being able to draw on a wealth of prior experience (especially from exams like CA1) to provide potential solutions. Most candidates did not break this problem down by following a structured approach to the discussion and some just listed very high level bullet point even though the question requested discussion. Better candidates prioritised regulatory concerns and risk management. Very few candidates considered practical issues such as systems, data, people, and processes. No candidates discussed the need to produce consolidated Group accounts.

Regulatory approval

- Before the transaction can go ahead, the Banks will need to notify the regulator of their intentions and obtain approval in writing. This will include the South African regulator (SARB) as well as the local regulators in each of the territories in which Bank B operates. The Banks will need to produce a document laying out their plans and demonstrating that the transaction will not negatively affect their existing customers.

Consideration needs to be given to whether this constitutes an application to be made under Section 52 of the Bank's Act.

From the Act:

"It is important to determine whether "an interest" should be regarded as a direct or an indirect interest. In the interests of regulatory certainty and efficiency, this Office has interpreted "an interest" as a direct

interest acquired by a bank or controlling company in an undertaking that is situated outside the RSA. Therefore, only the first line of acquisitions that a bank or controlling company obtains directly in an undertaking situated outside the RSA would be regarded as a direct interest and, hence, subject to the provisions of section 52(1)(c) of the Banks Act. "

- If these Banks are listed, the transaction would also be subject to adherence to local stock exchange requirements.
- The regulator will also need to be satisfied that the transaction will not result in excessive

concentration risk, or in anti-competitive outcomes (such as Bank A becoming the dominant market player) nor the market in which they operate.

Capital and risk management

- Bank A will need to consider the regulatory differences in capital and provision requirements between Bank A and Bank B's African subsidiaries. South African Bank's currently follow IAS 39 for credit provisioning purposes and Basel 2 for capital purposes. Other African countries may follow different (and less sophisticated) accounting and capital requirements.
- Bank A will need to consider the potential complexity of aggregating financial statements across different countries, and implementing a consistent view on risk. For example, many African countries may not have data collected to allow for more complex credit risk models to be built (which would be consistent with South Africa). Management in Bank A will need to develop new methodologies for quantifying risk. This will need to take into account local regulatory requirements as well as the risk appetite of the group.
- Bank A can investigate how Bank B aggregated financial results to a group level as the UK would also be compliant to Basel 2 and IAS 39. Bank A would need to investigate if the method currently used by Bank B would be acceptable to the South African regulator before leveraging existing methods.
- Bank A will need to investigate and understand capital and risk management approach for corporate products, which is significantly different to retail products. Issues that could emerge are:
 - Significant lack of default and loss data (compared to retail portfolio) for corporate products to build granular models
 - Need to rely on external data, and focus on how to relate external data to own experience
 - New methods of tracking and monitoring credit risk, rather than using days past due (e.g. using a watch list, or tracking rating downgrades)

Price

- Bank A will need to consider the purchase price of Bank B. This will generally be made up of the Net Asset value of Bank B, plus any associated goodwill and other intangibles. This price can be determined in one of the following ways:
 - Performing a detailed technical valuation of Bank B, using discounted cashflow models, business projections, and expert input
 - Considering the market value of the Bank (if its publicly listed)
 - The maximum funds available from Bank A for this transaction would be an upper limit on the deal.
- Bank A is likely to perform a detailed Due Diligence on Bank B, in particular on the credit portfolio. This will aim to assess the quality of the loan portfolio, the adequacy of provisions set aside for bad debts, and any negative trends in the business which could result in a purchase price adjustment.
- The price of Bank B will also be affected by the market perception of this Bank. It may be viewed as a highly sophisticated Bank, with strong financial performance. This could drive up the price over and above the net asset value.

- Potential savings in funding costs, as the retail bank may have cheaper retail funding Bank B had not been previously been able to obtain

Data and systems

- Bank A would need to give consideration to whether their existing systems are able to deal with Bank B's data. Where the Bank's are on different data and administrative systems, the Bank would need to plan on how to effectively integrate these, or how to manage to separate sets of systems.
- This is likely to be a significant challenge as Bank B's data may not be maintained in a single data warehouse and may be spread across multiple countries. The data in each local territory may also not be consistently captured (same fields across same time period). Where new data warehouses or systems are required, Bank A will need to give consideration to the cost associated with the integration.

Competition

- Bank A will need to consider the competitive landscape in which it operates, and whether any other major Retail Banks have performed a similar transaction before.
 - This could give them insight into whether such a transaction is feasible, through consideration of the outcomes of previous transactions which are similar. For example, if another Bank had previously acquired a Corporate Bank (similar to Bank B), and subsequently performed poorly in this area (commercial banking), it could highlight certain challenges.
 - Conversely, where successful transactions have happened, it could indicate that this is something worth pursuing.
- Bank A will also need to consider whether it will face any competition in attempting to acquire Bank B. If the deal is announced publicly, it may be that other Banks are also interested in Bank B. This could drive up the price, or result in a lengthy bid process. Where the potential transaction can be kept confidential, Bank A has a better chance of securing the deal.

Market perception

- Bank A will need to consider whether this is viewed as a hostile takeover or friendly acquisition. In the case of a hostile takeover, Bank A will need to consider the extent to which negative market perceptions can be managed. Bank A could be viewed as looking to exploit the business of Bank B, and hence lose its own customers / investors. The staff of Bank B may also feel threatened, and depart from the Bank, resulting in a loss of knowledge to Bank A.

Senior management & Staff integration

- Bank A will need to make decisions on the whether or not to keep in place senior management from Bank B upon transition, or whether to replace them with Bank A management (or other external staff). It will be preferable to transfer as many of the existing senior stakeholders to Bank A so as to maintain the corporate knowledge built up by these staff members over time. It would be difficult (and expensive) for Bank A to replace key senior management and specialist staff from Bank B in a short amount of time (while at the

same time trying to run a joint organization).

- Consideration should also be given to whether Bank B senior management will want to move across to Bank A or depart to another organisation (regardless of Bank A's intentions). It may involve lengthy and complex discussions to keep key stakeholders of Bank B. Where Bank A decides to let go of staff currently employed by Bank B, there would need to be consideration of the any severance arrangements. These could be costly to Bank A, and failure to offer fair severance deals could result in Bank A being viewed negatively in the market.

Existing processes

- Bank A would need to consider to what extent Bank B's business can be integrated into its existing processes
 - For example, the underwriting, loan origination and loan approval processes would need to be considered. Retail and Corporate banking have very different loan origination criteria, and the underwriting processes would need to allow for this.
 - Consideration would also need to be given to the process used to manage delinquent loans – collections and write-offs etc – as this differs significant between Retail banking (which tends to be managed on a portfolio basis) and Corporate banking (which tends to be managed on a customer basis).

Customers

- Bank A needs to consider the impact of the move on its own customers. They may view this as a move to strengthen their Bank and it may therefore be seen as a positive change. This could result in additional new business volumes on the retail side of their business.
 - Conversely, Bank A's customers may see this as a strategic move away from Bank A's core business (Retail Banking), and could perceive this as introducing additional risk to Bank A. As a result, customers may look to bank elsewhere, or to limit any additional personal investment into Bank A until such a time that it is proven that the acquisition has not negatively affected Bank A's business.
 - Bank B's customers may have concerns regarding Bank A's ability to manage the business effectively, and may withdraw their relationships with the Bank. This is particularly true for Corporate Banking, where customers are managed on a relationship basis. This could see Bank A lose a significant proportion of the business it has just acquired, especially given the nature of Corporate loans (i.e. they have significantly more flexibility and ability to withdraw from their facilities).

Expertise

- Bank A will need to assess whether it has the requisite expertise to run the business offering of Bank B.
 - This is particularly true for areas such as loan origination, pricing, risk rating, monitoring, collections process, risk mitigations.
 - This risk is exacerbated where Bank A is unable to retain key staff from Bank B who were previously responsible for these processes.

Question 4:

Define the following terms:

- (a) Liquidity coverage ratio (LCR)

$$\frac{\text{Stock of highly liquid assets}}{\text{Net cash flow over a 30-day time period}} \geq 100\%$$

Net cash flow over a 30-day time period

- (b) Net stable funding ratio (NSFR)

$$\frac{\text{Available amount of stable funding}}{\text{Required amount of stable funding}} \geq 100\%$$

Required amount of stable funding

This is a bookwork question. Most candidates did not specify these ratios need to be greater than 100%.

- (ii) Explain how these metrics are implemented in the South African Banking industry.

This question was generally well answered. Candidates were generally able to discuss LCR, and were less convincing on NSFR. A number of candidates used the wrong dates for when the implementation would be effective.

- The metrics are set in Basel III text with the aim to harmonize the implementation worldwide.
- The LCR was implemented 1st of January 2015. The NSFR implementation is expected 1st January 2019.
- However, the LCR requirement is phased in whereby banks have to meet a ratio of 60% in 2015, 70% in 2016 up to 100% in 2019.
- The South African industry does not have sufficient liquid assets to meet the LCR at inception.
- As a result the South African Reserve Bank (SARB) introduced a contingent liquidity facility effective 1 January 2015.
- Every bank can subscribe in the facility whereby unencumbered assets are earmarked, subject to certain haircuts, and these assets would then be encumbered in the event that the facility were utilised.
- The SARB increases the price of the facility as banks request to utilise more up to 40% of the LCR requirement.
- The SARB has also allowed banks to utilise their statutory reserves as part of the highly liquid asset qualification.
- The implementation of the Net Stable Funding Ratio is still under review. The South African funding framework (where money market funds provide wholesale funding to banks) make it very difficult for South African banks, if not impossible, to meet the requirement currently.

You work for a large South African Bank. The LCR and NSFR for your bank and two other banks in the market are as follows:

Bank	LCR	NSFR
Large South African	80%	90%
Bank 1	65%	90%
Bank 2	95%	90%

The bank's treasurer has asked you to advise the Asset Liability Committee on how to interpret the LCR and NSFR and how the ratios can be used to improve risk management.

(i) Outline the points you would make to the Asset Liability Committee.

This part of the question was generally poorly answered, with many candidates failing to comment on how the Bank could improve the ratios or what constituted the numerator and denominator. A number of candidates commented that the Bank is currently compliant on LCR given the phased in approach to be followed.

- In principle these metrics are designed to closer match the cash flow of the assets and liabilities of banks.
 - LCR
- None of the banks' currently meet the full LCR requirement and do not have sufficient high quality liquid assets to meet expected cash outflows.
- The risk is mitigated by holding sufficient high quality liquid assets (HQLA) that can be sold or utilised through repurchase transactions to generate sufficient cash to meet the outflow. The risk can also be mitigated by limited the expected cash outflow.
- The Bank must hold a stock of unencumbered HQLA. In order to qualify as HQLA, assets should be liquid in markets during a time of stress and, in most cases, be eligible for use in central bank operations. As a result the bank has to review its holding of HQLA and implement a plan to meet the LCR requirements as they fall due.
- The portfolio of HQLA can be optimised considering that the regulations imposed certain haircuts, as well as their expected yield and capital requirements.
- HQLA are comprised of Level 1 and certain marketable securities backed by sovereigns and central banks, among others. Level 1 assets generally include cash, central bank reserves, and There is no limit on the extent to which the bank can hold these assets to meet the LCR.
- Level 2 assets are comprised of Level 2A and Level 2B assets. Level 2A assets include, for example, certain government securities and corporate debt securities. Level 2B assets include lower rated corporate bonds, residential mortgage backed securities and equities that meet certain conditions.
- Level 2 assets may not in aggregate account for more than 40% of a bank's stock of HQLA. Level 2B assets may not account for more than 15% of a bank's total stock of HQLA.
- The bank manages the portfolio of Level 2 assets such to optimise the return subject to these requirements. This will include incentivising business to secure the optimal portfolio [Structured arguments regarding portfolio optimisation and reasons why the different bank's portfolios may differ].

- Total expected cash outflows are calculated by multiplying the outstanding balances of various categories or types of liabilities and off-balance sheet commitments by the rates at which they are expected to run off or be drawn down.
- The bank scrutinises all cash outflows and reviews processes to ensure accuracy of calculation, revises contractual terms where possible and incentivises business to mitigate cash outflow [structured answers regarding outflow management and reasons why cash outflow may be different as a result of the different business models applied by banks.]
- Retail deposits are expected to have lower cash outflow than wholesale deposits.
- Total expected cash inflows are calculated by multiplying the outstanding balances of various categories of contractual receivables by the rates at which they are expected to flow in.
- Total cash inflows are subject to an aggregate cap of 75% of total expected cash outflows, thereby ensuring a minimum level of HQLA holdings at all times.
- The bank scrutinises all cash inflows and reviews processes to ensure accuracy of calculation, revises contractual terms where possible and incentivises business to increase cash inflow [structured answers regarding inflow enhancement][2]

- NSFR

- None of the banks currently meet the NSFR and do not have sufficient stable funding to meet the funding requirement.
- The NSFR is still under review given the structural changes required. In principle Banks will require more long term wholesale funding and less short term funding. The market is not currently structured to accommodate this as a significant proportion of funding is raised through the short term wholesale market.
- Traditionally banks have always had an asset liability mismatch, referred to as maturity mismatch. The purpose of the NSFR is to reduce this and will therefore also impact the profitability of banks through a reduction of the net interest income.
- Stable funding includes: customer deposits, long-term wholesale funding and equity but excludes short-term wholesale funding. Banks can improve the ratio by increasing these sources of funding. However, such increases are detrimental to the long term profitability of the banks.
- These components of stable funding are not equally weighted:
 - 100% of loans longer than one year;
 - 85% of loans to retail clients with a remaining life shorter than one year;
 - 50% of loans to corporate clients with a remaining life shorter than one year;
 - 20% of government and corporate bonds.
 - Off-balance sheet categories
- The bank will increasingly need to consider lengthening its liability profile and also shortening its asset profile.
- Banks can consider changing t
- heir off-balance sheet exposures.
- This is expected to give further impetus to the strengthening of the shadow banking market of non-deposit taking institutions.