

Actuarial Society of South Africa

EXAMINATION

18 May 2018

Subject F205 - Investment

Fellowship Applications

EXAMINERS' REPORT

The scripts received suggested adequate bookwork preparation by candidates and the quality of scripts was more closely clustered than previous sessions (no FD's and very few FC's awarded). However only a handful were able to adequately apply their knowledge to potentially unfamiliar situations which they would encounter in their role as an investment actuary. A passing candidate is generally not only well prepared for the exam but is well read on key current investment related issues. It appeared that the allocated time was adequately managed by candidates, with very few not finishing their paper in time.

Question 1

Candidates responded well to part 1 of the question. The temptation was to write down everything they knew about MBS instead of considering the question and providing an outline of the feature of an MBS – time may have been wasted here. For part (b) some again wrote points less relevant to the situation sketched in the question, but were for the most part able to identify the relevant points as well.

Parts (ii) and (iv) were not as well answered and part (ii) was very poorly answered. Part (iii) required some higher thinking on an issue which has been raised in SA and is discussed in the financial media from time to time. Candidates mainly focused on the advantage to government, but were unable to articulate why this would be a disadvantage for pension funds. Wider reading would have armed candidates with a good answer for this part. Candidates are reminded that reading of financial publications is essential to F205.

(i)

(a)

- MBS's are usually issued in a number of tranches, each with a different level of priority in the debt repayment stream, giving them different levels of risk
- Tranche repayments will comprise interest payments plus repayments of capital
- Repayments are allocated to Senior debt tranches first
- Mezzanine tranches are then paid from residual payments
- Senior debt may carry further guarantees from government in this case
- High yield tranche, paid only after other two tranches,
- The yield or coupon is therefore lowest for senior debt and highest for the high yield tranche
- Different credit ratings are assigned to each tranche – For example AA to Senior debt to as low as junk status (BBB-) for high yield debt
- Sometimes an equity tranche is created which ranks below the high yield debt tranche
- SPV investors have no recourse to the original issuers of the mortgages in event of default
- The SPV can be “over-collateralised” to improve security of the tranches

(b)

Issues to consider related to the investment

- What is the initial yield would you be happy to bid at for the auction?
- The MBS's would need to be priced at a discount (yield premium) to government bonds of similar term. This is due to:
 - o Higher credit risk: the mortgages making up the MBS are likely to be made to individuals who are otherwise unable to qualify for a mortgage with a bank. This may mean that the credit risk may be significantly higher than similar tranches in developed countries.
 - o Is there an implicit or even explicit government guarantee? For example in the US, most MBS are government guaranteed, making them almost risk free.
 - o Illiquidity of the securities: there is currently not a liquid market in MBS's, investors should be compensated by demanding an illiquidity premium

- Will the MBS's be listed? This may or may not help liquidity as many listed instruments are still illiquid.
- How would you value these once purchased – given no liquid market? Probably own valuation at a fixed margin off government debt given above.
- What would the performance benchmark be ?
- What is the credit rating process for home loan applicant ?
 - Do home loan applicants need to comply to NCR?
 - How do you balance developmental needs of government with creditworthiness required by lenders?
- What rate will government charge on underlying mortgages – this will impact credit risk and price particularly for lower tranches. If the underlying mortgages are at prime but this is to citizens who can't access a standard loan through a bank then the defaults would be expected to be high, in which case prime is unlikely to be a sufficient interest rate.
- Should government be required to take an equity tranche to ensure alignment of incentives?
- The current state and outlook for SA property markets – economic and political outlook
 - What are the prospects in this regard – particularly wrt political risks such as land expropriation
- Nature of cash flows: Unlike a bond where interest is received regularly (every 6 months) and principle repaid at maturity, MBS's return interest and capital each month as homeowners pay their monthly mortgage instalments.
- These monthly returns may vary from month to month due to repayments and defaults. This will depend on the tranche you have invested in
- What is expected term of the investment (this may depend if the strategy is buy and hold to redemption vs trade out before maturity)?
 - MBS's have prepayment risk (resulting from home owners selling their home or paying off their current loan with the proceeds of new loan)
 - As with any bond, the yield on a mortgage security depends on the purchase price in relation to the interest rate and the length of time the investor's principal remains outstanding. The estimated yield on a MBS should reflect its estimated average life based on the assumed prepayment rates for the underlying mortgage loans.
 - These assumptions are important and investors lack data in this case to make informed assumptions
- Regulatory compliance: pension funds are regulated under Pension funds Act (Reg 28 specifically) and unit trusts under Cisca. Do these regulations allow investment in unlisted MBS's?
- Recently introduced default portfolio regulation may apply further restrictions in this regard?
- Regulations usually prohibit investment in non-investment grade securities for certain classes of investor. Will this preclude high yield/mezzanine tranches?

- Does the unit trust prospectus or retirement fund client mandate allow for these investments
- In the case of retirement fund, consider typical fund liabilities:
 - Pension funds usually have real, local currency based, long-term liabilities
 - MBS returns would be expected to beat inflation (priced at a discount to government debt risk free rate)
 - Would be in local currency
 - Term: would vary by medium to long term instruments
 - So good match for pension fund liabilities
- Unit trust liabilities: unit trusts come in many various forms so would have to consider each fund individually. A MBS would not be appropriate for an equity only unit trust.
- MBS's could provide diversification as currently pension funds/unit trusts may not have any such exposures. Would need to assess diversification benefits with other portfolio assets
- MBS's should enhanced yield over SA government bonds and generate higher returns than traditional fixed income assets
- Expected levels of default per tranche?
 - Is there sufficient data to gain confidence in this important estimate, especially initially.
 - Perhaps wait for a few tranches to assess experience before getting involved ... although a "cheeky" bid for a high yield might be worthwhile as others might also be reticent
 - Do you have the requisite experience to assess credit risk in this area
- Admin and Collections: government is issuing the mortgages. Who will be responsible for collecting the monthly repayments and reclaiming collateral on defaulting mortgages
- Strength of collateral: a mortgage bond is usually secured against the title deed of the concerned property. Does South Africa have enforceable property rights and a reliable deeds registry for properties. This is important for securing collateral in event of defaults
- Reputational risk: owning mortgages where homeowners are in default and thereafter evicted to recoup collateral. Could be politically insensitive and cause reputational damage to the fund management company and its clients
- On the other hand investing in such an initiative could assist in meeting SRI requirements or objectives of clients and demonstrate a commitment to socio-economic development in such an unequal economy
 - It might be particularly attractive to certain clients e.g. government or SOE-related pension funds. This should be considered when deciding whether to bid or not or at what price to bid.
- What would the costs of such an investment be – could be quite "labour intensive". How would this be carried into management fees (if at all)?
- Can full confidence be placed in the ratings of the tranches as conducted by the ratings agencies

- How would the allocation fit in with the existing portfolio and what assets would need to be sold to facilitate investing in the MBS

(ii)

- An MBS and a bank share are 2 distinctly separate asset classes
- Characteristics of MBS: considered a form of **fixed interest** asset, priced off the government bond yield curve.
- Each mortgage is secured against a property i.e. there is collateral and you are directly exposed to the mortgages of a range of individuals
- There may be some form of government guarantee on the MBS (common in the USA)
- Characteristics of bank shares: **equity** in nature, only source of income is dividends declared by the bank. These are by no means guaranteed.
- There is no underlying collateral. If a bank were to experience distress, bond holders and other creditors would receive relief before equity holders who would be last in line
- Bank share priced off a dividend yield, price to book ratio or PE ratio or a combination of these metrics and subject to the overall market/sector level that may be driven by other macro factors
- Banks are more diversified
- Profitability is more tied to the overall level of the economy and economic sentiment rather than a particular sector
 - o While majority of loans are mortgage loans, there is loan exposure other than mortgages e.g. car loans and credit cards and corporate lending
 - o also other income sources (transactional fees, advisory fees)
- Banks are experts in credit scoring and lending
 - o Difficult for an investor to gain confidence in level of collateral and creditworthiness of mortgages within a MBS. A buyer of a MBS is at an informational disadvantage
- Banks are financially geared (SA banks assets:equity > 10x).
 - o This means that banks do not only lend out their owners' funds (shareholder equity) but also make use of debt/deposits to finance loans. This enhances returns to shareholders
 - o However this also means that a small fall in value of banking assets may erase all a bank's shareholder equity. This makes a bank a more risky investment
- MBS has finite life. A bank is a going concern and investors value its earnings in perpetuity
- Banking shares will have higher liquidity than the MBS
- The mortgages granted by the bank will have exposure to lower credit risk individuals when compared to the MBS (where lenders have not qualified for a bank loan)

- Regulatory limits may be exceeded or concentration risk may become unacceptably high if additional allocation is made to banking shares in lieu of the MBS

(iii)

- Making compulsory ownership in pension funds will:
 - o Increase demand for the MBS.
 - o Price of MBS's will increase as a result.
 - o There is likely to be insufficient stock of MBS further exacerbating the increase in price (demand exceeding supply)
 - o The return an investor generates on any asset is primarily a function of the price he/she pays for that asset. There is a risk that the demand imbalance for MBS pushes the price to non-economically viable levels i.e. the returns generated by the MBS are insufficient compensation for the risks the investors take on
- This will initially be good for government as it will be able to finance lots of new mortgages at a lower cost
- Likely to see a boost in mortgage issuance and house buying/building – could boost construction sector or the broader economy in general
- However if the price of MBS's is pushed too high (ie yield too low) investors may not be sufficiently compensated for the risk they take on (primarily default risk)
 - o Usually when this situation occurs pension funds would rather invest in other asset classes/securities. However under this “prescribed asset” scenario this is not an options as all funds are mandated to invest 5% in MBS's.
 - o This goes against the principle of pension funds maximising returns with an appropriate level of risk
 - o It also potentially reduces diversification with up to 5% of every fund exposed to mostly sub-prime (sub-investment grade) residential mortgages
- Pension funds may suffer losses on their investment in MBS's
 - o This may result in future pension fund returns being lower than historically
 - o This may necessitate defined benefit funds relooking their assumptions of future returns
 - o If fund sponsors have to contribute more to funds, there will be less money to invest in their businesses (and the wider economy). This is not good for government and/or society
 - o DC funds will also be affected as lower returns means lower accumulated funds for members to retire with
 - o This will eventually have a negative effect on government as lower return on pension assets mean state must provide assistance for pensioners who do not retire with sufficient assets

(iv)

- May reduce demand for existing bonds as pension funds switch existing fixed interest exposure for the now compulsory assets
- This would likely see rising yields in the bond market
- MBS's are likely to have a medium duration. The proposal would affect this and other parts of the yield curve as pension funds would seek to neutralise the duration impact – could distort yield curve.
- This proposal results in an additional source of funding for government. This may result in a reduced need for government to issue government bonds at the same pace as before – the impact may however be quite small given that it addresses a need that has gone largely unfulfilled to date
- A pull-back in government bond issuance may however create a supply deficit in certain areas of the yield curve. Market participants are likely to bid up prices of these bonds and yields should commensurately fall
- The proposal may be interpreted by the market as a desperate measure by the government (i.e. forcing investment in certain assets). Investors may respond by demanding a higher risk premium for owning government bonds. This may result in an overall increase in the cost of government borrowing i.e. rising government bond yields
- There may be other indirect political and economic implications as this goes against normal free market principles and creates artificial distortions. This might even scare off discretionary investors. It also creates an unwelcome precedent as to what further compulsion the government may introduce if they “don't like” what pension funds are doing.
- Despite what has been said in question ii it might also lead to pressure on bank shares (or other asset classes) as investors rebalance to reduce exposure to the housing loan market and hence reduce exposure to banks as a proxy.

Question 2

This question was the most poorly answered by candidates. Those who passed the exam were, in general, distinguished by their responses to this question. The question required candidates to be able to consider an unfamiliar liability and develop an investment strategy around this. This is a critical test for identifying newly qualified candidates who are able to tackle such issues in the workplace. The information provided in the question was adequately considered in formulating answers (for example discussing taxation of investments). In some cases candidates were able to provide a reasonable description of the liability but proceeded to suggest an investment strategy completely mis-aligned to these liabilities, suggesting highly volatile asset classes although solvency is regularly assessed. Few also identified that key to the investment strategy was understanding and considering the method and assumptions used when valuing the liability.

(i)

- Determining the extent of the liability is particularly difficult as it is poorly defined
- Rehab is a costly and complex process
- What are the standards required for full rehabilitation?
- New technologies may reduce potential harm to environment thereby lowering the liability going forward (remember no withdrawals allowed). Equally new risks may be discovered
- Balanced by fact that environmental concerns are rising and more onerous rehabilitation standards might be required
- Must provide for both at closure of the mine and for a significant period after mine has closed – almost in perpetuity.
- Need to also allow for partial closures during the serviceable life of the mine
- However we expect final closure of the mine to comprise the bulk of the liability
- Need to look at expected life of the mine - this is primary consideration
- Each mine is unique – depends on types of mining, commodity being mined etc.
- Disasters may also render a mine completely obsolete before its expected lifetime and may significantly increase rehab costs
- Can have early closure if mine is no longer economically longer viable
 - o This is linked to resource prices and costs of mining
- There may also be political or other reasons for early closure (akin to German government ceasing nuclear power generation in the light of independent events in Japan)
- There may be some very long tailed events as impact on environment only comes through many years later
- Other expenses will be required –
 - o for example cost of consultants and environmental experts for closure and for conducting annual reviews
 - o Need to also provide security post closure – exploitation of abandoned mines can increase environmental impact
- Liabilities will be real in nature and can be expected to increase higher than inflation – related to

- Cost of environmental experts
- Equipment and machinery (e.g. for open cast mine)
- Water and soil rehabilitation
- Possible legal costs
- Liability is medium to long term depending on the life of the mine
- Interim rehab due to partial closures or events means some possible short term liabilities (for which liquidity is needed)
- Liability should be in local currency but may be linked to other currencies as well if overseas experts, equipment required?
- Liability is recalculated annually and may change significantly at any point if for example landslide or something like an accident/leak etc. or if events indicate an earlier closure of the mine.

(ii)

(a)

- Discussion with management and account executive – what are the objectives wrt to the fund. What is their risk appetite in this regard?
- Size of existing assets and early estimates of liabilities
- Who did the early estimate and is it reliable? How conservative is the basis and what implicit/explicit margins are included
- What is current liability – is there a shortfall? Will this be made up?
- Cashflow position of company What is the strength of the global mining company and the local operation's balance sheet (being an early stage mine) and profitability at the moment. What priority does the funding of the rehabilitation fund have over other expenses or distributions. Is there a parent/group company guarantee?
- Outlook for mine itself and industry in the developing country? Does the company have secure contracts with fixed prices in place?
- Details of the new regulation – tax incentives and permissible assets
- NB to know how liability will be calculated going forward – is there a statutory basis and what assumptions are used
- Need projections of liabilities under different circumstances – modelling – also need projections of contributions which will depend on commodity prices and costs of extraction
- Is liability carried on b/s – then matching even more important!!
- What are the details of the tax concessions?
 - Contributions tax free
 - No tax on investment returns
- Tax position of co If not profitable tax concessions not worth it
- Political risk – what property rights on the trust should mining assets be seized, or possibility of state claiming trust assets at some point in future
- What assets and asset classes are available in developing country
- Have other companies set up approved rehab funds – what have they done?
- What are the expected liquidity needs in terms of meeting the liabilities

(ii)

(b)

- Must comply with new regulation relating to the assets
- Assets should be held in a separate approved and identifiable vehicle (such as a trust) that is remote from the fortunes of the company – trust contributed to over the life of the fund
- Must make use of tax efficiency/concessions
- Must be able to continue to contribute regularly as liability grows or shrinks
- Ability to demonstrate adequate legal provision for rehab will make company more attractive as an investment target
- Given the nature of the liability, flexibility and liquidity are very important, for example to cover in the event of disasters or unscheduled closure
- so cash may seem appropriate at first, but
- Must invest in real assets as liabilities identified as real
- Term of assets must be suitable match to term of liability – what is lifetime of mine?
- Assets need to have little volatility of MV in order to demonstrate solvency compared to liability every year
- Therefore we require capital growth as well some capital guarantees – depending on mines ability to top up the fund to solvency
- All cash in bank account very inefficient
- But will still need some cash for liquidity to fund unexpected early closures or rehab costs while still operating

(iii)

What asset classes or structures would you consider including in the fund:

- Short and medium dated Inflation linked bonds would be a good match as they have fairly low volatility and it is likely liabilities would be calculated referencing these yields.
- Yields on ILBs may be quite low so this might be below what is ideally needed to keep costs down i.e. trade-off between certainty with higher contributions needed by company versus higher returns in long term minimizing contributions towards the fund.
- Can immunize more closely with zero-coupon bonds or structures/swaps
- If such structures and even shorter dated ILBs are available in the developing country
- Assets must be approved by the regulator and should qualify for any tax concessions
- However if too conservative will not earn high enough real return to match an inflation plus type liability. This could make future contributions higher – a potential conflict when trying to keep a mine profitable
- So may be preferable to invest a portion in higher growth asset classes in order to maximize returns, but with some underlying capital guarantee
- Capital guaranteed equity linked notes would be appropriate

- However the capital guarantee is only applicable at the end of the term of the note, and solvency must be assessed annually.
- Would need capital guarantees over shorter times such as one year and which then roll over – this is more costly
- Credit risk will be associated with guarantor of the notes
- Are some of the liabilities insurable –
 - o E.g. premature closure guarantees by short term insurers –may be costly and exp if mine is quite old
 - o Open ended nature of liability for claims long after closure could require different type of further insurance (long term insurance)
- If you can insure this you can free up the investment strategy for the remainder of the assets
- Will need to consider and allow for expenses in running the fund. Will the fund cover
 - o Investment expenses
 - o Annual assessments etc.
- Will need an allocation to cash for liquidity and expenses

Question 3

Candidates answered part (i) of the question very well, suggesting sound bookwork preparation. The raining part of the question required candidates to be able to consider a new market development from an actuarial perspective. Candidates demonstrated that they had been following the development of cryptocurrencies globally and, for part (iii), were able to identify some of the key risks to including these in an investment portfolio. Part (iii) was, however, for a third of the marks and most candidates did not generate enough points to score a pass mark here. The classic problem of not writing enough was clearly evident here.

Part (iv) was well answered, again suggesting good bookwork preparation. Part (v) was not well answered. Many did not identify the potential for money laundering, an issue which is highly publicized, and focused on protection of the public rather than protecting the currency via policy implementation.

(i)

Commodity:

- Real asset that derives value from real demand (and supply) for variety of inputs into the economy and production of goods.
- Although supply and demand can be used to determine its value, there can be long lag times distorting prices as supply can take time to reach the market
- Diversification is the main reason why an investor would want to invest in commodities
- There is a potential for enhanced returns on the back of strong growth in global demand for certain commodities
- Commodities have historically been believed to exhibit inflation hedging properties, although this does not hold true over all periods and they do go through cycles in the shorter term
- Direct investment in Commodities can also act as protection during times of equity market turmoil

Income generating asset

- An asset that is usually held to generate (usually nominal) cashflows
- Discounted cashflow method applied to predictable cashflows is used to determine the value of the investment which is therefore fairly stable
- Value driven by current and expected interest rates and associated policy
- Credit risk is an important variable to be assessed
- These assets can be substantially driven (away from its intrinsic value) by supply and demand factors or changes in perceived credit risk associated with the investment
- These assets are often used to match a particular liability, or for liquidity or as a low risk asset where capital preservation is important
- Often valued by pensioners as part of an income-producing portfolio
- Can also be used for speculative reasons to gain potential enhanced returns on the back of global and local trends or credit risk

Currency

- The drivers of currency performance include a countries' terms of trade and changes in demand for goods and services in a particular currency
- As well as investors' and currency traders' demand for a currency
- Strongly driven by speculation on the back of the political and economic outlook for a particular country
- Certain currencies (e.g. USD) are perceived as a safe haven in times of global economic uncertainty
- Closely linked to international credit ratings
- Local Investors might invest in a currency to hedge against local import inflation
- Strongly influenced by inflation
- Purchasing Power Parity with other currencies is also a driver of value
- Can also be used for speculative reasons to gain potential enhanced returns on the back of global and local trends
- Backed (and controlled / regulated / protected, at least to some extent) by Central Banks (generally)

Collectible

- Since a collectible has no cashflows, it cannot be valued using DCF methods
- Price can be attached to an emotional value placed on the item, such as perceived desirability or scarcity of object.
- Valuation is therefore often quite subjective
- Can also be used for speculative reasons to gain potential enhanced returns
- Although these items do not exhibit a direct link to inflation, a diversified portfolio of collectables could offer some protection against inflation

Gold

- Historically been used as a store of value and inflation hedge
- And seen as a safe haven in times of market turmoil
- The price is theoretically linked to supply and demand of the physical precious metal but such large volumes of gold are held by Central banks and sovereign wealth funds as well as ETFs and other speculators that the real supply and demand is only a limited factor.
- Value is however largely driven by global economic sentiment and uncertainty

(ii)

- Portability – easy to transfer or keep. Cryptocurrencies can easily be kept (either in a virtual wallet or on a platform).
 - o The transfer of coins is extremely easy.
 - o Security must be assessed. Are they easily hacked?
- Divisibility – currency has to be divisible in order for exact payments to be made.
 - o Parts of a cryptocurrency can be purchased.

- Uniformity – one unit here has the same value as everywhere in the world and it should be relatively stable (price changes should not be too extreme).
 - o To date cryptocurrencies have been very volatile and this is probably the biggest detractor to its usefulness as a currency. Prices are driven by speculation.
 - o There may be arbitrage opportunity between different countries as the value of cryptocurrencies may not be the same
- Limited supply – otherwise it will become worthless
 - o Only a certain amount of crypto coins are usually issued, distributed over a period of time.
- Acceptability – otherwise you can't use it as a form of payment
 - o Not widely accepted. A further big detractor to cryptocurrency's usefulness. Bitcoin is gaining more traction and more vendors are accepting it as a form of payment.
 - o Verification of Bitcoin purchases could be slower than traditional transactions and this hampers use for everyday, smaller items
- Durability – a currency should not devalue due to wear and tear, but only due to economic trends. For ex, if animals are used for a means of payment, sickness (which is not an economic reason) can reduce the value of the unit.
 - o Definitely true for a crypto currency as it is completely digital (except for virus??)

(iii)

- Market Risk/volatility – The risk of reduction in the market value of the investment portfolio due changes is the value of the cryptocurrency e.g. as a result of lower demand for currencies or highly speculative trading activity.
 - o Can be assessed by modelling (e.g.) value at risk – but due to the short time these cryptocurrencies have been around insufficient data exists for modelling
 - o *Mitigation:* Depending on your investor's risk appetite, hold an appropriate % of cryptocurrencies that will ensure that the potential impact is not disproportionate.
 - o *Mitigation :* If a developed market exists in these, can use cryptocurrency derivatives (e.g. bitcoin futures) to manage volatility
- Competition – the risk that a stronger, more versatile cryptocurrency is launched and the one invested in experiences reduced desirability.
 - o This is a significant risk as the technology is young and will continuously be developed.
 - o *Mitigation:* It is critical that the portfolio manager continues to research this asset class and stays on top of all potential new listings that could change the cryptocurrency landscape.
 - o *Mitigation:* Diversification between different types of cryptocurrencies will also assist in limiting the impact of specific new types of cryptocurrency technology that could be introduced.

- Active off-benchmark risk – the risk of underperforming your benchmark. It is very unlikely that the benchmark agreed on would have included cryptocurrencies and as such taking any position in a cryptocurrency will expose the portfolio to active risk.
 - Portfolio construction tools can be used to understand what the allocation to cryptocurrencies should be given risk and returns. And measuring the potential shortfall compared to the benchmark.
 - However given the short term data that is available, care should still be taken when interpreting these numbers.
 - *Mitigation:* Given risks only a small % should be allocated to cryptocurrencies or make a notional change to the benchmark to acknowledge allocation to cryptocurrency
- Operational risk – The risk that platforms are hacked and money stolen or forged?
 - Assess risk control measures put in place by platform(s) used.
 - *Mitigation:* Insurance (if available)
 - *Mitigation:* Invest time in understanding risk and researching solid e-wallets
 - *Mitigation:* Diversify money placement between platforms
 - *Mitigation:* A way to mitigate this risk is to move capital from the platform into private wallet
- Peer risk: To date most asset managers have not invested in a cryptocurrency. Being first mover could give you competitive advantage as being innovative but given the immaturity and volatility of this investment, peer performance risk is significant.
 - Measuring the potential shortfall compared to the peers.
 - *Mitigation:* Ensuring that there is a strong long term investment case that can be defended in the future.
 - *Mitigation:* Explain clearly to investors why you are including cryptocurrencies given investor risk and liabilities and ensure they understand the risks
- Reputational risk – this is not a very well understood investment and well known investors have openly stated their negative views on cryptocurrencies. If a significant loss is made, individuals will be quick to blame bad asset management and controls.
 - Measure the maximum loss in terms of the entire portfolio
 - *Mitigation:* Wait for these assets to mature and develop a stronger track record and then assess sustainability
 - Mitigation:* Ensuring that there is a strong long term investment case that can be defended in the future.
- Regulatory risk – for ex if government prohibits or regulates investment into these investments in the future for certain classes of investor.
 - Measure the possible impact such as maximum loss
 - Assess past trends if such a regulation were changes. For example if the regulatory authority usually includes grandfathering clauses risk could potentially be lower
 - *Mitigation:* Keep up to date with discussions the regulator has on cryptocurrencies. This will give you a good indication if the regulator is thinking about prohibiting these investments and remedial steps can be taken

- Government/political risk – for example if countries ban the use of cryptocurrencies thus reducing the usefulness and value of the currency (especially prevalent as governments believe cryptocurrencies are used to launder money)
 - o Measurement could be to assign probability times maximum loss
 - o *Mitigation:* Track both local and international changes. Key is to keep up to date with cryptocurrency discussion around the world
 - o *Engage with local regulators and asses their views in this regard*
- Exchange Risk – The risk of reduction in the market value of the investment portfolio arising from changes to local exchange rates. This risk arises when you want to sell your investment to convert it to local currency.
 - o Risk can be measured using historical exchange rates and comparing it to cryptocurrency movements. Measurements such as maximum drawdown and volatility can be used
 - o *Mitigation:* Depending on your investor’s liability profile, it might be better to disinvest into a range of currencies to avoid the sudden drop in one particular currency.
- Regulatory Tax risk – change of tax rules on the profits of these assets
 - o Measure the impact if local authorities follow international trends
 - o *Mitigation:* Also look at past trends for similar (or most similar) situations. Keeping up to date with discussion will be key to pre-empt when to sell.
- Concentration risk – if exposure is only to a single (popular) cryptocurrency
 - o *Mitigation:* Try to gain exposure to a basket of cryptocurrencies, subject to correlations exhibiting differences and that the currencies selected are well subscribed and traded
- Modelling Risk – Models used to determine how to incorporate cryptocurrencies in a portfolio may be incorrect – possible due to lack of sufficient data.
 - o *Mitigation:* Scenario or sensitivity testing of models

(iv)

(a)

Retirement member who hasn't saved enough

- Close to retirement, time horizon might be short for monies earmarked for cash withdrawal versus purchase of an income
 - o The investment is very volatile, and as such it will be difficult to predict the outcome on a shorter term basis. This is particularly dangerous for a member who needs the capital soon after retirement
- The time horizon of a retirement member is not ‘to retirement date’ but it is important to look beyond retirement until life expectancy when providing an income so even close to retirement the time horizon is actually long. In this case the member’s cost of purchasing an income is likely to be linked to long term interest rate expectations which represents a mismatch.
- Further from retirement - his time horizon is longer and will have a long term investment view.

- If the member believes that the technology and investment case is strong, then it might be a good investment
- Based on recent trends, it could offer very good diversification benefits but very volatile
- The member's liabilities are based locally and cryptocurrencies will not be a matching asset in terms of currency?
- If discretionary monies are used, no regulatory restrictions apply. Regulation 28 hasn't made provision for cryptocurrencies thus investment in cryptocurrencies through your retirement fund is prohibited.
- Even if a decision is made to include exposure to cryptocurrencies, it will likely be very small (less than 5% of total assets) as it is very volatile, lacks a meaningful way to calculate fair value and is in a bit of a mania phase at the moment
- However, even though regulation might not exclude investment in cryptocurrency via other vehicles at the moment, this may change and there is a risk of regulatory changes as it becomes more popular.

(b)

Individual saving for dream overseas holiday next year

- This will be a purely speculative investment
- The time horizon is short and
 - The individual can afford to lose the entire investment (and not go on holiday)
 - The upside potential is that they have a better holiday
- Since he'll be spending international currency, a cryptocurrency might be a better match (depending on the crypto currency acceptability in country to be visited)
- Volatility is high – making planning and timing of the holiday a bit tricky
- Should always have a diversified investment even for a short term plan / need like a holiday – all in cryptocurrency wouldn't be advised
- Hedging in the currency of your destination would be a more sensible plan

For all – what is the likely tax treatment of cryptocurrencies and is this likely to change

(v)

(a)

- The primary function of the Reserve Bank is to protect the currency of the country and to implement monetary policy and control inflation (implement inflation policy)
- To protect the value of South Africa's currency.
 - This is done by legislation such as the exchange control measures (currently R10m + R1m discretionary allowance and a maximum of 25% offshore for pension funds and 15% for insurers)
 - The SARB is responsible for the printing of money to ensure sufficient or limited supply is available in the market

- Sets the repo rate
 - o Manages inflation between set targets (3-6%) by implementing the monetary policy
 - o Also used as a form of economic stimulation for GDP as a secondary objective
- Ensuring that the South African banking system is sound
 - o For example SARB has the authority to fund banks if it feels it will protect the banking system
 - o For example also has the authority to appoint a curator when a bank becomes financially stressed to protect the public's interests
- SARB publishes the Leading Economic Index which indicates the direction of economic activity
- Implementation of Fiscal policy and acts as banker to government
- Manages foreign reserves
- Provides liquidity to the banking system
- Lender of last resort to banks
- Taxation (foreign investments)

Any other answers corresponding to information provided on the SARB website were awarded marks.

(b)

- Cryptocurrencies fall outside the jurisdiction of SARB and as such they cannot protect South Africans or South African companies who use this as an investment or form of payment. Government might feel it is in the interest of the public to be able to apply protection
 - o It might also feel that it is protecting South Africans as some cryptocurrencies have actually only been ponzi schemes in disguise.
- Because of the ease and anonymity of trading in these currencies, it can easily be used by criminals to launder money. Again the SARB might feel this is sufficient reason to eliminate the use of cryptocurrencies to combat criminal activity.
- In the extreme, if a cryptocurrency is used by all South Africans it will not be able to protect the value of the South African Rand as it will not have any implementation tools to use that will influence the value of the cryptocurrency.
- The intention is that South Africa only has one means of trade. By the introduction of cryptocurrencies this intention is violated