



Institute
and Faculty
of Actuaries

EXAMINERS' REPORT

SA7 - Investment and Finance

Specialist Advanced

April 2023

Introduction

The Examiners' Report is written by the Chief Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

For some candidates, this may be their first attempt at answering an examination using open books and online. The Examiners expect all candidates to have a good level of knowledge and understanding of the topics and therefore candidates should not be overly dependent on open book materials. In our experience, candidates that spend too long researching answers in their materials will not be successful either because of time management issues or because they do not properly answer the questions.

Many candidates rely on past exam papers and examiner reports. Great caution must be exercised in doing so because each exam question is unique. As with all professional examinations, it is insufficient to repeat points of principle, formula or other text book works. The examinations are designed to test "higher order" thinking including candidates' ability to apply their knowledge to the facts presented in detail, synthesise and analyse their findings, and present conclusions or advice. Successful candidates concentrate on answering the questions asked rather than repeating their knowledge without application.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Sarah Hutchinson
Chair of the Board of Examiners
July 2023

A. General comments on the *aims of this subject and how it is marked*

The aim of Investment and Finance Advanced (SA7) is for the student to develop a broad working understanding of financial and investment markets, across all major areas of investment expertise. The intent is to achieve expertise up to a level that allows for critical analysis of others, rather than up to the level of full specialist expertise in any particular area.

Candidates should ensure that their answers are sufficiently detailed to demonstrate understanding, as there were instances where inadequate explanations led to candidates scoring less well on questions than they might have done. The model solutions are intended to reflect the level of detail that a high scoring candidate might be able to produce. For many questions there are more marks available than the question requires to achieve full marks. This reflects that the examiners will give credit for valid alternative solutions, particularly in questions focussed on higher level skills.

Candidates who make relevant and well-reasoned points, not in the marking schedule, are awarded marks for doing so.

B. Comments on *candidate performance in this diet of the examination.*

Most candidates made reasonable attempts at all the first three questions, with question 4 less well answered. Candidates scored less well on those questions requiring in-depth analysis, evaluation and synthesis (creation of new solutions) such as the solutions required of a qualified actuary in practice. Typically, candidates scored better on those questions only requiring them to state their knowledge or apply it to a set of facts. To achieve a pass mark at the Specialist Advanced level, candidates will need to demonstrate their ability to analyse, evaluate and create new solutions.

Well prepared candidates were able to score highly across all four questions demonstrating their ability to apply their SA7 knowledge and techniques to a range of familiar and unfamiliar scenarios.

Candidates are reminded to ensure that their answers are relevant to the question and the scenario. Candidates are also reminded that to score well on longer questions, a broad range of points will need to be made.

With the computer based format candidates benefit from the ability to carry out calculations in Excel. It is important that assumptions are stated, and intermediate steps or formulas for calculations are shown so that maximum credit can be given.

C. Pass Mark

The Pass Mark for this exam was 58.
97 presented themselves and 42 passed.

Solutions for Subject SA7 - April 2023

Q1

(a)

What risk metric which will be used to place the loans into different funds? [1]

What is the risk profile of the loans - factors to consider which would impact the risk profile would include:

Ages of borrowers [½]

Borrower credit worthiness related to metrics such as credit scores [½]

Geographic location of borrowers [½]

Borrowers' employment status [½]

Number of loans [½]

Loan size - any large loans? [½]

(Credit not given for proxy measures such as lending interest rate, maximum 4 points)

What is the size of the loan that can be recovered when loans default [1]

Are there factors that could lead to receiving payments earlier than anticipated. [1]

[Marks available 5, maximum 3]

(b)

The funds allow an investor to have a clear understanding of the level of risk associated with their investment [1]

The funds allow an investor to make investment decision when considering loans with different risk profiles as they will have a better understanding of their relative risk profiles [1]

This can also help investors make a clear risk-reward choice when considering loans across the different funds [1]

(Other reasonable comments were also given credit)

[Marks available 3, maximum 2]

(c)

Do Oasis have sufficient expertise to appropriately determine the underlying risks within the loan? [1]

Will there be a large number of loans or a few large loans? [1]

Will there be differing loan sizes across the different credit qualities? [1]

How does concentration risk get factored into the determination of risk? [1]

Are there any potential conflicts of interest when Oasis place loans into funds? [1]

No certainty of lower default rates in higher credit quality funds, although this is the expectation [1]

[Marks available 6, maximum 3]

(ii)

The relative proportions in different funds will determine the level of credit risk and return [1]

It is likely that the level of defaults will be very low in the senior fund, which will have the lowest yields [1]

However the level of defaults will depend on the credit rating criteria [1]

The junior and equity funds will most likely experience higher levels of defaults [1]

This will reflect weaker credit profiles for the borrowers [1]
 or that they have secured loans such as mortgages to repay first if they default [1]
 The mix of funds, together with the credit underwriting criteria will determine the
 overall level of risk and return of the fund of funds [1]
 [Marks available 7, maximum 5]

(iii)

Pre-payments will reduce the interest received over the investment horizon of a
 fund, hence the return achieved will be lower [1]
 Penalties paid for pre-payment will reduce the impact on total return achieved but
 this is unlikely to make up for future interest which would have been received [1]
 Defaults will reduce the level of total return because a proportion of future cash
 flows will not be received [1]
 These cash-flows may be some or all of the interest payments as well as the
 principal [1]
 The amount which can be recovered in default will reduce the impact of a lower
 return [1]
 The timing of when recovered amounts are received will also have a bearing on the
 level of total return achieved as it may be possible to re-invest funds if they are
 received in a timely manner [1]
 [Marks available 6, Maximum 4]

(iv)

Pre-payments will likely impact interest-only investors [1]
 As the interest payable to them will likely be reduced if the payments are paid
 earlier without adequate penalties being paid for those who prepay [1]
 The impact on which IO investors are more impacted will depend on when pre-
 payments occur but those with shorter investment horizons are less likely to be
 impacted than those with longer horizons [1]
 (*credit given for comments about principal-only investors*)
 [Marks available 3, maximum 2]

(v)(a)

Risk metrics allow an investor to understand the level of relative risk embedded
 within investments made [1]
 The expectation is that higher risk investments will receive higher returns [1]
 Investors can also use risk metrics to determine if they have the appetite to invest in
 specific assets as many will have risk tolerance levels beyond which they will not
 invest [1]
 Risk-adjusted returns can be used by investors to find the best asset for a given level
 of risk [1]
 [Marks available 4, maximum 3]

(b)

Both metrics allow an investor to determine the variability of return on the funds and
 compare this with other investments. [1]
 The first metric looks at the variability around the risk-free rate and this is not
 necessarily the target return [1]
 In addition, the first metric would penalise variability above the market return, which
 should not be viewed negatively [1]

The second metric allows variability below a specified target return and this is more suitable for investors who have specific return targets [1]
 The second metric is more appropriate as variability above the target return is not penalised. [1]
 Neither metric gives an indication of the level of loss an investor can suffer [1]
 Neither metric allows an investor to assess how the return is impacted by different elements of risk associated with the security. [1]
 [Marks available 7, maximum 4]

(vi)(a)

VaR is the loss expected at a given confidence level over a specified time horizon [1]
 In order to calculate VaR the expected loss for the fund will need to be performed by projecting the fund value for the relevant horizon [1]
 It might be difficult to choose a time horizon which allows the requirements of all investors to be taken into consideration [1]
 Similarly choosing a confidence level which is suitable for all investors given differing investment risk appetites will be difficult. [1]
 Determining a multivariate distribution that allows for the potential heterogeneity of the loans within the fund will be difficult [1]
 Even if the loans are homogenous, allowing for the nature of credit risk and its impact on losses is difficult using standard distributions [1]
 Determining the dependency between loan defaults and recoveries is a key aspect of simulating losses directly and it will be difficult to determine the best way to model this dependency [1]
(Credit given for comments on historical calibration or parametric model)
 [Marks available 7, maximum 4]

(b)

A number of key variables will need to be estimated for the fund and this increases the level of uncertainty in the calculated VaR [1]
 VaR gives an indication of the loss at a given confidence level and horizon but it will not allow the investor to understand the level of loss that could be experienced beyond the chosen confidence level [1]
 The parameters used to calculate VaR may not allow appropriate differentiation between loans that sit within the fund [1]
 The calculated VaR number can be substantially different depending on the method used to calculate it [1]
 The VaR time horizon is limited by the underlying loans but this may be different to the investment time horizon [1]
 [Marks available 5, maximum 4]

(c)

Similar to VaR this metric will not allow the investor to understand the likely loss if one does occur beyond the VaR confidence level [1]
 The characteristics of the loans in each fund can change over time, and therefore the VaR and TVaR predictions from past data will not reflect the current portfolio [1]
 TVaR often has greater sensitivity to choice of assumptions than VaR [1]
 [Marks available 3, maximum 2]

[Total 36]

Overall, fewer than half of candidates achieved the pass mark on this question.

Parts (i), (iii) and (vi) were the best answered, reflecting their greater knowledge and application bias. Some candidates scored less well than they might have by focusing on a narrow range of comments in their answers.

Parts (ii), (iv) and (v) were less well answered, in many cases because candidates didn't take sufficient account of the specifics of the scenario in their answers.

Q2

(i)

Economic growth is likely to decline relative to expectations prior to the taper [1]

Economic growth is likely to be lower because less money will be printed,
resulting in a smaller wealth effect [1]

and because inflation might be lower, resulting in a relatively lower nominal
economic growth [1]

The overall effect depends on the size of the taper [1]

if it is relatively small, the momentum of the existing policy might dominate over,
with economic growth continuing but at a slower pace [1]

or if it is larger, the effect would be more substantial [1]

(Other reasonable comments were also given credit)

[Marks available 6, maximum 3]

(ii)

QE is likely to have caused increased price pressure in economies, albeit mostly in
asset markets [1]

Because QE increases asset prices, it also increases the cost of living of different
aspirational lifestyles, e.g. owning a home [1]

The unprecedented QE policy is likely to be inflationary because of the supply
shocks from the pandemic [1]

Tapering of the QE policy is likely to reduce this impact over time [1]

(Other reasonable comments were also given credit)

(iii)

Asset prices are likely to fall relatively speaking [1]

Asset prices are likely to have risen based on expectations of future asset
purchases and to the extent that the taper is unexpected, they will fall [1]

If the taper is well flagged by central bankers, the fall in asset prices is likely to
occur before the actual taper [1]

Again, the actual impact will depend on the size of the taper [1]

If the central bankers are prudent, they will likely reduce significantly the
emergency measures, albeit they might decide to risk overheating the economy rather
than to risk social disturbance until the pandemic is fully over [1]

Overall investment markets will move depending on whether they consider the
change in policy to be beneficial or detrimental to long-term asset valuations and
also taking into account the impact it will have on continued liquidity in the
market [1½]

(Other reasonable comments were also given credit)

[Marks available 6 ½, maximum 3]

(iv)

The impact on pension schemes will depend on their level of interest rate hedging and their asset allocation [½]
[½]

If they have a high hedge ratio, their funding level is likely to be stable as asset values and liability values are likely to reduce by similar amounts as bond yields rise [1]

If they have a low to medium hedge ratio, their funding level is likely to improve as asset values are likely to fall by less than liability values as bond yields rise. [1]

Tapering will likely moderate the existing impact from the QE policy [1]

(Other reasonable comments were also given credit)

[Marks available 4, maximum 3]

(v)

Many investors in bonds are forced buyers [1]

For example, pension funds and insurance companies [1]

They often need to buy them for regulatory or matching purposes [1]

Their long-term investment strategies might rely on positive returns for their profitability or to accumulate adequate funds for paying pensions [1]

But having to buy bonds that lock in negligible or negative nominal returns is likely to impede this [1]

and hence require investing in other assets with higher returns [1]

If they do not buy bonds, they face a mis-match risk [1]

This can also have regulatory impacts, for example the need to hold higher reserves [1]

Real returns will be even lower, except in a deflationary environment [1]

This is particularly pronounced for those investing in long-term bonds [1]

e.g. life insurance companies and pension funds [1]

and less so for general insurance companies [1]

(Other reasonable comments were also given credit)

[Marks available 12, maximum 6]

[Total 19]

Overall, fewer than half of candidates achieved the pass mark on this question.

Parts (i) and (iii) were well answered by most candidates, reflecting their familiarity with QE. Disappointingly, part (ii) was less well answered, in part because some candidates focused on the impact of the pandemic on inflation rather than the interest rate tapering.

Part (iv) was reasonably well answered, although some candidates made very detailed comments on leveraged hedging strategies rather than discussing asset liability matching more generally, thus missing marks.

Part (v) was poorly answered, within only a few candidates commenting on the distribution of prospective returns on bonds from a low yielding starting point, and the risk-return trade-off this implies.

Q3

(i)

Ego is considered the filter through which an individual sees the world [1]

because psychologically individuals are considered to see the world partly the way the world is and partly the way they are [1]

This is different from the common usage that often means somebody with too much self-regard or with too much egocentricity [1]

(Other reasonable comments were also given credit)

(ii)

An individual who is seeing the world closer to the way it is and less the way they are, is considered to have a healthy ego [1]

and vice versa [1/2]

For an investor to make realistic assessments of an investment, they need to have a healthy ego [1]

Otherwise, when they are likely to react poorly to changes in investment conditions [1]

They can become overconfident in response to good investment returns, it can go to their heads [1]

and they can fail to have adequate stop losses for investments that go poorly [1]

(Other reasonable comments were also given credit)

[Marks available 5½, maximum 5]

(iii)

Valuation metrics on their own are only shallow or weak narratives [1]

They are most appropriate for companies in relatively stable trading conditions [1]

For companies expected to go through significant growth they need to be seen in context [1]

Investors who have been buying the new electric car market can be doing so based on a narrative about the future of the company, perhaps also expanding into new markets and or it potentially becoming the main brand, e.g. the Apple of electric cars [1½]

Those shorting the electric car company are likely to be using narratives based on more traditional metrics [1]

If the company is in a bubble, often investors who short it cannot stay solvent longer than the market can stay irrational [1]

(Other reasonable comments were also given credit)

[Marks available 6 ½, maximum 6]

(iv)

Little meaningful Nous has likely been applied because the investor has largely taken the idea from a TV programme [1]

There is little evidence that his/her idea is unique or considered from different angles [1]

The narrative is more like the narrative of an 'amateur investor' than a 'professional investor' because the downsides of taking the short position don't seem to be well covered [1½]

The overall narrative appears shallow or naïve [1/2]

and there is little or no evidence of a competitive advantage over other investors [1]

Because the investor's narrative is poor, they are more likely to engage Ego-defence mechanisms if the positions goes wrong, as has happened [1]

resulting in the investor failing to see any of their errors and repeating their original mistake [1]

There is mention of losses being taken but there is no mention of a stop loss, nor the reasoning behind it, or the investor's discipline to enact it [1]

(Other reasonable comments were also given credit)

[Marks available 8, maximum 6]

[Total 20]

This question was answered well by nearly all candidates, with the average mark above the pass mark for the paper.

Parts (i) and (ii) were very well answered by almost candidates, reflecting their knowledge and application bias.

Candidates scored slightly less well on parts (iii) and (iv). Where marks were lost, this was mostly due to insufficiently detailed descriptions or not linking investment behaviours to ego, nous and pyr as drivers for these behaviours.

Q4

(i)

Independence will lead to a large currency mismatch [½]

and also a cross-currency interest rate mismatch [½]

This is because the liabilities will change from being 100% linked to the M\$ to being 90% in H\$ and 10% in L\$ [1]

They will also be discounted based on the corresponding interest rate curves [1]

Meanwhile the government bond assets will move from being 100% linked to the M\$ to being 20% in H\$ and 80% in L\$ [1]

It is likely that the majority of M\$ corporate bonds will be denominated in L\$, but some may follow the government bond precedent [1]

This will lead to a potential shortfall of 70% or more in H\$ exposure relative to the liabilities, which will need to be managed [1]

Unless the mismatch is addressed the level of asset-liability risk will be increased compared to the pre-independence position [1]

The separation of the two currencies is likely to lead to a period of initial volatility due to price discovery and fragmentation of liquidity [1]

(Other reasonable comments were also given credit, not no overseas assets held)

[Marks available 8, maximum 6]

(ii)

As asset-liability risk has increased and there have been no regulatory capital easements [1]

NFIC will need to address the new mismatches to manage its regulatory capital position [1]

The mismatch will need to be managed through a combination of the following methods and instruments:

Asset switches from L\$ assets to H\$ assets - government and corporate bonds [1]

Removal of excess L\$ interest rate exposure - bond futures, interest rate swaps [1]

Addition of L\$ interest rate exposure to address shortfall - bond futures, interest rate swaps	[1]
Removal of currency risk - currency forwards, currency futures, currency swaps	[1]
Not all instruments will have immediate liquidity in the aftermath of independence, so a combination of approaches will need to be used	[1]
Close attention will need to be paid to transaction costs	[½]
and the volatility of the relevant L\$ vs H\$ bases	[½]
It may be possible to pre-hedge some of the mismatch prior to independence.	[1]
However this could be expensive unless there is offsetting demand from other investors	[1]
as banks would need to hold reserves against the mismatch risk if they cannot offset flows	[1]
<i>(Other reasonable comments were also given credit)</i>	

[Marks available 11, maximum 9]

(iii)(a)

Constructing climate risk ratings:

As the new internal ratings are focussed on climate risk only, it is likely that they will consider a narrower range of criteria than the existing green bond ratings	[1]
The rating framework should form a view on the climate impact and climate risk of the projects that the green bonds are financing, based on the agreed scale	[1]
This will involve detailed scrutiny of the bond prospectus and supporting materials and scrutiny of government disclosures to understand how funds raised are deployed in practice.	[1]
There may be third-party analyses that are helpful in this purpose, although it is preferable to rely on primary data sources	[1]
This may need to be supplemented by Freedom of Information requests, where this is possible	[1]
In particular, due diligence is needed to ensure that green finance is not used for existing agreed green expenditure	[1]
and to understand how much of an impact new expenditure actually will have	[1]
This can only be monitored after a bond is initially rated and would be captured in revised ratings for existing bonds and for new bonds issued under the same financing programme	[1]
The rating will also need to determine whether it takes account of the current footprint of the government, and/or the direction of travel	[1]
It is desirable to ensure ratings are globally consistent across different countries	[1]

[Marks available 11, maximum 6]

(b)

Complexities:

A key challenge is that green bond funds will have been deployed by the Midland government pre-independence	[1]
This may not be a reliable indicator for how the Lowland and Highland governments will deploy funds in future	[1]
or even how they will deploy existing funds that were raised pre-independence	[1]
Over time it is likely that Lowland and Highland green government bond ratings will diverge according to their governments' priorities	[1]
However in the interim it is likely that similar ratings would be given based on	

historical data on projects financed [1]

Account may be taken of commitments made by either government but these would need to be carefully scrutinised [1]

[Marks available 6, maximum 4]

[Total 25]

This question was the least well answered question on the paper, with the average mark somewhat below the pass mark for the paper. The examiners also noted that a number of candidates struggled to complete the paper in the available time and this may have been a contributory factor. However some candidates did score strongly on this question.

Parts (i) and (ii) focused on the impact of economic changes on asset liability matching. The majority of candidates correctly identified the impact, but only a minority provided a sufficient depth and breadth in their commentary to score well.

Part (iii) was less well answered than the other two parts. Only a few candidates gave a clear explanation of how ESG ratings for investments might be constructed, and some of the complexities (e.g. data, consistency) that would need to be addressed. The examiners recognise this is a relatively new part of the course, however it is an increasingly important topic, and one where there is significant ongoing innovation.

[Paper Total 100]

END OF EXAMINERS' REPORT



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