Institute and Faculty of Actuaries

EXAMINERS' REPORT

SA7 - Investment and Finance

Specialist Advanced

September 2022

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.

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
December 2022

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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 three questions, achieving lower marks in questions 2 and 3 which were more challenging. Candidates tended not to score very well on the higher order parts of questions, however scored better on knowledge and application parts of questions. Well prepared candidates were able to score highly across all three 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 shown for calculations are shown so that maximum credit can be given.

C. Pass Mark

The Pass Mark for this exam was 59
90 presented themselves and 34 passed

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Solutions for SA7 - September 2022

Q1
(i)(a)
Forestry investment: £1,492,376
(2 for method, ½ for correct answer - see Excel)

(b)
Passive equity fund: £1,043,962
(2 for method, ½ for correct answer - see Excel)
Assumptions, (e.g. pension investments made mid-year, beginning on 30th birthday, ending on 70th birthday, fund accumulated to 70th birthday, no tax, returns are net of fees)
(Credit given for other assumptions) [7]

(ii)
Forestry investment: £1,341,086
(1½ for method, ½ for correct answer - see Excel)

Passive equity fund: £967,522
(1½ for method, ½ for correct answer - see Excel)
(Both calculations above are more complex than (i) but work from (i) can be used)

Additional assumptions (e.g. initial investment is assumed to be £2,000 at age 30 increasing by 3% at each subsequent birthday, with contributions ending at age 70) [1]
(Credit given for other assumptions) [5]

(iii)
In the flat contribution case, forestry investment results in an accumulated fund that is over 40% higher than under the equivalent equity fund [1]
In the increasing contribution case, the forestry fund is slightly less than 40% higher than the equity fund [1]
the increase being moderated by the relatively later investment profile [1]
For many of the citizens, particularly those on lower incomes, such an increase would make a noticeable impact on the financial means available in retirement [1 ½]
(Other reasonable comments were also given credit)
[Marks available 4½, maximum 3]

(iv)
Individual risks:
Forestry investment involves investing in timber as a commodity so the returns will be linked to timber prices [1]
This gives rise to a risk that timber prices will perform less than expected over the duration of the investment [1]
Also importance is how well timber prices performance relative to consumer price inflation [1]
Whilst the risk is that they perform less well compared to increases in the cost of living or relative to salary inflation [1]
timber prices have a strong historical track record of increasing faster than consumer

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prices [1]
This risk can be managed by attempt to avoid investment when timber prices have spiked higher and delaying harvesting of timber during times of depressed timber prices [1½]

Hazard risks:
Storm damage [½]
Fire damage [½]
These risks can usually be substantially managed by forestry insurance [1]
Other hazards include frost damage during the early growth [½]
which can be managed by replanting of saplings damaged by frost [1]
There are usually pest risks, for example from animals, (sheep, deer, etc) that eat the bark and damage the trees [1]
this can be mitigated by tree protection methods, e.g. adequate fencing or using deer protectors [1]
There is also disease risk, and risk from insects [1]
and this is difficult to mitigate [½]

Forestry management risks:
The trees planted also face a number of risks that can result in poorer than expected biological growth [1]
This can arise from poor forestry management practice [½]
such as poor site selection [½]
poor maintenance of the site [½]
or failure to thin the crop at suitable times [½]

Economic and regulatory risks:
Forestry is considered to have a liquidity risk as it can take time to sell down a forestry investment and the price might need to fall to get a quick sale [1]
This can be mitigated by planning any sales well in advance [½]
This is possible in a well-managed pension fund [½]
Ideally forestry involves investing in a diversified portfolio across profitable tree types, geographical location etc [1]
Insurance is usually available but there is a risk that it might become less available in the future as it is insured usually on a rolling annual basis [1]
There is usually substantial regulatory risk arising from changes in regulations that can reduce the returns available [1]
for example, limiting the replanting of commercial forestry trees and mandating the planting of trees that are loss making [1]
Forestry can have limited transparency so fraud risk exists and can be substantial especially where there is a lack of expertise and experience [1]
In many countries forestry is tax-free but there is a risk of an adverse change in these circumstances [1]
When investing outside your currency zone, there is a currency risk [1]
Technology has seen continual improvement in forest in recent decades and centuries and there is a risk of this slowing down [1]
Another risk is that of a limited availability of forestry investment sites and consequent capacity issues [1]
(Other reasonable comments also given credit (no credit for wider points on DC

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investment objectives, which are part of the solution to (vi))

[Marks available 27½, maximum 16]

(v)

The impact of inflation on equity prices is complex [½]

Historically the correlation between equity returns and consumer prices is near zero on an annual basis and only marginally positive on a 3 or 5 year average basis [1]

Higher inflation can mean higher prices achieved by companies but higher inflation usually necessitates tighter monetary or fiscal policy to reduce inflation, and this can be detrimental to equity returns [1]

Higher inflation at present is likely a significant risk for equities if it leads to significant reductions in QE asset purchases [1]

The impact of inflation on forestry is more straightforward. If timber prices rise, forestry returns directly increase [½]

for a diversified portfolio with regular harvesting / thinning [½]

Higher inflation can also lead to higher costs of harvesting [½]

Historically technological improvements have kept harvesting costs either fixed in nominal terms or at least lower than timber price increases [½]

(Other reasonable comments also given credit)

[Marks available 5½, maximum 5]

(vi)

Forestry has advantages and disadvantages in terms of suitability

Forestry returns have historically outpaced equity returns, traditionally considered the asset class with the highest investment returns [1]

Timber prices have historically outpaced consumer prices making them a good match for salary inflation [1]

Forestry returns as well as being real, have a stronger correlation with inflation than equity returns [1½]

There is not a strong historical tradition of investing in forestry in pension funds, though some funds have done so for many years [1]

so there is limited existing expertise amongst advisors [½]

(Other reasonable comments also given credit)

[Marks available 5, maximum 4]

[Total 40]

This question was answered reasonably well by most of the candidates, with the average candidate achieving a pass mark on this question.

Part (i) was well answered although some candidates did not state all assumptions made.

Part (ii) was less well answered, with a number of candidates not stating key assumptions.

Part (iii) was generally well answered.

Part (iv) was less well answered on average. To score well in this part a broad range of relevant points needed to be made covering the headings given.

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Part (v) was less well answered on average. Less prepared candidates didn't discuss the impact of inflation on equity returns, losing marks.

Part (vi) was well answered by candidates.

Q2

(i)

Pros: Published Indices

Easy to do [½]

Data readily available, and accurate [½]

Pros: Peer Group

Gives an indication of the cost or benefit of a strategy, relative to those adopted by other funds [1]

Pros: Benchmark Portfolio

Benchmark portfolio can be constructed to reflect fund objectives [1]

Can be helpful in aligning fund manager's interests with liability requirements. [1]

Cons: Published Indices

Index may be inappropriate for investor's objectives [1]

Cons: Peer Group

Comparison may be inappropriate if other funds have very different objectives [1]

General Cons:

All methods look at past performance only, so are not a reliable guide to the future [1]

Assessments do not take account of risks taken by managers [1]

(1 mark for naming all three methods correctly. Credit given for alternative answer discussing money-weighted vs time-weighted returns)

[Marks available 8, maximum 6]

(ii)

	Year 1	**Year 2**	**Total**	**Actual-Expected**
Actual	6.50%	6.25%	13.16%	
Index	6.50%	6.00%	12.89%	0.27%
Peer group	6.00%	5.50%	11.83%	1.33%
Benchmark	7.20%	5.60%	13.20%	-0.05%

(1 mark for correct total return for actual, index, median and benchmark, 1 mark for correct comparisons)

[5]

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(iii)
If the asset allocation is set by the manager, then the benchmark return is the best comparator to actual return, as this allows for the manager's discretion in setting asset allocation. If this is not the case, then the index return is a more suitable comparator, as the asset allocation will have been set by someone else [2]

(iv)
Cash allocation:
The calculations could incorporate an allowance for a cash allocation, perhaps up to 2% [1]
This would affect the actual, index and benchmark returns calculated using the data provided, but the peer group return would not change [1]

Fees:
The calculations could be amended to ensure that returns are being assessed on a net of fees basis [1]
This may affect the actual and benchmark returns, depending on whether net or gross returns have been used for Fund A [1]
This may also affect the peer group return [½]
Within the index return, an allowance for fees for an index fund would need to be built in [1]

ESG integration:
This is more complicated to allow for, as the peer group may have similar or different levels of ESG integration within their investment processes [1]
Similarly, the indices used within the analysis are likely to be broad market indices, and so would not necessarily be suitable [1]
It may be possible to identify indices that incorporate ESG tilts within their index construction [1]
which could be more suitable depending on the rules they have adopted [½]
although they may not necessarily be better than a broad market index for analysing Fund A [½]

[Marks available 9½, maximum 7]
[Total 20]

This was the least well answered question on the paper, with most candidates achieving less than the pass mark.

Part (i) was generally well answered although some candidates focused on risk adjusted performance metrics rather than performance measures. Credit was given in (i) for this approach.

Part (ii) was less well answered than (i). Candidates who used risk adjusted performance metrics in (i) and didn't expand the range of metrics in this part were unable to provide complete answers to this question.

Part (iii) was poorly answered as it followed on directly from (ii).

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Part (iv) was poorly answered. To score well in this part of the question, adjustments to the performance measurement calculations needed to be suggested for each of ESG considerations, cash positions and management fees.

Q3

(i)

These organisations would need to complete projects such as purchasing equipment for schools in an underprivileged area or the development of community projects [1]

Delaying the completion of these projects would have a negative impact to the communities who would benefit from them [1]

Hence provision of finances prior to grants being received will provide significant benefits [1]

(ii)

Option 1:

Using equity provided by founders means that the firm will not need to go through the process of borrowing funds [1]

This means funds will be available quicker [1]

And given the lack of a balance sheet and credit history difficult underwriting processes or expensive capital are avoided [1]

Determining the cost of capital is more difficult when using equity capital [1]

Using the equity capital means that there will be less flexibility for funding other business activities [1]

Option 2:

Borrowing from other firms likely means that there will be a lengthy underwriting process given the lack of financial history of the firm [1]

It is possible that the cost of capital when borrowing from other firms will be materially higher [1]

The cost of capital will be easier to determine when borrowing from other firms [1]

Borrowing from other firms means that it will be easier to continually raise funds at different points in time [1]

And it will also be possible to borrow large amounts [1]

Option 3:

Acting as an intermediary means there is likely to be a lower profit margin [1]

Processes will also need to be put in place to complete third-party underwriting processes which reduces profits further [1]

(Credit given for other relevant comments)

[Marks available 15, maximum 11]

(iii)

Source of funding:

What is the appetite to borrow from corporations that are outside of the UK and is this limited to certain regions? [1]

Will currency mismatches be hedged when funds are borrowed from firms outside the UK? [1]

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Will any currency hedges be only partial hedges of will attempts be made at hedging most or all of the nominal amounts? [1]
Will currency hedges need to be precise from a maturity perspective? [1]
Will UA be willing to borrow from firms that provide greater funding flexibility but with a much higher cost of capital? [1]
Will UA be willing to hire from non-financial firms that may be looking to satisfy CSR requirements? [1]
What are the range of capital costs if funds are borrowed from differing regions/countries globally [1]
How long does it take for organisations to receive funding from government bodies once this has been requested? [1]
What is the attitude of government bodies to organisations to which they provide funding seeking liquidity in private markets? [1]
Can repayment terms and contracts be drawn up with the government bodies providing funding to reduce credit risk? [1]

Loan structure and payment timing:
What will be the potential timing mismatches between when borrowed funds need to be repaid and when loan repayments are made? [1]
How are repayments structured (lump sum or multiple repayments)? [1]
What is done with money received prior to borrowed funds need to be repaid? [1]
What is done if borrowed funds need to be repaid but loan repayments have not been received in full? [1]
How much interest can be charged on late repayments? [1]
What is the likely volume of loans and what is the range of loan sizes? [1]
(Credit given for other relevant comments)

[Marks available 16, maximum 13]

(iv)
A repo is a collateralised loan where the lender receives an asset that the borrower will repurchase for a higher price at a future date [1]
A total return swap (TRS) is a transaction between two counterparties who exchange the returns on two different underlying assets [1]

(v)
With a repo UA will be able to use standardised terms to determine the return which they can get for each particular loan [1]
And the collateral received will underpin the value UA can receive from the transaction [1]
One challenge with setting up a repo is the range of asset which government bodies will be able to use as collateral within each deal [1]
Dealing with global CBOs means that UA will need to be in a position to construct repos in various jurisdictions which could be challenging if repo markets are not mature in all regions [1]
Some of the assets may not be suitable due to poor marketability which could lead to UA having to wait before they get their funds if they have to sell the asset [1]
Total return swaps will also fix the returns UA receive at the outset depending on which returns they agree to receive [1]
Even in the case where UA receive a return linked to a floating rate, this is more well defined [1]

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And that could allow UA to include this well know floating rate definition within their payment terms to firms they borrow from [1]
It may be difficult to get a counterparty who will be sufficiently interested in the profile of return being offered by UA's loan portfolio [1]
Using a TRS introduces significantly more counterparty risk than alternative structures [1]
Conversion of various currencies would need to be dealt with if TRS structures are centralised in a particular region [1]
There may be differences in credit risk in a scenario where a loan is made and the pledged grant is withdrawn or amended [1]
This will depend on the contractual terms underlying the repo or TRS transactions [1]
and whether the counterparty is exposed to the credit risks of the loan or of UA [1]

[Marks available 14, maximum 11]

[Total 40]

The majority of candidates achieved less than the pass mark on this question.

Part (i) was generally well answered although some candidates did not understand that UA was providing bridging finance, in return for a haircut on grants as compensation for credit risk.

Part (ii) was well answered in most cases, although some candidates didn't explain that a key difference of Option 3 is that credit risk is being transferred unlike with the other two options.

Part (iii) was poorly answered by most candidates. To score well candidates needed to comment on mismatches between sources of funds and the return on loans, and uncertainty about the levels or timings of grants.

In Part (iv) candidates performed well.

Part (v) was reasonably well answered. Candidates needed to explain which risks were being transferred under the two structures, and how these structures might result in changes to the risk and return of the loans.

[Paper Total 100]

END OF EXAMINERS' REPORT

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