

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2015

Subject SA6 –Investment Specialist Applications

Introduction

The Examiners' Report is written by the Principal 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.

F Layton
Chairman of the Board of Examiners
December 2015

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

1. The aim of the Investment Specialist Applications subject is to instil in successful candidates the ability to apply knowledge of the United Kingdom investment environment and the principles of actuarial practice to the selection and management of investments appropriate to the needs of investors.
2. Candidates are reminded to 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. 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.

B. General comments on *student performance in this diet of the examination*

This paper was relatively well answered. Candidates in general demonstrated a good grasp of Core Reading and were able to apply this knowledge in familiar situations. A number of candidates struggled to score well in parts of questions where higher order skills were being assessed or where situations were unfamiliar and a question needed to be approached from "first principles".

C. Comparative pass rates for the past 3 years for this diet of examination

Year	%
September 2015	46
April 2015	62
September 2014	23
April 2014	28
September 2013	25
April 2013	28

Reasons for any significant change in pass rates in current diet to those in the past:

It should be noted that the number of candidates sitting this exam is very low and so a reasonably stable pass rate should not be expected.

Solutions

Q1 (i) (a) What are infrastructure projects?

Infrastructure projects are basic facilities, services and installations needed for the functioning of a community.

Examples include gas pipelines, toll roads, bridges, tunnels, airports, prisons or hospitals.

Infrastructure projects are generally characterised by their long lives. Some also have long development times.

They are generally managed and financed on a long-term basis.

Historically it was seen as the role of government to fund and manage these assets for the good of the population.

Increasingly the assets are owned or managed by the private sector in ring-fenced structures, with various forms of provision such as joint ventures, franchises or service agreements.

(b) What are the investment characteristics of infrastructure projects?

The development period means that there is an initial period of low or negative cashflows, followed by an extended period where they will deliver cashflows to their owners. This is often referred to as a “j-curve”.

The cashflows often have some degree of inflation linkage.

Cashflows will often exhibit a high degree of stability. This can lead to low correlations to traditional asset classes.

Often infrastructure assets are natural monopolies or have other unique characteristics such as location. These give the owners the opportunity to earn super-normal profits due to low elasticity of demand.

Therefore default risks are low during the operating phase; however revenues may be subject to price caps by regulators.

During the construction or pre-construction phase of a project, default risks are higher and cost overruns can be a significant risk leading to the risk of additional financing being needed or dilution.

Other risks include changing government policy, conflicts of interest within the government, reliance on government support, legal and regulatory risks, and wider business / macroeconomic factors that lead to changing demand.

Due to the long-term nature of a project, investors normally expect to be rewarded by means of an illiquidity premium. Similarly most infrastructure projects are single-purpose therefore this can result in a premium due to concentration risks.

Typical IRRs can be 15–20% during the construction phase (with higher rates for projects with high levels of risk or uncertainty), and 5–10% for mature projects with low or highly certain investment costs.

(c) **The case for pension funds investing in infrastructure**

Pension funds will find the following aspects attractive:

- Low default risks, stable long-term revenue streams, inflation linkage (some projects), tangible asset, ability to hold long-dated revenue streams to meet long-dated payments (i.e. low reinvestment risk), yield, diversification from other asset classes particularly equity and credit.

They may find the following factors unattractive:

- Regulatory uncertainty, illiquidity of investments, construction phase uncertainty, large investment size, management costs, complexity of financing structures, governance, specialist expertise required

In general, larger pension funds are likely to find infrastructure projects offer attractive investment opportunities, subject to pricing.

(ii) (a) **Infrastructure asset classes**

Infrastructure project can issue equity or debt.

Equity offers greater influence over the underlying project, scope for higher returns due to capital growth, but higher risk/volatility. Equity will be a real asset.

Debt offers higher yields, lower risk/volatility, and less exposure to regulatory risks. Unless the debt is inflation-linked, it will be a fixed asset. Debt will generally be secured against the project.

In addition, infrastructure exposure can be gained by investing in assets such as equities issued by infrastructure operators or builders, or listed funds.

(b) **Approaches to investing**

Listed securities or funds – these are listed equities or funds that offer secondary market liquidity with relatively low costs. These will be managed in accordance with a published prospectus.

Direct (in-house/segregated account) – this is a portfolio of directly held investments, either public or private. The manager can have varying levels of discretion, depending on the investor's needs and capabilities.

Unlisted funds – many asset managers offer pooled funds that invest in a diversified portfolio of infrastructure assets. These can be closed-ended or open-ended. Divestments and investments may be subject to liquidity restrictions in open ended funds. Funds of funds are also available. The manager will be responsible for investment decisions, governance matters, and charge a fee.

Shared platform/club – whilst these can be structured as segregated or pooled accounts, they offer delegation and pooling of governance but also greater control and lower fees than would apply for a fund.

Challenges

General issues – whilst there is increased demand for institutional funds due to falling bank appetite for holding these assets, institutional investors often struggle to achieve sufficient scale to build diversified portfolios. Investors may also struggle with governance issues and exerting influence on boards. Asset manager fee scales may be prohibitively high, particularly for infrastructure debt. The long time horizon means that regulatory risk is potentially greater e.g. due to a change in tax treatment.

Listed equities or funds – issues include the following:

- May be difficult to construct a large portfolio using listed assets
- Lack of control over underlying investments and transactions
- Possible drift of style over time

Direct – issues include the following:

- Requires sufficient scale to justify set up costs and governance
- Without sufficient scale, it may not be possible to construct a diversified portfolio
- Governance requirements may be time intensive
- It will take time to build up a portfolio

Funds – issues include the following:

- Manager fees can be high, particularly under a fund of funds approach.
- Even where funds are open ended, there can be restricted liquidity (e.g. gates or anti-dilution levies).
- There may also be agency issues, e.g. the manager is incentivised to gather assets rather than be more selective.

Clubs – issues include the following:

- Need sufficient interest from committed investors.
- Governance arrangements or decision making framework may be unwieldy depending on the extent of discretions.

Question 1 was generally well answered. The first part was well answered but few candidates achieved close to full marks despite the question being knowledge based. The second part was less well answered with only a minority scoring over half marks, which was disappointing.

Q2 (i) The investment characteristics of the asset:

Nature of the investment – it is a “real” asset, so likely to produce a real return over time. The sovereign wealth fund is likely to aim to produce a real return over time. As well as GDP growth, property returns are influenced by other factors such as relative demand for property, rental growth relative to salary or GDP, etc.

Term of the investment – it is a long-term investment, producing a flow of rental income for as long as the property continues to exist. This would make it a good match to the likely longer term nature of the sovereign wealth fund.

Currency of the investment – the rental income is likely to be in local currency terms so it is unlikely to be a good match for the sovereign wealth fund unless it is denominated in the relevant currency. However, assuming that purchasing power parity holds over the long term, the real nature of the investment might indirectly hedge any currency risk.

Certainty – rents from the property are likely to rise over time, however there is also a risk of voids. If the property needs to be sold for some reason there is a risk that the market price is below its fair long term value when the sovereign wealth fund might want to sell it.

Liquidity / marketability risk – the liquidity and marketability of the investment is likely to be relatively poor, in particular at times of market distress when it might be more likely that the sovereign wealth fund might

need or want to dispose of the asset. During times of market distress both liquidity and marketability might become an issue.

Expertise required– the wealth fund will need resources/expertise to manage the properties – e.g. collecting rent, handling problems with the tenant and organising and carrying out repairs etc. Does the fund have any similar existing resources or expertise? Or would it need to acquire such expertise? How many apartments will be purchased? Does the wealth fund have resources and/or expertise to manage them? Will the number of apartments be enough to justify hiring any resource necessary to manage them?

Taxes should also be considered, as the sovereign wealth fund is an overseas investor and may be subject to withholding taxes or be unable to offset taxes under dual taxation treaties.

Specific characteristics of the properties:

Location of the properties. This will be a key influence on its liquidity and exposure to voids. Prime properties are typically more liquid and less likely to experience voids

Residential properties are generally NOT considered to be a good investment for institutional investors, as the law in most countries is normally considered to be on the side of the tenant. Additionally the costs of maintain the investment are considered to be high. The exception is luxury or high-end residential properties where the tenants are likely to be professionals. If the apartments are in a prime location it might be more attractive from this perspective.

Diversification – how much diversification do the properties provide? There is likely to be a concentration risk given that they are all in the same location and same building. This is less of an issue if the wealth fund is very large and if it has a very large property portfolio. Does the fund have existing property assets – would this investment add to the diversification among the scheme's assets? Or would it add to concentration risk.

- (ii) There may be circumstances where the investment is attractive. E.g. if the individual is close to retirement they might consider purchasing apartments rather than investing their savings in an annuity – as they might consider the annuity to be more expensive and/or likely to produce a significantly lower income. This might be the case when prices in the property market are quite depressed say due to a lack of credit availability.

Managing and maintaining the apartments might be attractive to the individual as a form of employment, either before and/or during their retirement. However, as the individual ages, they might become less able to directly manage and maintain the properties – or become more reliant on others to do so.

If the individual does not have any other form of pension provision or any other assets, then he/she will be exposed to significant concentration risk. From a diversification perspective it would be better to own units in different buildings and locations.

If the property becomes void, which would be more likely if it was not "prime", then the individual might experience detrimental shortfalls income during retirement

The illiquidity of property may become an inconvenience at a future date if the investor's needs change.

Pooled property investments e.g. REITS/UT may be more suitable.

Question 2 was the best answered question on the paper, with both parts of the question generally well answered.

Q3 (i) Currency markets

The introduction of a new currency (W\$) will create a meaningful number of foreign exchange transactions, given the size of Woodland and the interconnectedness of the two economies.

A forward market in W\$ is likely to develop in the run-up to independence, although it may be volatile and/or one-sided since activity is likely to be dominated by investment funds or hedging activity.

If the initial exchange rate is set at too high or too low a level then this will create further volatility.

This volatility should subside once there are two-way trade flows in the economy and a clearing rate for W\$ is achieved.

Equity and debt markets

A fundamental factor is the extent to which obligations under existing Grassland government bonds are to be assumed by the Woodland government, and also whether they will be redenominated into W\$.

Few existing G\$ securities by other issuers are likely to be redenominated into W\$, since only a minority of investors will be Woodland based. However without a vibrant government debt market it will take time for the Woodland debt market to achieve critical mass.

Given the relatively small size of Woodland, most issuers are likely to continue to issue new debt and equity securities in the Grassland markets to maximise access to liquidity.

Some debt issuers will want to issue new debt in the Woodland markets, either to localise Woodland revenues and issuance, or because they want to diversify their funding base.

Some equity issuers may seek a secondary listing on the Woodland stock exchange but few large companies are likely to move their primary listing.

If Woodland is slow in developing its own institutions then W\$ denominated debt securities may begin to be issued in the Grassland markets. This could also happen if it is more tax efficient to issue W\$ debt in Grassland rather than Woodland.

Equities with significant Woodland exposure could be volatile due to investor uncertainty. There may also be increased volatility in the Grassland equity markets generally, relative to other major markets.

Interest rates in both Grassland and Woodland could be volatile in the immediate period after independence. It will take time for a liquid market to develop in longer dated (over 10 years) W\$ interest rates due to lack of issuance and uncertain investor demand.

Property

Given the physical nature of property, property transactions will need to be denominated in the currency applying to the location.

This may result in illiquid markets in Woodland around the time of independence due to uncertainty around the exchange rate.

- (ii) (a) At the independence date few existing assets in the portfolio are likely to be automatically converted from G\$ to W\$. Assets that might be converted could include some money market instruments and bonds (most likely Woodland government bonds).

At the independence date the insurer's existing liabilities will be unchanged if no Woodland policyholders choose to convert their policies.

In practice this is an unlikely scenario given the tax changes. The conversion rate is likely to depend on both the extent of the tax differential and policyholders' confidence that W\$ will not depreciate following independence.

It is likely that most new Woodland business would be W\$ denominated post-independence, as Woodland policyholders would want to pay W\$ denominated premiums and receive W\$ benefits.

Where policyholders choose to convert their policies, this will create a practical difficulty for the insurer since the insurer will be unable to hedge the future currency mismatch or convert the backing assets into

W\$ assets until independence. This will result in a mismatch between assets and liabilities until the asset transition or hedge is completed. Market capacity for this could be limited if there is an insufficient supply of suitable assets (government bonds or money market instruments in particular). Some banks may be willing to make a market in W\$ currency hedges prior to independence, although market capacity will be limited.

There may also be operational complexities around the conversion exercise such as late notifications that need to be honoured. This would increase the extent of uncertainty about conversion rates.

- (b) Where annuities are converted at independence date a G\$ guaranteed payment (with any future increases) will be converted into the corresponding W\$ payment.

This will create a need for W\$ interest rate sensitive assets to be held to match the interest rate sensitivity of the liabilities, with some sensitivity out to 30 year or longer maturities. Few such assets are likely to exist at longer maturities until W\$ bond markets have grown in size through new issuance.

This means that the insurer will face particular difficulties in hedging these risks, and the insurer may be forced to hold shorter duration assets and tolerate the interest rate mismatch. Banks may issue longer dated assets (e.g. interest rate swaps) but this will be a capacity constrained market that is illiquid and expensive to trade until there is a larger physical / cash market. The insurer may consider overhedging at shorter maturities to achieve a similar sensitivity to parallel interest rate movements, but this would create curve risks.

Another possibility is to hold some long-dated G\$ interest rate assets as a proxy against W\$ interest rates, and migrate these to W\$ interest rate assets as their duration falls or market liquidity improves. However hedge effectiveness may be poor, as the correlation between W\$ and G\$ interest rates may not be very high.

For new annuities, it is likely that premium bases will reflect these hedging costs / risks and it may be that W\$ guaranteed annuities are unpopular and alternative products (e.g. unit linked annuities) become more popular.

Additionally, there will be some unwinding of existing G\$ interest rate hedges or G\$ bond sales that needs to be implemented to avoid an overhedge to G\$ interest rates following entering into W\$ interest rate hedges.

- (c) The investment strategy will be dominated by the need to invest to achieve the interest rate sensitivity of the annuity policies.

However, there will also be a need to achieve a sufficiently high yield on assets so that the assets can fund the liabilities as they fall due.

Overseas assets can be held but they would need to be hedged back to W\$ or the currency risk tolerated (e.g. due to a relative value view). It would not be appropriate to hold unhedged overseas assets given the change of liabilities.

The assets will need to have a similar liquidity profile to the liabilities to avoid reinvestment risk. This is particularly the case if new business volumes are low, since there will be less “natural” liquidity to refine hedges or fund payments over time.

Whilst it would be desirable to invest in domestic W\$ fixed income and floating rate debt, this will not be possible due to the small market and difficulty in constructing a diversified portfolio. Therefore there would need to be greater use of overseas assets in the credit portfolio, most likely using G\$ assets.

If interest rate hedging costs are high, it is possible that a more risky investment strategy becomes desirable to increase the expected return, provided the capital implications of doing so are not onerous. However expected return and capital are likely to be optimised at a group level rather than at a book level, given the scope for diversification of risks.

Over time it is likely that the asset allocations for W\$ and G\$ policies will diverge given the different liability profiles and the different fixed income markets.

Question 3 was the least well answered question on the paper. The first part was reasonably well answered. The second part was the least well answered part of the paper, with very few candidates scoring more than half marks despite credit being given for a wide range of relevant comments.

END OF EXAMINERS' REPORT