

EXAMINERS' REPORT

November 2013 examinations

Subject F105 — *Finance and Investment* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principle Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

QUESTION 1

i.

The main purpose of the SPV is to provide protection to investors that purchased the bonds from failure of Bank A.

This is achieved by establishing the SPV as a separate legal entity so that it will be “bankruptcy remote” in the event of the failure of Bank A.

In addition the SPV may grant security over the receivables to secure its obligation to repay interest and capital, in which case the investors in the SPV would be entitled to claim the underlying assets in the event of default.

ii.

Prepayment risk:

- This is the risk of the debt being repaid sooner than anticipated because the underlying loans have been paid sooner than expected.
- This creates uncertainty over the timing of cashflows and reinvestment risk.
- Prepayment reduces the duration of the debt securities, which is likely to occur when interest rates decline (borrowers have greater ability to repay their home loans then), thus limits capital appreciation from reducing rates.

Extension risk:

- This is the risk of the debt being repaid later than anticipated because the underlying loans have been paid later than expected.
- This creates uncertainty over the timing of cashflows.
- It increases the duration of the debt securities, which is likely to occur when interest rates rise (borrowers have less ability to repay their home loans then), thus increasing capital depreciation from increasing rates.

iii.

The approach for the asset-backed security issued by a SPV might differ in the following ways:

- Less focus on the bank’s future profitability and quality of earnings as these may not be relevant to the SPV.
- Less focus on company strategy, competitor analysis, and management track record, except in the specific areas of debt underwriting, management and collections which may impact on the SPV.
- Less focus on the bank’s financial strength, operating performance and market profile.

- Greater focus on economic factors affecting home loan repayments e.g. employment levels, home price trends.
- Greater focus on the assets transferred to the SPV:
 - Predictability and sustainability of cashflows from underlying loans
 - Lease terms, rental prospects (for buy-to-let properties)
 - Loan to home values
 - Home owner credit profiles, overall debt levels and debt repayment to income
 - Asset diversification (e.g. geographic, home segment/size)
- Greater focus on assessing prepayment and extension risk (which may not affect other assets of the bank).

iv.

A CDO structure is one that divides the debt issue into tranches of securities that differ by credit risk features. By doing this the debt issue is likely to appeal to a greater range of investors. This should have the effect of reducing the overall cost of borrowing.

This question was not answered well.

For part (i) most students were able to make sensible points about the SPV.

For part (ii) it was clear that many students did not read the question carefully before answering. Many thought that prepayment would create a reinvestment risk for the SPV assuming the SPV had contracted to provide a fixed level of income to its investors – however as this is a pass-through security all cashflows (whether paid early or late) flow through to the security investors as and when they are received (this was explained clearly in the question).

For part (iii) limited credit was given for only listing the bookwork points relating to credit rating the bank, unless the student went on to discuss how the SPV would be assessed differently. A number of students again neglected to read the question and made points about the various tranches of the asset backed security, while in fact there is only one tranche with a pass-through.

Part (iv) was generally well answered.

QUESTION 2

i.

The most likely reasons are yield enhancement, where offshore bonds may offer more attractive yields at acceptable risk levels, perhaps due to expected yield curve or exchange rate movements, and diversification: the overall risk of the portfolio may be reduced by diversifying the portfolio geographically.

ii.

If the domestic currency appreciates against the foreign currency and this outweighs any excess return on the offshore asset relative to the domestic asset, then the fund will underperform the current strategy (and provide assets insufficient to meet liabilities).

iii.

The insurer will have to enter into futures contracts on the LMJ, denominated in ZAR, with a three-year maturity taking a short position so that the position offers protection against a reduction in the value of the LMJ in ZAR terms with a total value of R15 million.

iv.

$$5 * e^{(3*(0.08-0.04))} = \text{ZAR}5.6375$$

v.

Futures contracts need to be shorted to the extent of the maturity value of the LM bond, i.e. LMJ2.66076 million. Working in millions: liability at maturity = 100; if exchange rate is 4:

- asset value = $0.85 * 100 + 2.66076 * 4 = 95.64305$
- futures payoff = $2.66076 * (5.6375 - 4) = 4.35695$
- hence net position is 0.

However if exchange rate is 6:

- asset value = $0.85 * 100 + 2.66076 * 6 = 100.96457$
- futures payoff = $2.66076 * (5.6375 - 6) = -0.96457$
- hence net position is also 0.

So the hedge is effective regardless of the direction of exchange rates.

vi.

- Using currency swaps: enter into swap to pay LMJ and receive ZAR in three years' time;

- or using forward contracts: essentially the same as the futures contract strategy, but using OTC forward contracts rather than exchange-traded futures.

vii.

$$\text{Liability value} = 100 * 1.1^3 = 133.1$$

$$\text{Exchange rate} = 5 * (1.1/1.03)^3 = 6.0903$$

$$\text{Asset value} = (0.85 * 100) * 1.1^3 + (2.66076 * 6.0903) * 1.03^3 = 130.84237$$

$$\text{Futures payoff} = 2.66076 * (5.6375 - 6.0903) = -1.20475$$

$$\text{Net position} = -3.46238$$

The reason for this is that the real liability has been mismatched by the currency hedge as a result of eliminating purchasing power parity protection against unexpected inflation differentials. To the extent that exchange rates reflect changes in purchasing power parity, they will adjust with realised inflation in the two economies and hence an unhedged currency position is appropriate for real liabilities (but only to the extent that PPP is reflected in exchange rates, which empirically tends to be only over the very long term).

Parts (i)-(iv) and (vi) of this question were adequately-answered by most candidates. The performance on the two parts which required a demonstration of the effectiveness of the hedge were, however, more disappointing. For part (vi) in particular, few candidates were able to translate their knowledge that currency hedging creates a mismatch for real liabilities if exchange rates adjust to reflect purchasing power parity into a practical demonstration that this is so.

For part (ii), several candidates identified the risk the wrong way round, i.e. that the domestic currency depreciates. Similarly, a number of candidates entered the wrong side of the futures position in (iii), in which part several also identified forward strategies (rather than futures as stipulated in the question), or strategies involving futures on bonds (which would eliminate the return differential as well as the currency risk).

In part (v), candidates needed to consider the portfolio context, rather than just showing the profit on either the bonds or the futures. Several candidates failed to take note of the fact that interest rates were continuously compounded while inflation rates were annual effective.

QUESTION 3

i.

Infrastructure investment entails financing long-term infrastructure, industrial and / or public services projects based on a non-recourse or limited resource financial structure, where the project debt and equity used to finance the project is repaid from cash-flows generated by the project.

Main types include social and economic infrastructure investment.

Examples of economic infrastructure investment:

- highways
- water and sewerage facilities
- energy distribution
- telecommunication networks

ii.

(a) *“undrawn commitments” include amounts committed to investments but not yet drawn.*

Prior to the launch of a private equity fund, funds are committed by the investor which commitments to be drawn down by the manager as required.

During the term of the investment the manager has a right to call on the funds committed, make investments and earn fees.

And new investors may join the fund and commit money over a relatively long period of time. Commitment does not require the investor to transfer any cash at the time of commitment.

However, the manager may call on committed funds with little notice during the investment period.

Undrawn commitments at the end of the investment period will expire, and the investor becomes free to use the funds for other purposes.

(b) *“carried interest”*

Carried interest refers to the profit share arrangement in a private equity investment which exists as an incentive to achieve strong performance.

The carried interest paid to the manager is typically a percentage, e.g. 20%, of all profits over a hurdle amount.

The hurdle amount would typically represent the return of all drawn commitments accumulated at a rate of interest.

iii

Although there are unlikely to be tax cash-flows or debt cash-flows as the fund will typically be in a zero-tax environment and any debt raised to finance an individual investment will be non-recourse to the fund, the factors that require consideration are the following:

- the total rate of tax on an investment in the private equity fund;
- how the tax is split between different components of the investment return;
- in the case of a private equity fund, the capital component consists of commitments drawn and any carried interest;
- undrawn commitments at the end of the investment period will expire and will not attract any tax liability;
- any dividend payments made by the underlying investments may be considered as income and taxed separately from capital gains;
- the timing of tax payments, e.g. capital gains at the end of the life-cycle of the private equity fund;
- whether the tax is deducted at source or has to be paid subsequently;
- the extent to which tax deducted at source can be reclaimed by the investor;
- to what extent losses or gains can be aggregated between different investments or over different time periods for tax purposes.
- Extent to which double taxation agreements provide relief to the overseas investor.
- Where some degree of involvement of the management of the private company is a precondition for the investment, consider that tax treatment of the fee in the hands of the management company, and whether part-management is an expense item that may be offset against the return.
- Whether investments are tax deductible, with tax recovery when capital is repaid to the investor – this can make the risk / return trade-off attractive for higher risk investments.

iv.

Environmental, social and ethical issues are an increasingly important consideration for many investors.

In order to be attractive, companies and asset managers are paying increasing attention to environmental and ethical considerations, as part of their investment process and decision making.

As listed companies are increasingly required to produce information on their ethical stance (Socially Responsible Investment (SRI)), it may be desirable for private equity funds to follow suit.

v.

(a)

The main advantage of assessing the performance relative to published indices is that it is relatively easy to do, as the data for the index will be readily available and should be reliably accurate.

The main disadvantage is that the published index might not be appropriate, and as such, there may be no single index which is consistent with the objectives of the investor.

(b)

- Heterogeneity of private equity funds: funds will differ depending on their strategy and fund managers' area of expertise.
- Shares in private equity investments are not freely available for trade and thus the index is not necessarily investable.
- The production of reliable indices usually requires knowledge of the market values of the constituents of the indices at frequent intervals, which probably don't exist for private equity vehicles.
- Private equity investments may not pay dividends at all, or where paid, these may be at infrequent intervals which may make the calculation complex, so any yield on the index will not reflect the universe of companies but the actions of just a few companies.
- Investors in some private equity forms e.g. venture capital may receive several calls for capital, and the timing of capital injections may differ between investors in the same fund due to long fund-raising periods; this will be difficult to allow for in an index.
- A number of private equity ventures (and funds) may not survive – if these funds are excluded from index calculation the index will overstate performance, hence index construction must reflect the impact of failed funds to avoid survivorship bias.
- Selection bias: only successful funds will select themselves for inclusion in the index.
- Deals may be treated with a degree of confidentiality.
- Companies may not have obvious comparators that can be used as a proxy, consequently any estimation of values is subjective and expensive.

Part (i) was bookwork and generally well-answered by most candidates.

Part (ii) was bookwork. Most candidates were able to define undrawn commitment, but as an explanation was required more information should have been provided than merely defining the concept. Disappointingly, very few candidates were able to explain carried interest, and hence scored no marks for this part of the question.

In part (iii) most candidates made a reasonable attempt at this question in stating the factors identified in the core reading. In this question, the examiners expected the candidates to apply the core reading to a concrete example, but almost no one was able to integrate the core reading

with the specifics relating to private equity, hence average marks were scored by the majority of candidates.

In part (iv) most candidates were able to make a reasonable attempt at this question, highlighting the increasing importance of SRI. However, few were able to expand their answer commensurate with what is expected where an explanation is required.

The first part of part (v) of the question was bookwork and well attempted by the majority of the candidates. However, most candidates failed to make a reasonable attempt at the second part, which transpired to be the most challenging aspect of this question. Most students provided general issues relating to the construction of an index, however a careful reading of the question indicates that the focus was specifically on the issues relating to the design of a suitable index for private equity. As most candidates failed to incorporate in their answer any aspects relating to private equity, few marks were obtained for this part.

QUESTION 4

i.

The application of Trust law would lead to the following:

- Pension fund assets are legally separated from the sponsoring employer's assets and held in Trust;
- The assets belong to the beneficiaries (or members).
- Trustees are appointed as legal custodians of the assets.
- Trustees must:
 - Comply with the pension fund's trust deed and relevant regulation and legal precedence;
 - Act in the best interest of the beneficiaries;
 - The standard of care required is that of the ordinary prudent man of business acting in the management of his own affairs;
 - Subject to the terms of the trust deed, common law also requires trustees to exercise proper care when investing the funds;
 - The standard of care which a trustee is obliged to take with regard to investment decisions is likely to depend on whether or not he holds himself out as being a professional trustee;
 - A professional trustee will be assessed by a higher standard of care and must exercise the special skill and care which he professes to have;
 - Where trustees do not have the required expertise they must appoint suitable advisors;
 - Act with fairness and equity between classes of beneficiaries of the trust;
 - Act with integrity and may not profit directly from actions and decisions taken.

ii.

Within a statutory regulation system the government sets out the rules and polices them. This has the advantage that it should be less open to abuse than the alternatives and may command a higher degree of public confidence.

Also, economies of scale can be achieved, e.g. with separate departments monitoring different aspects of financial services provision, such as capital adequacy, product sales and security trading, across all financial markets within the jurisdiction.

Statutory regulation can be more costly and slower to respond to changing market circumstances.

A self-regulatory system is organised and operated by the participants in a particular market without government intervention.

The incentive to do so is the fact that regulation is an economic good that consumers of financial services are willing to pay for and which will benefit all participants. An alternative incentive is the threat by government to impose statutory regulation if a satisfactory self-regulatory system isn't implemented.

iii.

Statutory regulation can apply to:

- Vetting and approving trustees to ensure that they are ‘fit’ and ‘proper’ for the role;
- Require initial and regular trustee training;
- Require minimum levels of competence assessed in an objective way (e.g. exams);
- Prescribe the mix of trustees between employer and employee appointed;
- Require minimum levels of disclosure to members and the regulator (e.g. actuarial and financial reports);
- Rules about composition of trustees (e.g. split between employer and employee representatives);
- Asset rules (prescribed assets, maximums, exclusions);
- Minimum solvency rules (with intervention if solvency breaches certain levels), which may entail prescribed valuation bases (for defined benefit schemes).

Self regulation can apply to:

- Independent ombudsman to review trustee decisions that members may not agree with;
- Regular minimum training requirements (in addition or in place of statutory training requirements);
- A code of conduct for trustees to adhere to.

This question was reasonably well answered, however as it was a straightforward application of bookwork it should have been answered better than it was.

QUESTION 5

i.

A hedge fund can be defined as a pooled investment vehicle that is privately organised, administered by professional investment managers and not widely available to the public.

The three main classes of hedge funds are:

- a. Global funds
- b. Event-driven funds
- c. Market-neutral funds

The ability to take short positions means that the hedge funds can have positive investment return even when markets are going down. It also distinguishes the funds from other investors who may be precluded from “shorting” investors.

ii.

Assumptions:

- Traders are able to arbitrage
- Dividends are payable continuously

$$F_0 = R100,000,000.00 * \exp^{[7\% - 2\%]}$$

$$= R105,127,109.64$$

iii.

Assumptions:

- No cash-flows during the year
- Funds invested earn the risk-free rate
- No trading expenses

$$\text{Cash investment} = R100,000,000.00 * \exp^{[7\%]}$$

$$= R107,250,818.13$$

Broad Industry Sector	Performance
Resources	$R100,000,000 * 90/100 = R90,000,000.00$
Industrials	$R100,000,000 * 70/100 = R70,000,000.00$

Broad Industry Sector	Alpha
Resources	$R90,000,000 - R105,127,109.64 = (R15,127,109.64)$
Industrials	$R105,127,109.64 - R70,000,000 = R35,127,109.64$

Broad Industry Sector	Fund Value at End
Resources	$50\% * (R107,250,818.13 - R15,127,109.64) = R46,061,854.24$
Industrials	$30\% * (R107,250,818.13 + R35,127,109.64) = R42,713,378.33$
Financials	$20\% * R107,250,818.13 = R21,450,163.63$

iv.

Notional sector allocation, notional long/short positional allocation:

Broad Industry Sector	Fund Value at End
Resources	$R100,000,000 * (1/3) * (120 / 100) = R40,000,000.00$
Industrials	$R100,000,000 * (1/3) * (110/100) = R36,666,666.67.00$
Financials	$R100,000,000 * (1/3) * (105/100) = R35,000,000.00$

Actual sector allocation, notional long/short positional allocation:

Broad Industry Sector	Fund Value at End
Resources	$R100,000,000 * 50% * (120 / 100) = R60,000,000.00$
Industrials	$R100,000,000 * 30% * (110/100) = R33,000,000.00$
Financials	$R100,000,000 * 20% * (105/100) = R21,000,000.00$

Long/short positional performance:

Broad Industry Sector	Long/Short Positional Performance
Resources	$R46,061,854.24 - R60,000,000.00 = (R13,938,145.76)$
Industrials	$R42,713,378.33 - R33,000,000.00 = R9,713,378.33$
Financials	$R21,450,163.63 - R21,000,000.00 = R450,163.63$
Total	$(R3,774,603.80)$

Sector allocation performance:

Broad Industry Sector	Sector Selection Performance
Resources	$R60,000,000.00 - R40,000,000.00 = R20,000,000.00$
Industrials	$R33,000,000.00 - R36,666,666.67 = (R3,666,666.67)$
Financials	$R21,000,000.00 - R35,000,000.00 = (R14,000,000.00)$
Total	$R2,333,333.33$

Total relative performance:

Broad Industry Sector	Total Relative Performance
Resources	$R46,061,854.24 - R40,000,000.00 = R6,061,854.24$
Industrials	$R42,713,378.33 - R36,666,666.67 = R6,046,711.66$
Financials	$R21,450,163.63 - R35,000,000.00 = (R13,549,836.37)$
Total	$(R1,441,270.47)$

v.

Keeping the market capitalisation weightings in the different sectors results in relative outperformance to the extent of approximately R2.3 million. The sector selection outperformance is primarily driven by the relative overweight position in Resources relative to the peers, resulting in R20 million relative outperformance. Normally the sector selection outperformance would be allocated to the tactical asset allocation skills of the asset manager. In this case, however, the hedge fund manager is merely maintaining a market-neutral weighting that may well not be a considered investment position. If this is the case then any industry sector selection out- or underperformance should be disregarded in analysing the manager. The investment mandate should clarify the freedom the hedge fund manager has in making tactical asset allocation decisions.

vi.

The long/short positional selection views of the hedge fund result in relative underperformance, underperforming the peers by approximately R3.8 million. The long position in Resources results in the greatest relative underperformance of approximately R13.9 million. The short position in Industrials manages to outperform the peers by approximately R9.7 million. The decision to not be exposed to the Financials sector results in a marginal outperformance relative to the peers. If the hedge fund does not control tactical asset allocation decisions then the long/short positional performance attribution is the true measure of the manager's skill. Over the measurement period, therefore, the hedge fund does not appear to demonstrate skill relative to its peers. Furthermore, the decision to not have a directional view with regards to Financials is concerning. One should expect positional views on all industry sectors.

vii.

Many tax systems distinguish between income and the increase in value of a capital asset. It is possible for the rates of tax to be different for income and capital gains and each may be subject to a separate annual tax-free allowance. Furthermore, investment income may be subject to a different rate of tax than "earned" income.

viii.

Investment income. The returns are likely to be viewed as the proceeds of trading assets to generate investment profits.

In general this question was poorly done. Parts (i) and (vii) were pure bookwork questions and were reasonably answered by well-prepared candidates.

Part (ii) was a simple application of forward pricing, but very few candidates scored full marks for stating the assumptions.

Very few candidates scored well on parts (iii) and (iv). For part (iii), even the best candidates did not try to build the fund up methodically. A number of candidates mis-interpreted the part-question to include the calculation of a total return index. Part (iv) was a simple performance attribution exercise, although recognising that the “normal” stock selection performance was replaced by long/short positional performance. Furthermore, even the best candidates did not provide complete answers.

Part (v) and (vi) required candidates to highlight the key performance results. Very few candidates did this in a methodical manner. Very few candidates tied the performance attribution back to the functioning of a market-neutral hedge fund.

Part (viii) required a basic understanding of how the type of taxation relates to the sources of return.

QUESTION 6

i.

Matching refers to investment in assets which have cashflow profiles which match those of the liabilities in terms of nature (real or nominal), uncertainty, currency, and timing. The practical issue is that such assets are often not available for the majority of liability profiles.

However, in this case, the duration is relatively short so bond markets ought to provide assets of suitable term; liabilities are “reasonably predictable” and so uncertainty is not a major constraint; if “products for the domestic market” implies that they are denominated in the local currency, then currency mismatch should not be a significant issue; and timing ought not to present a major challenge if there is a sufficiently broad and deep bond market. Matching may therefore be viable (at least approximately) in this case. However, it will require frequent rebalancing and removes upside potential.

ii.

Conditions:

- equal PV of liability outgo and asset proceeds
- equal DMT of value of liability outgo and asset proceeds
- spread about DMT of value of asset proceeds exceeds spread about DMT of value of liability outgo

Immunisation however protects only for small changes in interest rates and for parallel shifts in the yield curve, i.e. it does not protect against yield curve twists.

iii.

Immunisation removes the possibility of mismatching profits (apart from a small, second-order effect) and requires constant (or at least frequent) rebalancing.

iv.

The portfolio is protected against a 1 basis point change in interest rates at each of the key rate durations. It therefore protects against small parallel and non-parallel shifts in the yield curve. However, it does not offer protection against larger interest rate changes at key rate durations because it does not offer convexity protection. It also does not offer protection at durations between the key rate durations.

On the whole, this question was reasonably-answered, although it was apparent that the PV01 approach was not well-understood: many candidates stated that it provided no protection against changes in the shape, rather than level, of the yield curve, whereas this is specifically what the approach is designed to protect against.

END OF EXAMINERS' REPORT