

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2011 examinations

**Subject SA5 — Finance
Specialist Applications**

- 1** (i) Borrowing to invest in assets that produce future net income is usually sensible and should contribute to future growth in gross domestic product (GDP); providing that the future income is actually generated.

Increases in asset values often occur in unison with GDP growth, income growth and optimism for future growth and income. This can lead to:

- (1) Companies/persons over-estimating the future income that assets will be able to generate (and hence the debt that is prudent to take on to fund the asset purchase); and
- (2) Companies/persons borrowing to spend (as distinct from invest) in the belief that either unspecified future disposable income will be available to pay back the debt or recent increases in asset values will be largely permanent and available to pay back the debt.

Debt can be spent (and not invested) on disposable items e.g. cars, holidays, luxury clothes and jewellery and also on larger assets such as houses and shares. This can lead to inflated asset prices which, other things held equal, would add to the volatility in a downturn.

The UK banks and other lenders would also thrive in an increasing debt environment. They would of course suffer worse in a debt fuelled downturn due to defaults and much reduced demand from suitably qualified new borrowers.

In broad terms:

- debt can be repaid by selling the asset which is subject to the debt
- generating income from the asset which is subject to the debt
- using other assets or income to repay the debt

In a downturn, asset values and income may both fall sharply but the debt will not generally fall at all. As total debt increases as a percentage of current asset values and/or as a percentage of current annualised income then there is less scope for asset values/ income to fall before the company/person is unable to repay the debt.

Financial distress and bankruptcy creates both direct and indirect costs. For example, companies stop producing goods and services and let employees go. Companies/persons lose income and their livelihoods. Companies/persons are forced to sell assets in times of very low values in order to repay as much of the debt as is possible.

Companies/persons stop paying tax and persons turn to the Government for benefits at a time when the Government's income is reduced.

Labour is unproductive, companies/persons have far less capacity to borrow and spend and as a consequence GDP growth is severely impacted and can be expected to be negative.

Hence an economic downturn is of far less consequence if companies'/persons' debt is a prudent percentage of their assets and income. The higher the debt the greater the impact of the downturn, that is the increased volatility.

In terms of the economic strategy:

- maintaining macroeconomic stability – high debt levels creates instability
- meeting the productivity challenge – some debt is needed to fund productivity
- increasing employment opportunity for all – raising debt to invest improves GDP growth and hence employment
- building a fairer society – keeping debt at affordable levels keeps the economy growing at levels which can allow the Government to redistribute income as required
- delivering high-quality public services – tax receipts are dependent on a healthy economy

In terms of government policy:

- Monetary policy – volatile GDP growth makes it very difficult to control money supply and interest rates. In a downturn interest rates will be near zero.
- Fiscal policy – volatile GDP means volatile taxation receipts making it very difficult to plan future government expenditure and hence, by implication, the public sector borrowing requirement (or debt repayment).
- Exchange rate policy – in times of high GDP growth the Government might wish to revalue the currency to reduce inflationary pressures, in times of low and negative GDP growth the Government might wish to devalue the currency to make exports more competitive. Volatile GDP growth makes it difficult to build a stable economy with modest levels of inflation.
- Prices and incomes policy – Stability will be impossible as volatile GDP growth implies volatile supply and demand.

[The most straight-forward way to answer the question was to set out both the main forms of government policy and the main elements of the UK government's economic strategy as given in the core reading. The student could then comment on the relevance of each to the question.]

- (ii) Whilst the proposal will inevitably reduce overall gearing in the economy, the EAC doesn't want to stop companies/persons from borrowing sensibly.

It is not practical for the Government to try to impose lending restrictions on the lenders. There are too many sources, many of which are not UK domiciled. There are UK bank and non-bank lenders. There are international bank and non-bank financial intermediary lenders. There are debt capital markets.

Any new measures should be as straightforward as possible. Complicated measures can be difficult to enforce and are more likely to have unexpected results.

The EAC recognises that it is reasonable to borrow against short term future disposable income and hence the 6 month term exception in the proposed changes. This will enable things such as working capital loans and trade finance to remain for companies and credit card debt and store finance to remain for persons.

The EAC wants to encourage lenders and borrowers to borrow moneys which are secured against specific assets. It hopes that:

- (a) The assets will generate future income to repay the debt; and/or
- (b) In a downturn the asset can be sold to repay the debt leaving the company/persons in a position where they may be worse off but still able to cope comfortably with the downturn.

Companies will raise debt secured against specific assets for high value assets and for assets which have a relatively long lifetime. Companies will often raise unsecured debt to provide general funds to support growth. Because debt is tax deductible and because debt ranks senior to equity in a bankruptcy, debt is seen by companies to be both cheaper and more flexible than equity.

Removing the tax deductibility of unsecured debt with a term in excess of 6 months will make the debt relatively more expensive to the company which will encourage the company:

- (a) To secure debt with assets.
- (b) To raise equity instead of medium/longer term debt.

In a downturn the secured assets will hopefully have sufficient value to allow them to be sold to repay the debt and the increased use of equity should reduce the company's sensitivity to debt repayments.

Persons should be free to borrow and lenders free to lend. The new legislation will hopefully encourage lenders to focus on the value of the pledged assets and not on a person's income. Future income is easily lost or substantially reduced in a downturn. Future disposable income is often over-estimated by both lenders wishing to lend and borrowers wishing to borrow.

Future disposable income over the next six months is relatively certain and hence reasonable to lend against.

A person's income will still be important as it will determine the person's ability to repay the loan.

Lenders will be unlikely to take the chance that the person will choose not to repay an unsecured loan and will likely only lend on a secured basis. Lenders will assume that they will need to repossess and sell the asset to recover their principal in the event of default. The probability of default will be a function of the person's future income and the future state of the economy.

[The majority of candidates recognised that the EAC was trying to curtail debt driven spending and not debt to finance future income.]

(iii) UK companies

- Raise more secured debt with term greater than 6 months and less unsecured debt with term greater than 6 months.
- Raise more short term unsecured debt with rolling term structure.
- Raise more equity to finance general growth.
- Offer more and new types of assets as security.
- Probably restructure things so that the debt to equity ratio is somewhat lower. The Government's tax take might increase and the ROE might reduce marginally. The reduced debt/equity ratio will potentially improve the company's credit rating.
- In periods of relatively high GDP growth a UK company's competitiveness with international companies may be slightly impaired but in a downturn the UK company will cope better and may be better able to purchase new assets at distressed prices.
- Possibly greater use of alternative financing e.g. securitisation
- The overall cost of capital will likely rise as either the company will maintain a lower leverage ratio or pay more in tax on some of its debt than before.

Persons

- Unsecured term loans are likely to all but disappear. Discretionary spending financed with debt is should fall.
- Lenders will likely accept new asset types as security e.g. life insurance policies.

- Loan amounts will likely be smaller as the lenders look to make loans supported by the assets. This should help to curtail asset bubbles.
 - Short term unsecured loans of a rolling nature may increase.
 - Young persons may need to rely more on family guarantees than in the past. For example, with respect to first home loans.
- (iv) Avoid it by replacing unsecured debt of more than 6 months' term with secured debt, equity and/or short term unsecured debt. This is what the EAC intends.

Use non-traditional asset types to secure the debt. This should be acceptable to the EAC.

Use assets which have a shorter lifetime than the loan to secure the debt. The tax authorities could set rules on the characteristics of acceptable security to remove this abuse.

Use assets which are worth less than the loan to secure the debt. The tax authorities could set rules on the characteristics of acceptable security to remove this abuse.

Manufacture securities which can be classified as an asset but in fact are the net present value of a future income stream. The tax authorities could set rules on the characteristics of acceptable security to remove this abuse.

Issue unsecured loans under which the term continuously resets to be 6 months long but with a maximum number of say 5 years. The tax authorities could write the tax legislation to remove this abuse.

[There were a wide range of reasonable actions that the company might take and supporting ways that the tax authorities might seek to curtail those actions.]

(v) Loan Types

- Credit card loans
- Bank overdrafts
- Unsecured personal loans
- Car loans
- Home loans

Risks facing the banks when lending to individuals

- Risk of default
- Loss given default
- Prepayment risk
- Interest rate risk

Risk Control

- Prudent ratio of asset value/loan value.
- Contractual review of asset value to loan outstanding from time to time. Early repayment, additional collateral, interest penalty.
- Asset value insurance paid for by borrower.
- Collateral margining.
- Bank needs to become much more expert in asset value estimation and possibly asset management.
- Secure one loan against a vast range of assets, e.g. ISAs, pension, bank accounts.
- May bring back era of using one bank for all products.
- Encourage short term unsecured loans (like credit card loans) to keep the term below 6 months.
- Bank may have unfair competition from foreign lenders who potentially escape the rules.
- The use of guarantors may increase.

[Many candidates would have scored higher marks if they had remembered to refer to a range of different types of loans and to describe how different loan types would be impacted differently by the proposed changes.]

- (vi) Solvency Capital Requirement – The SCR will be based on a 99.5% confidence interval of the variation over one year of assets minus liabilities. It can be calculated using standard prescribed stress tests or factors (which are then aggregated using prescribed correlation matrices). This approach is known as the Standard Formula. The SCR can alternatively be calculated using an internal model, which must be approved by the insurance company's supervisory authority.

Minimum Capital Requirement – The MCR is defined as a simple factor based formula which is intended to be roughly 30%–40% of the SCR. The SCR may not be lower than the MCR.

- (vii) Companies may only continue to trade so long as the directors believe that they have sufficient assets and income to meet their current obligations.

Solvency 2 is too high a capital standard for most companies. It is also expensive and time consuming to calculate. It is intended to make the chance

of the company becoming insolvent very remote. The public does not require this to be a feature of all companies and in particular non-financial companies.

Most companies trade goods and services. Apart from relatively small invoices payable and receivable, the public and other companies have relatively little financial exposure to them, making the notion of a significant solvency margin unnecessary. Invoices payable and receivable are already included in the minimum capital requirement calculation for all companies anyway.

Limited liability companies are established to allow individuals to separate their own assets from the company. Making them place relatively large amounts of capital in a company negates much of the point of forming a company.

The economy needs more small companies. They offer an avenue for productivity, entrepreneurialism, employment. High solvency requirements will stifle the ability to form small companies.

Most individuals won't have access to the requisite amounts of capital. This will make it extremely difficult for private companies.

Many companies will need to stop trading if the minimum capital requirement is strengthened.

The introduction of the minimum capital requirement is not required to meet the Government's economic strategy and would only inhibit it.

It would make UK companies uncompetitive with their foreign competition.

Credit rating agencies already serve as something of a proxy to this suggestion.

[There were several good responses to this question noting that there are thousands of small UK companies and that for many companies the general public and/or even the company's customers are not severely impacted by a company's insolvency. For example, the failure of a corner shop.]

2 (i) $p[\text{up}] = pu = 0.3$

$$p[\text{down}] = pd = 0.5$$

$$p[\text{same}] = ps = 1 - pu - pd = 0.2$$

$$\text{in top league, } p[\text{same}] = pu + ps = 1 - pd$$

$$\text{in bottom league, } p[\text{same}] = pd + ps = 1 - pu$$

discount rate assume 10% [other reasonable assumptions exceeding risk-free possible but 0% not suitable]

ignore taxation

assume expenses incurred midway through the year

The following table shows the binomial tree

Year	League			Calculation
1	1 st	2 nd	3 rd	
<i>p</i>	1	0	0	$p[1] = 1$ $p[2] = 0$ $p[3] = 0$
£	100	0	0	$£ \cdot p[x]$
2	1 st	2 nd	3 rd	
<i>p</i>	0.5	0.5	0	$p[1] = 1 - pd = 0.5$ $p[2] = pd = 0.5$ $p[3] = 0$
£	50	25	0	
3	1 st	2 nd	3 rd	
<i>p</i>	0.4	0.35	0.25	$p[1] = (1 - pd)(1 - pd) + (pd)(pu) = 0.4$ $p[2] = (1 - pd)pd + (pd)(ps) = 0.35$ $p[3] = (pd)(pd) = 0.25$
£	40	17	6.25	
4	1 st	2 nd	3 rd	
<i>p</i>	0.305	0.345	0.35	$p[1] = (1 - pd)(1 - pd)(1 - pd) + (1 - pd)(pd)(pu)$ $+ (pd)(pu)(1 - pd) + (pd)(ps)(pu) = 0.305$ $p[2] = (1 - pd)(1 - pd)(pd) + (1 - pd)(pd)(ps) + (pd)(pu)(pd)$ $+ (pd)(pd)(pu) + (pd)(ps)(ps) = 0.345$ $p[3] = (pd)(pd)(1 - pu) + (pd)(ps)(pd) + (1 - pu)(pd)(pd) = 0.35$
£	30.5	17.25	8.75	

PV revenue =

$$100 + (50 + 25) / 1.1 + (40 + 17 + 6.25) / 1.1^2 + (30.5 + 17.25 + 8.75) / 1.1^3$$

$$= £262.90\text{m}$$

[A straight-forward question which was handled well by most.]

- (ii) $PV[\text{costs}] = 50/1.1^{0.5} + 50/1.1^{1.5} + 50/1.1^{2.5} + 50/1.1^{3.5} = £166.23\text{m}$
 $PV[\text{fixed assets}] = £75\text{m}$
 $NPV = PV[\text{revenue}] - PV[\text{costs}] + PV[\text{fixed assets}] = 262.90 - 166.23 + 75$
 $= £171.67\text{m}$
- (iii) Borrow the full £150m from a bank
- Risk to investor: investor takes on personal liability. The investor may have insufficient income/wealth from other sources to service the debt if the club is demoted.

- Attraction to investor: finance is independent of transaction. May offer improved flexibility for managing both the loan and the investment in the club.
- Risk to bank: unsecured debt – what potential assets are available in event of default, what are they worth? In the near future the investor will hopefully purchase the club which might then be pledged as security for the loan
- Costing: rate probably based on unsecured debt at least initially and prior to the purchase of the club; take investor's financial standing, relationship with bank, size of loan compared to other assets into account
- Attraction to bank: offers the largest lending volume to the bank
- There may be a different tax impact as compared with leveraging the club.
- Risk/attraction to club – the club's own financial position is left unchanged meaning it continues to be debt free and receive all of the tv receipts.

Take out a £75m mortgage from a bank using the stadium as collateral.

- Risk to investor: investor will need to find another £75m himself.
- [lower] risk to bank: bank has high security in physical asset; could take possession of stadium and sell to repay loans.
- [higher] risk to bank: the bank is relying on the net profit of the club to meet the interest payments on the loan. The bank will no doubt also estimate that there is a 50% chance that in year 2 the team will have been demoted and the bank will be relying on excess profits from the first year to meet the future mortgage repayments. The bank will no doubt assume that at some point the club will be unable to meet the interest repayments and the bank will need to repossess the stadium.
- Risk to bank: very high loan-to-value ratio (100%) => may be insufficient collateral if property prices fall.
- Costing: interest rate will be higher than mortgage rates for similar properties as the interest cover is less certain; could still be lower than the other forms of finance.
- Risk/attraction to club – the club's own financial position is impacted. The club risks losing its stadium to the banks and the club will need to use a part or all of its tv receipts to repay the mortgage.

Securitise the television receipts to raise £200m.

- Attraction to investor: no direct liability to investor.

- Risk to investor: may pay away considerably more than £200m if team remains in top league.
- Costing: expected PV[receipts] is £263m so selling at a discount to expected value.
- Risk to bondholder: television company may choose to renegotiate payments.
- Very unusual form of bond – will there be purchasers for the securitised bonds?
- Risk to bondholder: income could be very volatile depending on team's league performance.
- Risk to bondholder: buyer has no recourse against other team assets.
- Risk to bondholder: bond unlikely to be investment-grade rated, may not be allowed to purchase.
- Costing: implied interest rate very high [see discount above]; probably most expensive form of finance due to significant uncertainty and volatility of receipts so bondholders will apply high discount rate / use conservative receipt assumptions.
- Risk/attraction to club – the club's own financial position is extremely negatively impacted. Assuming that the investor uses £150m to give to the previous owner then only £50m remains to meet the club's expenses. The club's expenses in years 2, 3, and 4 will need to be met by the new owner or the club will need to find new sources of income to avoid going bankrupt.

[Several candidates failed to get better marks for this question because they failed to set out their answer to include both attractions and risks for both the investor and the finance providers. The poor set out appeared to lead to the candidate accidentally omitting to answer one or more possible permutations.]

(iv)

- Set up special purpose vehicle (SPV).
- Independent of sports club or bank.
- SPV issues [sells] bonds to investors.
- SPV gives 200m from bond sale to sports club in exchange for right to receive 4 years television receipts. Simultaneously the sports club lends the new owner 150m to meet the sales proceeds and keeps 50m to cover the first year's expenses.

- Club pays television receipts to SPV which pays these on to buyers of bonds.
- No recourse to club's assets if payout less than anticipated.

(v)

- Price of other clubs which may be available for sale.
- Full accounts for the club for the past X years.
- Current club ownership structure / capital structure.
- Anticipated demand for any bonds that may be issued.
- Potential for other revenue streams within the club.
- Possible changes to expenses over duration of ownership / reliability of expense assumption.
- Reliability of revenue assumption; is the TV deal contractual? When will it be renegotiated?
- tax outcome should be taken into account
- synergy with investor's other portfolio assets / opportunity cost and return of this investment
- expected time taken up by new investment
- staff, player etc issues within club
- valuation of any goodwill - sports clubs will have disproportionate brand / marketing value

(vi)

- Increase term of bonds to have more years of television receipt payments.
- Include top-up payment from club to guarantee minimum level of income.
- Include equity warrant to give bondholders some ownership option of club.
- Convert bonds to shares in club.
- Offer ancillary benefits e.g. free match attendance.
- Renegotiate the TV contract
- Try to list the bonds

[This question was not answered particularly well. The question referred to making the bond more attractive to bondholders. Several candidates' answers included approaches which were not relevant to the bondholders.]

(vii)

- FSA listing rules require listed company to report on how it applies principles of Code on Corporate Governance.
- Extends UK principles based regulation.
- Confirm it complies with Code's provisions or provide explanation where it does not.
- Shareholders must evaluate company's statement, taking into account size and nature of company.
- Shareholders form own opinions on potential governance issues within company and adjust share price accordingly.
- Shareholders can seek to replace directors if governance is poor.

(viii)

- Non-executive directors should be scrutinizing company operations.
- At least half the board should comprise non-execs.
- Non-execs should normally serve only 2 terms before being subject to re-election.
- Non-execs should normally be included in the audit committee and the remuneration committee
- There should be a statement in the annual report on which non-execs the board considers to be independent
- and on the steps the board has taken to ensure non-execs develop and understanding of the views of major shareholders of the company
- and, where an executive director serves as non-exec elsewhere and is remunerated for this, whether such remuneration will be retained.

(ix)

- Sell to another wealthy individual. This is a simple sale of all of the shares in the club to another individual for a lump sum payment. Many wealthy individuals own clubs for emotional reasons and or as a hobby meaning it may be possible to secure an inflated price for the club.

- Instruct the sporting club to stop playing and sell the club's assets separately. In a wind up, the club will be able to sell the stadium and may be able to sell the players.
- The market capitalisation is likely to be too small for the London Stock Exchange. It will be expensive to list and is unlikely to raise much capital. The break up value of the club may be the most attractive option to the investor and particularly if the market value of the stadium has risen and if the players can be sold to other clubs. This said, wealthy investors can often pay unrealistically high prices for sporting clubs and so before breaking it up the owner should see if it can be sold on to another wealthy individual.

[Other suitable answers would include merging the club with another club if the explanation was reasonable.]

END OF EXAMINERS' REPORT