Subject SP2

CMP Upgrade 2021/22

CMP Upgrade

This CMP Upgrade lists the changes to the Syllabus objectives, Core Reading and the ActEd material since last year that might realistically affect your chance of success in the exam. It is produced so that you can manually amend your 2021 CMP to make it suitable for study for the 2022 exams. It includes replacement pages and additional pages where appropriate. Alternatively, you can buy a full set of up-to-date Course Notes / CMP at a significantly reduced price if you have previously bought the full-price Course Notes / CMP in this subject. Please see our 2022 *Student Brochure* for more details.

This CMP Upgrade contains:

- all significant changes to the Syllabus objectives and Core Reading
- additional changes to the ActEd Course Notes and Assignments that will make them suitable for study for the 2022 exams.

0 Changes to the Syllabus

This section contains all the ***non-trivial*** changes to the syllabus objectives.

An additional bullet point has been added to Objective 3.1 as follows:

3.1 Assess how the following can be a source of risk to a life insurance company:

- policy and other data
- mortality rates
- investment performance
- expenses, including the effect of inflation
- persistency
- mix of new business
- volume of new business
- guarantees and options
- competition
- actions of the board of directors
- actions of distributors
- failure of appropriate management systems and controls
- counterparties
- legal, regulatory and tax developments
- fraud
- aggregation and concentration of risk
- **climate risks.**

1 Changes to the Core Reading and ActEd text

This section contains all the ***non-trivial*** changes to the Core Reading and ActEd text.

Chapter 1

Section 3.1

The first four paragraphs of ActEd text at the top of page 11 have been amended as follows:

The benefit on death might be, for example:

- the larger of a fixed sum assured (*eg* £10,000) and the value of units, or
- some percentage (*eg* 100%, 101% or 120%) of the value of units.

This makes unit-linked policies very versatile. If the first version is chosen, with a very high sum assured (relative to the premium), then the policy can be almost entirely protection. Choose a lower level of sum assured (or, equally, a higher premium), then the policyholder could end up with unit funds accumulating up to the sum assured level after a period of, say, 20 years. This would be similar to the non-linked endowment described above, with death benefit equal to, or at least the same order of magnitude as, the survival benefit. (This version would be chosen if the unit-linked endowment were to be used for paying off a loan.)

With the second version the emphasis would be on savings, so it might be appropriate if the policy was being used as a retirement savings policy, for example.

Both versions are commonly found in practice, because they are used to meet different needs.

Chapter 8

Practice questions

A new Question 8.2 has been added. Replacement pages are attached.

Chapter 9

Section 4.4

A new Question 4.3 has been added that covers climate change related regulations. This has also been added to the Summary on page 22 at the end of the section on 'The regulatory regime'. Replacement pages are attached.

Chapter 10

Syllabus objective

Climate risks have been added to the syllabus objectives.

Chapter 11

Syllabus objective

Climate risks have been added to the syllabus objectives.

Section 11

A new section has been added that covers climate change risks. This has also been added to the end of the Summary. Replacement pages are attached.

Solutions

The following point has been added to Solution 11.3 at the end of the section headed 'Risks from investment':

The consequences of climate change can also lead to investment risk, *eg* stricter regulations on pollution may reduce the profits of some industrial companies. [½]

Chapter 12

Syllabus objective

Climate risks have been added to the syllabus objectives.

Chapter 13

Section 2

The question at the bottom of page 4 has been amended as follows:

Explain the main risks to the company of maintaining a management box.

The solution at the top of page 5 has been amended as follows:

The most significant risk here is that the value of the underlying assets goes down, so the value of the units that the company is holding for its own account decreases.

There is also a risk that the expenses of managing the box are higher than expected.

There are operational risks, *eg* in keeping track of which units belong to policyholders and which to the company.

The first paragraph beneath the solution on page 5 has been amended as follows:

Due to the investment risk, companies that use a box will normally keep it as small as practical given the degree of unit flows that arise from their policyholders.

Solutions

The fourth point in Section (ii) of Solution 13.2 has been extended as follows (this part is now worth 4 marks instead of 3):

By using a box, unnecessary creation and cancellation of units is avoided …. [½]

… and so the associated transaction costs of buying and selling assets in the market is avoided too. [½]

There will be expenses related to managing the box. [½]

Chapter 16

Section 1.6

The fifth paragraph on page 9 has been amended as follows:

Hence a life company may not find its guarantees so onerous if it can reduce the financial impact of those guarantees. In the case of investment guarantees, the company can reduce the financial impact by matching as closely as possible with suitable investments. For instance, with immediate annuities it is theoretically possible to invest so as to virtually eliminate the investment risk (as we mentioned earlier in the course), though there are many difficulties (such as a shortage of suitable investments) that can prevent this happening in practice. For savings policies with significant guaranteed surrender values, some investment in very secure assets (such as short-dated government bonds) can reduce the surrender risk. These issues are discussed in more detail later in the course.

Section 1.13

A new section has been added that covers sustainable investment options. Replacement pages are attached.

Summary

'Sustainability of investment options' has been added to the bullet point list.

Solutions

The following point has been added to Solution 16.1:

It may wish to invest in sustainable industries to avoid negative publicity if the competition also invests sustainably (or if it wants to differentiate itself if the competition does not invest sustainably). [½]

The fifth point in Solution 16.2 has been amended to:

Are the fund links attractive, sustainable and is there enough choice? [½]

The following point has been added to part (i) of Solution 16.4:

The sustainability of the assets within the funds will impact their likely returns and the attractiveness of the product to some potential policyholders. [½]

Chapter 21

Section 4.2

The following paragraph has been added after the first paragraph of Core Reading:

A prospective valuation of a contract calculates how much it will cost the insurance company to provide the benefits and associated expenses allowing for the future premiums that would have been paid. If the surrender value equals a realistic prospective value, then the cost of the surrender is exactly the same as the expected cost of the contract remaining in force.

Chapter 22

Summary

The Summary has been updated to include two new sets of bullet points outlining the profit from the alteration. Replacement pages are attached.

Chapter 28

Section 2

The following paragraph has been added at the end of this section:

In addition to the principles described above, the company should also consider Environmental, Social and Governance (ESG) issues when setting its investment strategy, as described in earlier chapters. For example, the impact of climate change could affect both the expected return from an investment and its risk.

Section 3.2

The ActEd text between the second and third paragraphs of Core Reading has been amended as follows:

So the proceeds from the assets may exceed the net liability outgo in the early stages of the contract if the term of the assets is shorter than the liabilities. The excess will have to be reinvested at unknown rates, making strict matching impossible and introducing reinvestment risk.

Similarly with a block of recently written business, premium income may exceed benefits and claims for some years, giving a net inflow in such years. No asset type can match that (without straying into the complexities of derivatives), and so the company will have to invest these surplus premiums at unknown future rates.

Even single premium contracts can lead to reinvestment risk if coupon income exceeds claim and expense outgo in the early years. This problem can be overcome by the use of zero-coupon bonds, but they might not exist in the market being considered.

Section 4.1

The text in italics at the end of the question on page 25 has been amended as follows:

A life company would not normally increase risk by reducing diversification as there is no extra return for taking on specific risk (whereas systematic risk is generally rewarded with higher expected returns).

Solutions

The following point has been added to the final bullet point list in part (iii) of Solution 28.4:

- environmental, social and governance issues [½]

The following point has been added to Solution 28.6 under the heading 'Risk and returns':

The company should consider Environmental, Social and Governance (ESG) issues, *eg* the sustainability of the companies invested in will affect the asset returns and any ethical issues regarding the companies invested in may impact the insurance company's reputation. [1]

Chapter 32

Section 0

The first paragraph has been amended as follows:

This chapter includes the Core Reading definitions with which you need to be familiar. These definitions are an easy target for a short bookwork question. You should not reproduce these word-for-word in the exam, but you must be able to express the ideas with equal precision in your own words.

2 Changes to the X Assignments

Overall

There have been minor changes throughout the assignments, including changes to mark allocations.

More significant changes are listed below.

Assignment X1

Solution 1.2 has been updated as follows for the section headed 'Mortality':

Mortality [½]

There will be a mortality risk if the death benefit exceeds the value of the unit fund. [½]

Also, the unit fund itself is likely to exceed the asset share at outset, depending on initial expenses and contract design. [½]

The risk should largely disappear for contracts of long duration in force if the death benefit is a fixed monetary amount (as the unit fund should grow over time, reducing the sum at risk). [½]

However, the death benefit is unlikely to be significant for a pensions contract. The contract is fundamentally for savings. [½]

Question 1.3 has been updated as follows:

(i) List the three types of bonus which may be used under the 'additions to benefits' approach to distributing surplus on conventional with-profits policies, stating when each is added to the contract. [2]

(ii) Comment on which of the types of bonus are most suitable for distributing:

(a) income from assets

(b) capital appreciation on equities

(c) surplus arising from a one-off event. [4]

[Total 6]

Much of the solution to part (i) of Question 1.3 has been deleted so that it now reads:

(i) ***Additions to benefits bonus types***

There are three types of bonus: regular reversionary, special reversionary and terminal. [½]

Regular reversionary

A regular reversionary bonus is declared throughout the lifetime of a contract, usually once a year. [½]

Special reversionary bonus

These are 'one-off' bonuses given during the term of the contract in addition to any regular reversionary bonuses. [½]

Terminal bonus

Terminal bonus may be paid when a policy becomes a claim (maturity, death or sometimes surrender). [½]

[Total 2]

Question 1.5 has been replaced by the following question (replacement pages are attached for the solution):

A mutual insurer sells without-profits term assurances and with-profits endowment assurances. Both contracts have regular premiums and a term of ten years. Term assurances have sum assured of $200,000 and endowment assurances have sum assured of $50,000.

Compare the size of the asset share for these two contracts after they have been in force for three years. (Hint: consider each component of the asset share.) [9]

Assignment X2

The following point has been added to Solution 2.6 under the section headed 'Investment risk':

The company should take particular care with regards to the potential for climate change to negatively impact its investments. [½]

The second point under the heading 'Marketing and development risk' in Solution 2.6 has been replaced by the following points:

Sales might be low as the company does not currently have a reputation for selling unit-linked business.

Potential applicants may not feel that the company has the necessary investment expertise … [½]

… as the term assurances are likely to be backed by bonds, whereas the unit-linked funds may be invested in equities and property. [½]

The company will also lack a track record for its unit funds – applicants often choose their unit funds by considering past performance. [½]

The sixth and seventh points under the heading 'Marketing and development risk' in Solution 2.6 have been replaced by the following points:

There is also considerable risk that future investment performance *will* be disappointing due to a lack of investment expertise. [½]

The company could improve its potential investment performance by recruiting suitably experienced staff, and/or by training its existing staff. [½]

Assignment X4

There have been a number of changes to Question X4.8. Part (i) of Question 4.9 has also been changed. Corresponding changes have been made to the solutions. Replacement pages are attached.

Assignment X6

Question X6.7 has been amended as follows:

A large life insurance company has ample free assets. It sells with-profits business written in conventional form to customers in its domestic market, using both the 'additions to benefits' system and the revalorisation system.

(i) Discuss the suitability of each of the investments listed below:

(a) long-dated domestic government bonds

(b) fixed-interest policy loans (these are loans made to policyholders against the security of their policy value)

(c) ordinary shares (domestic market)

(d) direct investment in property

(e) overseas ordinary shares.

[18]

(ii) Describe how your answer to part (ii) would have been different if the company had been small, with limited free assets. [4]

[Total 22]

The solution to Question X6.7 has been correspondingly update. Replacement pages are attached.

3 Other tuition services

In addition to the CMP you might find the following services helpful with your study.

3.1 Study material

We also offer the following study material in Subject SP2:

- Flashcards
- Revision Notes
- ASET (ActEd Solutions with Exam Technique) and Mini-ASET
- Mock Exam and AMP (Additional Mock Pack).

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3.4 Feedback on the study material

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If you have any comments on this course, please send them by email to **SP2@bpp.com**.

Chapter 8 Practice Questions

8.1 Describe how the four main distribution channels used by life insurance companies operate.

8.2 Exam style

A life insurance company is considering writing a new flexible unit-linked product targeted at high-net-worth individuals. The product allows flexibility in the amount of premiums payable and could be used either as a savings vehicle or to provide life cover, or a mixture of the two. The policyholder can invest in a range of different unit funds and switches can be made subject to charges. Annual fund management charges vary by fund.

Discuss the distribution channels that the company could use for this product. [13]

The solutions start on the next page so that you can separate the questions and solutions.

Chapter 8 Solutions

8.1 The four distribution channels are:

Insurance intermediaries

These are independent of any particular life insurance company. They can advise their clients on the best contracts for their needs from among all the contracts available.

They may be remunerated by commission from the insurance companies whose products they sell or by fees from their clients.

Tied agents

These are salespeople who offer the products of only one or a limited number of insurance companies. If the tie is to more than one company then usually the product ranges of the companies are mutually exclusive.

Typically, tied agents are financial institutions such as banks. Tied agents are remunerated by the companies to which they are tied. The remuneration could be in the form of commission payments or by salary plus bonuses.

Own salesforce

These are usually employees of a life insurance company and so only sell the products of that company. They may be paid by salary or commission or a mixture of the two.

Direct marketing

The main forms of direct marketing are telephone selling, press advertising, mailshots, and the Internet.

Telephone selling might involve 'cold-calling' by the company or might be in response to an advertisement (in which case press advertising and telephone selling are part of the same process).

Press advertising might include an application form or invite requests for further information. Mailshots will definitely include application forms.

Internet selling may be linked to advertising, and is essentially web-based application processing.

8.2 ***Insurance intermediaries (brokers)***

Insurance intermediaries are salespeople who act independently of any particular life insurance company (although they can be owned by one). [½]

Their aim is to find the best contract, in terms of benefits and premiums, for their clients, from the whole range of products and insurance companies available in the market. [½]

They may be remunerated, via commission payments, by the companies whose products they sell, or they may alternatively receive a fee from their clients. [½]

This product is complex, and so the face-to-face explanation and advice, which these intermediaries are expert in providing, will be essential in order to secure a sale of the product. [1]

Clients of insurance intermediaries tend to be financially sophisticated and will often be the initiator of any eventual sale. The target market, being financially sophisticated and therefore likely to initiate sales, is therefore very likely to use this channel. [1]

The intermediaries are also likely to promote themselves actively to existing clients by, for example, instigating a periodic review of finances. [½]

This sales channel therefore appears to be very suitable for generating new business of this product for the insurer. [½]

Clients for this particular product will also need advice on an ongoing basis throughout the duration of the contract (which could potentially be for the whole of life). This kind of relationship is typically fostered through this sales channel, improving persistency. [1]

On the other hand, with this channel the insurer runs the risk of losing business to competitor products, both at the time of sale or during the contract (the latter causing the policy to be surrendered). The insurer therefore has to ensure that its product remains highly competitive in all respects in order for good sales and persistency to be achieved. [1]

Own salesforce

Members of an own salesforce will usually be employees of a life insurance company and hence will only sell the products of that company. [½]

They may be remunerated by commission or salary or a mixture of both. [½]

It will usually be the salesperson who initiates a sale, making use of client lists. However, once they have built up a rapport with a particular client, it will then often be the latter who initiates further sales. [1]

This channel therefore also has the advantage of establishing good long-term relationships with clients. [½]

Once the policy is sold, it will therefore be easier for the insurer to ensure that the policy is regularly updated to meet needs (using the flexibility within the product design to alter premiums *etc*), so that persistency should be good and the product should better fulfil its profit potential (*eg* through future premium increases). [1]

If a company has its own salesforce then it may seem logical to use it, although its client lists may include only a limited number of high-net-worth individuals. [1]

The channel may not prove that successful overall because many potential clients will choose to buy this product only from independent advisors, where they will have more choice. [½]

The salesforce also has the disadvantage of having higher overhead costs for the insurer, as the insurer may provide a basic salary to their sales staff along with office accommodation, training, transport, *etc*. [1]

Even an existing salesforce could incur significant additional training costs, as this is a complex product. [½]

Tied agents

Tied agents are salespeople who are 'tied' to one, or sometimes several, life insurance companies, that is they offer to their clients only the products of those companies. [½]

Typically they may be the employees of a bank or other similar financial institution. [½]

Where the tie is to more than one company, it will sometimes be the case that the product ranges of the companies are mutually exclusive, but more often there will be an overlap. [½]

Tied agents are remunerated by the companies to which they are tied. The remuneration could be in the form of commission payments or by salary plus bonuses. [½]

It will often be the client who will initiate the sale, but some tied agents may actively engage in selling. [½]

There is therefore the potential for the insurer to reach reasonably financially sophisticated customers, while still avoiding much of the competition. [1]

On the other hand, the availability of suitable tied agents for this particular product might be limited. For example, this channel can be successful where the product is sold in conjunction with the agent's main business, *eg* in association with a mortgage being arranged for the client by a bank. However, the product in question might be seen as overly complex for such a purpose and may not therefore achieve many sales. [1½]

Direct marketing

This takes four main forms: mailshots, telephone selling, press advertising and internet selling. [½]

The product is too complex, and requires too much ongoing support, to be readily sold or maintained without face-to-face discussions and advice being given, and so this channel is probably not suitable to be used to on its own to sell this product. [1]

However, direct marketing can be useful in reaching the target market, *eg* via information provided on the internet or through advertising in suitable publications. [½]

Such forms of contact could therefore be sufficient to entice the client to seek further information about the product, following which a meeting with the insurer's own salesforce could be arranged. [½]

[Maximum 13]

4.3 Climate change related regulations

There is widespread concern among policymakers and financial regulators of the damage that climate change could cause to the financial system and, conversely, the role that the financial system can play in achieving an orderly transition to a low-carbon economy.

Chapter 11 looks at how climate change can pose a risk to financial companies.

Financial companies can assist in the transition to a low-carbon economy by investing in companies that develop new, greener technologies for example.

In order to limit the impact of climate change on the financial systems, regulations are under development whose aims include ensuring that financial institutions:

- **consider climate risks in existing business planning, investment management and risk management processes**
- **effectively disclose and report on climate-related risks and opportunities**
- **adopt a consistent and reliable means of assessing, pricing and managing climate-related risks.**

At the moment, many insurers have made a voluntary commitment to address the impact of climate change, although future regulation may require all insurers to take action. For example, a number of insurers have signed up to the United Nations-convened net-zero asset owner alliance which commits to moving asset portfolios to net-zero greenhouse gas emissions by 2050.

Chapter 9 Summary

Expenses and commission

Commissions may be initial and/or renewal. Other expenses can be categorised into initial, renewal and termination expenses.

Initial expenses and commission are usually the largest expense categories.

Overheads can be any expenses that are not specifically related to a particular policy activity. More often they are the 'fixed' expenses, that do not vary with volume of business within a given scale of company operation.

Inflation is a key element of the uncertainty and risk associated with future expenses.

The main different expenses are salaries, property, computer and investment expenses. Many are linked in some way to earnings inflation. Price and (particularly) earnings indices can be used to help predict the relevant inflation rates.

New business volume is more volatile than in-force volume or claim numbers. New business may fluctuate in line with economic cycles. Initial, renewal and claim expenses reflect this pattern of volatility.

Economic environment

The available assets will influence investment policy and interest rate assumptions.

Volatility of investment markets will increase cost of capital for insurers, so increasing policy prices. This can also affect the demand for life insurance products.

Legal environment

Life insurance companies' operations will be influenced by PRE. PRE can have legal force through court rulings, so it can place considerable restrictions on companies.

General contract legislation may outlaw certain policy conditions, so restricting a company's ability to manage risk and/or issue certain product designs.

New legislation that has retrospective force could be a serious problem.

Any inaccuracies in the information given to the policyholder regarding contractual terms can lead to a risk of consequent legal action against the company.

The regulatory regime

Governments may impose restrictions on life insurance companies, usually with the stated aim of protecting policyholders. The more common restrictions are:

- the types of contract that a life insurance company can offer
- the premium rates, or charges, for some types of contract
- rating factors that can be used to calculate premiums
- the terms and conditions of the contracts
- the channels through which life insurance can be sold, sales procedures or information given at the point of sale
- the ability to underwrite (*eg* prohibition of the use of genetic test results)
- the amount of business that may be written, via minimum reserving or solvency capital requirements
- the types of asset or the amount of any particular asset in which the life company may invest for the purpose of demonstrating solvency.

The wider regulation of different sales media also has an impact on life insurance companies and the products that they sell.

Regulations are under development that aim to limit the impact of climate change.

The taxation regime

The most common approaches to life insurance company taxation are:

- a tax on the annual profits of the business
- tax payable on investment income / gains less some or all of the operating expenses of the company.

Different tax treatment of different types of life insurance contract can make it cheaper to provide some benefits as one form of business than another.

Different tax treatment of life insurance business and other forms of saving may create opportunities for a life insurer, but may also impose restrictions on contract design.

In comparing the tax advantages of different products one must consider:

- the taxation treatment of premiums paid, in particular whether the premiums are deductible from the individual's taxable income and whether there is a premium tax
- the taxation of the life insurer's funds during the life of the contract
- the taxation treatment of the eventual policy benefits.

Professional guidance

Actuarial associations will often issue professional guidance for actuaries advising life insurance companies. This will typically give actuaries a framework of points to be considered in carrying out their responsibilities in order to maintain professional standards.

Actuarial associations may also issue professional guidance on the interpretation of government regulations.

11 Climate change risks

Climate change risks could arise from adverse changes in the physical environment and secondary impacts in the economy at a regional or a global scale.

Climate risks for financial companies are categorised into physical, transition and liability risks:

- **Physical climate risks are the first-order effects of environmental changes such as greenhouse emissions, pollution and land use. An examples of physical climate risks could be an increase in mortality or morbidity in an insured population due to global warming or pollution.**

  So physical risks could impact an insurer by increasing the number of claims, but could also impact it in other ways, *eg* an increase in storms or floods could damage infrastructure that the insurer holds as an investment.

- **Transition risks refers to economic, political and market changes as a result of efforts to mitigate climate change. An example of climate transition risks could be policy changes designed to reduce fossil fuel consumption (*eg* taxes, subsidies, limitations) resulting in investments in fossil fuels and carbon-intensive industries losing value.**

  So we might expect falling profitability for some sectors of the economy, particularly if they have a large carbon footprint. Indeed, some investments may become 'stranded assets' and lose all their value, *eg* coal mining if there was a ban on the use of coal-fired power stations. In contrast though, some sectors of the economy may see increased profitability, *eg* companies specialising in new greener technologies.

- **Climate liability risks can arise from injured parties seeking compensation for the impacts of climate change. An example of climate liability risks could be a link established between air pollution and adverse health conditions, resulting in a new class of latent claims.**

  Life insurance companies may face legal risks such as mis-selling if they fail to take into consideration their policyholders' preferences with regards to sustainable investment.

The chapter summary starts on the next page so that you can keep all the chapter summaries together for revision purposes.

Chapter 11 Summary

The following are some of the risks faced by a life insurer:

The mix of business by nature and size of contract

The unpredictability of the mix of new business by nature and size of contract is a risk for the insurer.

Examples of a contract's nature are: class of business, type of contract, contract design, and premium frequency.

Unexpected variation in nature or size may change the risk profile of the company, which may lead to an overstretching of the company's capital and other resources available to cover the risk.

Coverage of per-policy expenses is particularly vulnerable to a reduction in the average size of policies issued.

The mix of business by source

Different distribution channels involve different sales methods and reach different populations. As a result, the demographic and expense experience of the various channels is likely to differ. Variation from the insurer's assumed mix by source could therefore invalidate the insurer's demographic and expense assumptions.

The volume of business

Insurers may experience difficulties as a result of:

- too much business, so that its capital resources or administrative capacity are exceeded
- too little business, so that it fails to cover its overhead expenses.

Guarantees and options

To calculate the cost of guarantees and options, a life insurance company will use a model. Model, parameter and random fluctuations risks therefore occur.

Competition

The need to compete may lead management to take unacceptable risks. This might involve decisions to:

- reduce premium rates or charges under new business contracts
- offer additional guarantees and options under new business contracts
- increase bonuses under existing contracts
- increase salaries or commissions in the respective distribution channels
- keep charges too low under existing, reviewable, contracts.

Distributors

Distributors may:

- encourage lapse and re-entry where this favours the policyholder
- take advantage of loopholes in product design
- take advantage of timing loopholes in unit pricing practices.

The management of the company

Management risks can arise because:

- the directors have made a conscious decision to ignore sound risk-management advice in pursuit of other competing aims
- the control systems in place are inadequate or are not properly followed.

Mismanagement can lead to financial losses, regulatory intervention, and damage to the company's reputation.

Counterparties

If an insurer has an agreement with another entity then it faces the risk that the entity either fully or partially defaults on its obligations or performs them to an unacceptable standard. This is counterparty risk.

Legal, regulatory and tax risks

Future changes to any of these can adversely affect the insurer and/or its policyholders (see also Chapter 9.)

Fraud

Directors, staff, policyholders and even external parties can all perpetrate fraud and so cause loss to the insurer.

Climate change

Climate change risks could arise from adverse changes in the physical environment and secondary impacts in the economy.

Climate risks for financial companies are categorised as:

- physical risk
- transition risks
- liability risks.

Solution

The key reason is that a major change will result in significant systems development, which will take time.

There are benefits in terms of saving time and cost with such things as training administration and sales staff, printing marketing literature and so on.

There is also a possibility that a design, which appears much more attractive or favourable to policyholders, may seem unfair to existing policyholders and may lead to some dissatisfaction and possible marketing risk. For example, it may cause many policyholders to surrender their policies over a short period of time and the company may be unable to recover all of its expenses from them (particularly fixed expenses).

1.12 Regulatory requirements

A company must adhere to any regulatory requirements, *eg* maximum (capped) charges, treating customers fairly.

These should be taken into account in product design.

Question

Explain why it is important to treat customers fairly.

Solution

Reasons include:

- to meet what would be considered to be normal standards of professional ethical behaviour
- because it may be a regulatory requirement, or one recommended by professional guidance
- to foster ongoing trust and good relations with policyholders, the media, and the public in general, which in the long term will help to generate future sales.

1.13 Sustainable investment options

Increasing focus is being placed on the Environmental, Social and Governance (ESG) issues. The drivers for this are a combination of regulatory, marketing, and social responsibility.

A company needs to consider the sustainability of investment options when designing products.

Chapter 11 discusses how climate change could cause investments in fossil fuels and carbon-intensive industries to lose value.

As well as the environmental impact on investments, ESG considers social factors such as the working conditions of the employees of the companies that are invested in and governance factors such as the accounting standards used by these companies.

Example

An insurer might be considering an investment in the shares of a company involved in the fossil fuels industry. The insurer would need to consider the extent to which it felt that this industry was sustainable when estimating the likely returns that it would make on this investment. This could impact on the design of the charges and guarantees for the contract.

The insurer would also need to consider the reaction of potential policyholders to this investment when assessing the marketability of its contracts.

2 Interaction of product design factors

These factors are not necessarily independent, in that meeting one may prejudice the meeting of another, and so a compromise will usually need to be reached. Also, the factors are not necessarily mutually exclusive.

It is the job of the 'marketing actuary' to design a product, with the aim of giving the 'optimal' compromise between the factors set out in this chapter.

Question

List pairs of factors that are likely to be difficult to reconcile.

Solution

The following conflicts of interest are likely to occur:

Profitability Financing requirement Risk characteristics Onerous guarantees Sensitivity of profit	*versus*	Marketability Competitiveness Cross-subsidies (possibly)

Chapter 22 Summary

Without-profits alterations

In assessing an alteration method, the principles we might judge it against include:

- affordability
- consistency with boundary conditions, *eg* surrender, paid-up, new policy
- stability
- avoidance of lapse and re-entry
- fairness
- ease of calculation and of explanation to the policyholder.

For without-profits alterations, one of the key themes is to extract a suitable amount of profit from the policy after alteration. The method of equating policy values before and after the alteration can usually be used to produce satisfactory (or the least unsatisfactory) terms for the alteration. Often, using a current premium basis before and after is a good starting point.

The profit 'released' at the date of alteration from the original contract will be:

- the full expected profit under the unaltered contract, if a realistic prospective value is used for the policy value before alteration
- no profit at all, if an earned asset share is used for the policy value before alteration
- something in between, if a prospective value using a basis incorporating margins is used for the policy value before alteration.

The profit expected to emerge, from the date of alteration, over the remaining life of the altered contract will be:

- no profit at all, if a realistic prospective value is used for the policy value after alteration
- profit corresponding to the margins in the assumptions, if a prospective value using a basis incorporating margins is used for the policy value after alteration.

Paid-up values can also be calculated using the proportionate method.

When performing alterations, particular note should be taken of the risk of financial or mortality selection against the company.

Unit-linked alterations

For unit-linked contracts, the units attaching to the contract at the date of converting to paid-up will remain attached, possibly after deduction of any penalty that applies.

The practice questions start on the next page so that you can keep the chapter summaries together for revision purposes.

Solution X1.5

This topic is covered in Chapter 5.

To compare the asset shares we need to accumulate the various components of the asset share from the start of the contracts to the end of their third year … [½]

… using the company's past actual experience. [½]

Premiums increase the asset share. These will be larger for the endowment assurance … [½]

… as the benefit is payable on maturity as well as death … [½]

… and the premium will include a loading for future bonuses … [½]

… but will be offset slightly by the higher sum assured of the term assurance. [½]

The asset share of the endowment assurance may be increased by a share of the company's profits from its without-profits business, … [½]

… although if losses were made then these may reduce the asset share. [½]

The asset share of the endowment assurance may also be increased by any withdrawal profits from other with-profits contracts … [½]

… although these could be losses early in the term of the contract, *eg* if a return of premium is paid as a surrender value. [½]

The term assurance will not be adjusted for the profits on without-profits business or withdrawals. [½]

The investment return is likely to have added more to the asset share of the endowment assurance … [½]

… as it has the higher premium … [½]

… and is likely to have a higher risk investment strategy, *eg* including some equity exposure. [½]

The asset share may actually be reduced by interest when the asset share is negative, which is more likely to be significant for the term assurance. [½]

It is also possible that the asset share could reduce if asset prices fall. This is more likely for the endowment assurance given its riskier investment strategy. [½]

Expenses reduce the asset share. The term assurance is likely to have larger initial expenses … [½]

… as more underwriting is required due to the larger sum at risk. [½]

The cost of providing death benefits in excess of the asset share is also deducted. This will be larger for the term assurance … [½]

… as it has the higher sum assured. [½]

The asset share for with-profits policies is often reduced by transfers of profit to shareholders, but this does not apply here as the company is a mutual. [½]

The asset share may be reduced due to the cost of any capital required to support the contracts in the early years. This is likely to be higher for the term assurance … [½]

… as it has a smaller premium, higher initial expenses … [½]

… and more onerous reserves as its benefits are guaranteed, whereas the endowment assurance has an element of discretionary benefits. [½]

The asset share of the endowment assurance may be reduced by any contribution to the free assets to support smoothing and investment freedom … [½]

… but this will not apply to the term assurance as it is without-profits. [½]

The asset share of both contracts could be reduced by tax … [½]

… this could be more significant for the endowment assurance if tax is paid on investment returns. [½]

In conclusion, the asset share is likely to be much larger for the endowment assurance than the term assurance at the end of the third year. [½]

[Maximum 9]

X4.8 A life company sells five-year without-profits endowment assurances. The sum assured is 50,000. The death benefit is payable at the end of the year of death. Level premiums of 9,733.72 are payable annually.

The premium and reserving basis is as follows:

Mortality: 1% *pa*

Interest: 6% *pa*

Expenses: Initial, 30% of the first year's premiums, payable at the start of the contract

Renewal, 5% of all premiums, including the first, payable at the start of each year.

(i) Calculate the gross premium prospective policy value just before the start of the third year of the policy. [6]

Immediately before the payment due at the start of the third year, the policyholder wishes to alter the policy by increasing the sum assured to 65,000, and increasing the total term of the policy to six years.

(ii) Calculate the new annual premium payable under the policy, allowing for an alteration expense of 150. [6]

(iii) Comment on your answer to part (ii). [2]

[Total 14]

X4.9 An insurer sells regular premium without-profits endowment assurances. The insurer is reviewing the methodology and basis that it will use to calculate the embedded value of these contracts in its accounts.

(i) Outline the differences between the definition of a passive valuation approach and that of an active valuation approach. [2]

(ii) List the items that the insurer will need to choose a methodology and basis for in order to calculate the embedded value. [3]

(iii) Give examples of how these items could be calculated using:

- a passive valuation approach
- an active valuation approach. [3]

[Total 8]

END OF PAPER

Solution X4.8

This topic is covered in Chapter 22.

(i) ***Gross premium policy value***

We want the reserve at the start of the third year, *ie* two years after the start of the policy.

The expected present value of the future benefits on death and maturity is:

$$50,000(qv + pqv^2 + p^2v^3) = 50,000\left(\frac{0.01}{1.06} + \frac{0.99\times 0.01}{1.06^2} + \frac{0.99^2}{1.06^3}\right) = 42,057.79 \quad [2]$$

The expected present value of the future premiums is:

$$9,733.72(1 + pv + p^2v^2) = 9,733.72\left(1 + \frac{0.99}{1.06} + \frac{0.99^2}{1.06^2}\right) = 27,315.23 \quad [2]$$

The expected present value of the future expenses is:

$$9,733.72x0.05(1 + pv + p^2v^2) = 27,315.23\times 0.05 = 1,365.76 \quad [1]$$

So the gross premium reserve is:

$${}_3V = 42,057.79 + 1,365.76 - 27,315.23 = 16,108.32 \quad [1]$$

[Total 6]

(ii) ***New premium after alteration***

The current reserve plus the value of future premiums must be sufficient to fund the future benefits and expenses plus the alteration expense.

The expected present value of the future benefits on death and maturity is now:

$$65,000(qv + pqv^2 + p^2qv^3 + p^3v^4) = 65,000\left(\frac{0.01}{1.06} + \frac{0.99\times 0.01}{1.06^2} + \frac{0.99^2\times 0.01}{1.06^3} + \frac{0.99^3}{1.06^4}\right) \quad [2]$$

$$= 51,677.71$$

The expected present value of the future premiums is now:

$$P(1 + pv + p^2v^2 + p^3v^3) = P\left(1 + \frac{0.99}{1.06} + \frac{0.99^2}{1.06^2} + \frac{0.99^3}{1.06^3}\right) = 3.62093P \quad [2]$$

The expected present value of the future expenses is now:

$$Px0.05(1 + pv + p^2v^2 + p^3v^3) = 0.05\times 3.62093P = 0.18105P \quad [1]$$

So the new premium satisfies the equation:

$$16{,}108.32 + 3.62093P = 150 + 51{,}677.71 + 0.18105P$$

Solving this, we find that $P = 10{,}383.91$. [1]

[Total 6]

(iii) ***Comment***

This is a higher premium than before. [½]

The higher sum assured will require the premium to increase. [½]

Extending the term will have the opposite effect, because more premiums are paid and are accumulated for longer. [1]

However, the increase in sum assured is too great to be covered by an increase in term alone. [½]

[Maximum 2]

Solution X4.9

This question tests the material on active and passive valuation approaches from Chapter 20 in the context of embedded values.

(i) ***Definition of passive and active valuation approaches***

A passive valuation approach is defined as being a valuation methodology which is relatively insensitive to changes in market conditions … [½]

… while in contrast, an active approach is defined as being based more closely on market conditions. [½]

A passive valuation approach is defined as having a valuation basis which is updated relatively infrequently … [½]

… but an active approach is defined as having assumptions that are updated on a frequent basis. [½]

[Total 2]

(ii) ***Items needed to calculate an embedded value***

An embedded value is the sum of the shareholder-owned share of net assets (the excess of the assets over the liabilities) and the present value of future shareholder profits arising on existing business.

A methodology is required to:

- value the assets [½]
- value the liabilities. [½]

A basis is required for the following items (in order to calculate the present value of the future profits):

- investment return earned on reserves [½]
- mortality [½]
- expenses [½]
- expense inflation [½]
- surrender rates [½]
- rates of conversion to paid up [½]
- risk discount rate. [½]

A basis is also required to value the liabilities. [½]

[Maximum 3]

(iii) ***Examples of a passive and active valuation approach***

Passive valuation approach

The assets could be valued at historic cost or book value. [½]

The liabilities could be valued passively using a net premium valuation (as this method is fairly insensitive to yield changes as the net premium is recalculated). [½]

The bases used to value the liabilities and project the profits could be changed infrequently. [½]

For example, the investment return assumption may be 'locked in' (*ie* remain unchanged) over the life of the contract. [½]

Active valuation approach

A market-consistent approach could be used as follows:

- the market value could be used to value the assets [½]
- the risk-free rate could be used as the investment return to value the liabilities [½]
- the risk-free rate could be used to project the investment return earned on the reserves when projecting the profits [½]
- the risk-free rate could be used as the discount rate to calculate the present value of the profits. [½]

The non-economic assumptions could be updated regularly. [½]

The examples given above have been chosen because they are described in Chapter 20. However, equally valid examples should also be given credit.

[Maximum 3]

Check actual withdrawals *vs* expected withdrawals from recent model office projection work. [½]
[Maximum 3]

(iii) ***Advantages and disadvantages***

If the company's results are incorrect, and these lower persistency rates better reflect reality, then the suggestion is sound for all of the areas of work concerned. [½]

However, assuming that the internal results are accurate and that the MD is suggesting that the company uses persistency rates that are lower than reality, it needs to consider what a lower persistency assumption means in terms of prudence, … [½]

… and also to what extent the company wants prudence in the areas of work mentioned. [½]

First, what does a lower persistency assumption imply for prudence?

Lower persistency will be *more* prudent where discontinuance terms are such that the company loses out. [½]

This is probable at early durations (especially with negative asset share), … [½]

… but should not be the case later on unless the company is deliberately paying out more than asset share for PRE / marketing reasons. [½]

Lower persistency rates will also be more prudent if there are potentially onerous guaranteed discontinuance terms. [½]

Lower persistency rates will be *less* prudent if the discontinuance terms are such that the company, overall, makes a profit on discontinuance (*ie* a profit *in excess* of that which it would have accrued were the policies concerned to have continued). [½]

This is unlikely, unless there are no PRE / marketing pressures on the company. [½]

Next, is extra prudence wanted?

Reserving

For reserving for demonstration of solvency to supervisors, possibly yes – if there is doubt about the validity of the persistency assumptions, it is better to use a more prudent set. Also, using industry data may be more easy to justify to supervisors. [1]

But the extent to which this is an issue will depend on the local statutory reserving regulations. [½]

For instance, if these prescribe 'choose a 0% or 100% withdrawal rate for each product class (or policy) depending on which is more prudent' (which has been a common approach), then the whole question is immaterial. [½]

The extent to which extra prudence is wanted will depend on how prudent the basis already is in aggregate, … [½]

… the financial impact of any strengthening of reserves, … [½]

… and how much extra security any required solvency capital may already add. [½]

Embedded value

Normally (*eg* internal company work) a best estimate is required. [½]

It does not *really* matter too much if a parameter is wrong for one year, as after one year, the company should have a better idea of the situation. (Unless, that is, the EV is being used to set a sale value.) So it is better *not* to have extra prudence. [1]

Pricing

A best estimate is likely to be wanted, but it is very important to get assumptions right, especially for conventional without-profits business. So normally go for the prudent side of best estimate. [1]

If certain that the company's figures are correct, stick with them (*ie* use the company's figures with a small margin, depending on the guarantees involved). [½]

If there is some doubt about the validity of the company's own assumptions, it is better to move a bit more in the direction of prudence, especially if rates are guaranteed. So the MD's suggestion could be reasonable here (if higher w_x = more prudent for the products concerned), assuming that this does not put the company out of the market. [1]

Greater prudence in the assumptions could justify a decrease in the risk discount rate. [½]

[Maximum 10]

Solution X6.7

This topic is covered in Chapter 28.

(i) ***Suitability of investments***

General points

The company should select investments that are appropriate to the nature, term and currency of the liabilities. [1]

The investments should also be selected so as to maximise the overall return on the assets, where overall return includes both income and capital gains. [1]

The extent to which the first principle may be departed from in order to meet the second will depend, all other things being equal, on the extent of the company's free assets and the company's appetite for risk. [1]

The choice of assets may be limited by regulation. [½]

The company should choose assets that are consistent with its environmental, social and governance policy … [½]

… and with the expectations of its policyholders. [½]

The suitability of the investments will depend on their taxation, and this may be different for the overseas assets compared to the domestic assets. [½]

(a) ***Long-dated domestic government bonds***

These assets would be appropriate to match long-term liabilities fixed in monetary terms, … [½]

… such as the guaranteed sum assured and any declared bonus on policies some way from maturity. [1]

This is true for the UK-style 'additions to benefits' surplus distribution method (ATB) and the revalorisation method. [½]

Index-linked securities (if available) are a reasonable match for the company's expenses. [½]

Government bonds are less suitable for discretionary benefits under ATB, … [½]

… because bonds are expected to under-perform equities in the long term … [½]

… and do not offer protection against unexpected inflation. [½]

Under the revalorisation method there is no deferral of distribution of profit. [½]

This makes equity investment prohibitively risky. [½]

Government bonds may therefore be the predominant asset class backing with-profits business using revalorisation. [½]

The returns are denominated in the local currency and so domestic bonds are a good currency match. [½]

(b) ***Policy loans***

These would offer fixed returns that are likely to be above cash yields, … [½]

… are appropriate for liabilities fixed in monetary terms … [½]

… and are reasonably secure. [½]

Policy loans may not offer returns as high as those on equities, but this depends, among other things, on the rate of interest used to calculate the loan. [½]

Also, the term of the investment would be chosen by the policyholder and so the company would not be in control of this. [½]

The returns are denominated in the local currency and so are a good currency match. [½]

(c) ***Ordinary shares***

Equities offer real long-term returns, which is arguably what policyholders are seeking from with-profits savings policies. [½]

Equities are therefore a suitable 'match' for future bonuses. [½]

This is particularly so for the discretionary bonuses, *eg* terminal bonus under ATB. [½]

Also, the highest long-term nominal return would be expected from this class. [½]

The returns are denominated in the local currency and so are a good currency match. [½]

The market value is volatile, but with a high level of free assets the company can absorb movements in the capital value. [½]

(Equity investment would be prohibitively risky for the revalorisation method – see earlier.)

(d) ***Property***

Property investment also gives an expected real long-term return … [½]

… and so would be suitable for non-guaranteed liabilities. [½]

Its large unit size will be less of a problem for this large company. [½]

Its volatile capital values in the medium term … [½]

… and illiquidity … [½]

… would not greatly trouble a company with significant free assets investing for the long term. [½]

Property is therefore a useful diversification from equities in pursuit of best returns. [½]

(e) ***Overseas shares***

For with-profits liabilities these provide a good match in terms of the nature of any discretionary liabilities, … [½]

… but not in terms of currency. [½]

The uncertainty of capital values and the currency risk both make these poorly suited to with-profits business under the revalorisation method. [½]

The company might want the currency mismatch because it gives more diversification by economy; … [½]

… alternatively, the currency risk could be hedged (at a cost). [½]

In the long-term overseas equities *might* provide better returns than domestic equities and so might be more appropriate from the point of view of maximising returns. [½]

[Maximum 18]

(iii) ***Small company with limited free assets***

Closer matching [½]

The company would need to ensure that the nature, term and currency of the assets are closer to those of the liabilities. [½]

This is because there is less of a cushion against adverse experience. [½]

This might mean more bond investment and less in equities and property as the volatility of equities and property poses too great a solvency risk for this level of free assets. [1]

Liability valuation

It is possible that the valuation of liabilities is performed at an interest rate that is derived, or in some way related to, the yield on the asset portfolio. [½]

Pressure on the free assets is likely to favour fixed interest in order to reduce the value of the liabilities. [½]

This would also lead to increased investment in fixed-interest bonds, less in equities and property. [½]

Similarly, any solvency capital requirement is likely to be greatest for equities and property leading to increased investment in fixed-interest bonds. [½]

[Total 4]

