



Institute
and Faculty
of Actuaries

EXAMINERS' REPORT

CP1 - Actuarial Practice

Core Practices

Paper One

September 2022

Introduction

The Examiners' Report is written by the Chief Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Sarah Hutchinson
Chair of the Board of Examiners
December 2022

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

The aim of the Actuarial Practice subject is to use the technical and business skills learnt in the Actuarial Statistics, Actuarial Mathematics, Actuarial Modelling and Business subjects, combining them with new material on how the skills are applied to solve real world problems.

The subject provides the essential knowledge of risk management techniques and processes required by all actuaries and is an essential introduction to Enterprise Risk Management, subject SP9 and the Chartered Enterprise Risk Actuary qualification. The subject also underpins the SP and SA subjects, covering essential background material that is common to a number of specialisms.

This subject examines applications in practical situations of the core actuarial techniques and concepts. To perform well in this subject requires good general business awareness and the ability to use common sense in the situations posed, as much as learning the content of the core reading. The candidates who perform best learn, understand, and apply the principles rather than memorising the core reading.

The examiners set questions that look for candidates to apply the principles specific to the situation set out in the questions, having read the question carefully. Many candidates gain few marks by writing around the subject matter of the question in a more general fashion. Detailed specialist knowledge is not required and nor is very detailed development of particular points.

Well prepared candidates demonstrate that they have used the planning time well to understand the breadth of the question and to structure their answer, this is a big advantage in making points clearly and without repetition. This also enables candidates to use the later parts of questions to generate ideas for answers to the earlier parts.

Time management is important so that candidates give answers to all questions that are roughly proportionate to the number of marks available.

The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to use these points to aid their revision.

Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

B. Comments on candidate performance in this diet of the examination.

Paper 1 scored lower than Paper 2 with the average scores being circa 6% different between the papers which is the reverse of previous sessions. This session had 12 questions in Paper 1 and there was evidence that were candidates that had time constraints particularly on Q12. The stronger candidates had clearly spent time preparing both their answers and time management leading to answers that went into more detail where required and appropriate for the number of marks available.

C. Pass Mark

The Pass Mark for this exam was 54
700 presented themselves and 277 passed.

Solutions for Subject CP1 paper 1 - September 2022

Q1

The funds are the same size, so this is not because one is bigger than the other. The government bond fund is lower risk than the Equity Fund and therefore should expect to:

Have a lower return [1]

This is because of the equity risk premium - i.e. is the additional return that investors require from equity investment to compensate for the risks relative to risk-free rates of return [1]

The equity risk premium fluctuates from time to time, depending on the overall level of confidence of investors and their views on risk [1]

There may be a different level of inflation expectations in the funds [½]

Greater volatility in equities leads to higher required return [½]

Different tax implications for funds, e.g. equity investment may be being encouraged [1]

Dividend expectations could be higher [½]

e.g. due to high economic growth expectations [½]

Greater default risk in equities leading to higher required return [½]

One fund could be active managed, one passive [½]

Time horizon of bond fund (could be short, dated bonds) [½]

[Marks available 7½, maximum 4]

This question was reasonably well answered but it is worth noting that very few candidates obtained full marks. This was generally due to candidates repeating the same points from different angles rather than focusing on a wider breadth of ideas.

Q2

When carrying out sensitivity analyses, it is important to change the assumptions one at a time, in a logical manner [½]

Normal practice is to start with a central set of assumptions on a best-estimate basis [½]

and then to vary each item in turn, to quantify the effect of assumption changes [½]

Once the impact of each assumption is quantified they can identify which are material [½]

Could then only add margins for prudence to the most material assumptions [½]

Or add a margin to all [½]

It is then also necessary to test the effect of multiple assumption changes [½]

And correlations/dependencies between them [½]

In most cases the assumptions will be neither fully independent nor fully correlated and the result of applying two tests simultaneously will be greater or less than the sum of the individual results [½]

The scheme's risk appetite will be key in determining the overall prudence margin [½]

The scheme's investment strategy and the strength of the sponsoring employer will influence the risk appetite [½]

Assessment of the necessary margins depends on the risk involved [½]

- and its materiality, to the final result [½]
- For some factors, it may be reasonable to add a simple percentage loading. For others, a more detailed analysis of experience, perhaps using a stochastic approach, may be needed to determine a margin consistent with the risk appetite [1]
- Will need to consider whether to apply a similar margin across all best estimate assumptions or focus on the most significant assumptions e.g., discount rate, mortality. [1]
- Sensitivity also depends on how much variation in the underlying parameter [½]
- E.g. expenses might be a narrow range, but test wider for equity returns [½]
- Overall margin of prudence not being excessive [½]

[Marks available 10, maximum 4]

This was not very well answered, only the best prepared candidates developed answers beyond the basic points.

Q3

- The scheme could have seen poor investment returns from the assets that they held, in particular lower than expected [1]
- The mortality experience of the scheme could have been worse than assumed, that is less people dying than expected [1]
- Deaths of active members could mean more death in service payments [½]
- Increased number of new entrants could have not been funded for by the company sponsoring the scheme [1]
- Inflation could have been higher than expected, this could have affected both pensioners in payment but also the revaluation in retirement [1]
- Salary increased higher than expected, therefore increasing the accrual rates higher than planned [1]
- Premiums/Contributions from the members or the sponsors could have been lower than expected [1]
- Legislation could have changed, making the liabilities more onerous [½]
- Incorrect valuation previously [½]
- Higher expenses than expected [½]
- Assumptions more prudent (e.g. lower risk assets) [½]
- Fewer transfers than expected (or paid out at a higher rate than assumed) [½]
- Discretionary increases awarded [½]
- Or other change in benefits [½]
- Higher than expected withdrawal/ERs if terms generous (vv if not) [½]
- Adverse tax event [½]
- Failure of insurer or other counterparty if pensions secured [½]
- Anti-selection with argument (e.g. fixed commutation factors) [½]

[Marks available 12, maximum 5]

This question was very well answered with most candidates scoring high marks. The candidates that over illustrated specific reasons did not score as well as those that made sure their answer had sufficient breadth.

Q4

- (i)
- | | |
|--|-----|
| Systematic risk is risk that affects an entire financial market or system | [1] |
| Diversifiable risk arises from an individual component of a financial market or system. | [½] |
| It is not possible to avoid systematic risk through diversification. | [½] |
| The main systematic risk in the fund is a decline in the domestic equity market, with all stocks being affected | [1] |
| The risk cannot be avoided by the fund investing in overseas equities or other asset classes | [1] |
| However, by investing in many holdings, the diversifiable risk can be mitigated and leave the portfolio sufficiently diversified to limit exposure to systematic risk only | [1] |
| The fund manager could purchase options on the equity index to ensure their actual return does not deviate too far away, although that could be expensive and reduce returns | [1] |
| Diversify by both industry category and individual stocks | [½] |
- [Marks available 6½, maximum 3]

- (ii)
- | | |
|--|-----|
| A CRO's role is to have responsibility for overall leadership and development of risk management within the organisation. The CRO will give advice to the Board on risk | [1] |
| Business units will often have a risk manager responsible for using the allocated risk budget effectively | [1] |
| All employees at the organisation should look out for risk and suggest ways that risk can be mitigated or controlled | [1] |
| The auditors will have a role in monitoring risk and adherence to risk management policies | [½] |
| Any risk committees that have a role in risk management | [½] |
| Any other sensible internal stakeholder | [½] |
| Have processes in place so that employees can report risks easily and the CRO can react quickly. The Board of Directors will have overall responsibility for setting the risk appetite | [1] |
| Fund manager should stay within active risk budget | [½] |
| Monitor against agreed target and understand reasons and impact of divergence from it | [½] |
- [Marks available 6½, maximum 3]
[Total 6]

Both parts were well answered with most candidates scoring highly on (i).

For part (ii) those candidates that read the question in detail and picked up the keywords scored better than those that just listed the stakeholders.

Q5

- | | |
|--|-----|
| The average tells us nothing about the trend of expenses. | [1] |
| The assumption may be in line with recent experience and recent experience is expected to continue a past downward trend e.g. average is over last 4 years with yearly actual amounts of £100, £90, £80, £70 | [½] |
| On the other hand, experience over last 4 years may be on an upward trend (e.g. look like £70, £80, £90, £100) or simply £85 flat in which case other factors may be driving a low assumption | [½] |
| The expected future experience may be different from past experience (i.e. recent | |

experience is not expected to continue) Possible reasons may be: [½]

(Marker Note - half mark per point up to 4 for the below reasons)

- regulation change to impose a cap on expenses [½]
- tax change to increase the allowed tax relief on expenses [½]
- volumes of business expected to increase, reducing per policy expenses [½]
- due to spread of fixed costs [½]
- expense no longer involves renewal commission/fees e.g. selling over internet rather than involving brokers [½]
- inflation may be reducing [½]
- increased efficiency of administration [½]
- outsourcing at lower cost [½]
- changes in the mix of homogeneous groups e.g. future lives expected to fall into a category where less frequent communications are required [½]
- move to marginal pricing so no longer taking on overheads [½]
- past one-off cost has now been paid off [½]
- a lower assumption will reduce the premium charged i.e. aiming for increased marketability [½]
- competitors may have been lowering premiums [½]
- may be willing to reduce profits per policy but hoping volumes increase enough to that total profits increase (or don't reduce) [½]
- or maybe loss leader, to cross sell other more profitable products [1]
- Other assumptions in the pricing basis have been adjusted [½]
- (e.g. move from prudent to best estimate) [½]
- and they compensate for a reduced expense assumption. [½]
- Prudence may have moved to another assumption (e.g. discount rate) [½]

Other:

- Abnormal or random fluctuations in past data [½]
- The assumption may have little impact on the premium charged but may make the admin department/product appear more efficient internally having a lower stated assumption. Or more efficient externally e.g. product surveys [1½]
- May have been errors in calculating either the average or the revised assumption [½]
- Some expenses may have been reclassified as not renewal [½]

[Marks available 15½, maximum 7

Score for this question were mixed. Candidates that made sufficient points tended to explain them in detail and then did very well. Most candidates made good points, explained them well but then spent more of their answers on a smaller range of points.

Q6

(i)

Death:

- Minimum guaranteed return [½]
- Or aligned to inflation or other index [½]
- Option to switch the product to a relative on death - with no underwriting [1]

Surrender:

Minimum guaranteed return (though may want to add a penalty)	[½]
Guaranteed surrender penalty	[½]
Option to make paid up rather than surrender	[½]

Maturity:

Minimum guaranteed return	[½]
Or aligned to inflation or other index	[½]
Option to renew or buy new product on maturity on same terms as before	[½]
This could include no underwriting on the member at that point in time	[½]
Option to buy annuity on guaranteed terms	[½]

[Marks available 6, maximum 3]

(ii)

Where an insurance company must hold capital requirements based on stressing the balance sheet position the capital that must be held will depend on how the price of options and guarantees change in stress	[1]
An insurance company can use financial derivatives to manage its exposure to financial risks it is exposed to within the financial products it writes	[½]
A financial derivative (asset) whose price moves in the same direction and by the same amount as a liability in response to changes in financial conditions results in the value of assets and liabilities changing by offsetting amounts leaving the surplus unchanged. This protects to the solvency position of the insurance company	[1½]
This offsetting can also apply in the capital requirement calculations reducing the amount of capital required to be held. This allows more business to be written for a given amount of available capital	[1½]

Key benefits of financial derivatives are:

Intrinsic characteristics are clear providing a higher level of transparency enhancing contract certainty	[1]
Fungible contracts so ease to arrange and unwind positions	[½]
Enhanced liquidity so readily tradeable	[½]
Observable market prices so limited requirement to negotiate price	[½]
Operational risk reduction	[½]
Facilitates the use of electronic trading venues	[½]
It is therefore more efficient to actively manage financial risk exposure as it changes, for example when surrenders occur.	[1]
If the guarantee/option bites, insurer incurs cost of additional benefit	[½]
Which could be substantial if a lot of policyholders take benefit at that point	[½]
Which could happen if policyholders can choose the date	[½]
i.e. selection	[½]
Pay-out from an appropriate derivative can mitigate this	[½]

[Marks available 11½, Maximum 4]

[Total 7]

Part (i) was generally well answered, although care was needed on terminology in places (e.g. Guaranteed SV is not the same as Guaranteeing an SV).

Part (ii) was not well answered with few candidates focusing on the issue being raised and just discussing derivatives from a general investment perspective rather than in relation to Options and Guarantees.

Q7

(i)

Look at impact of an adverse scenario	[½]
Should be plausible	[½]
Reasonable example, e.g. pandemic, oil price shock, environmental disaster	[1]
Group risk exposures by category, so for a manufacturer group by suppliers, raw materials, customer demand, financial risks, operational risks such as fraud	[3]
Then develop adverse scenario for each group of risks	[1]
Can be used to show key decision makers (e.g. Board) impact of scenario on company to help understanding of key risks	[½]
e.g. help Board understand events or combination of events that would cause company to fail	[½]
Particularly useful where past data may not be a useful guide to the future - e.g. impact of climate risk	[1]
May need expert judgement on developing credible adverse scenarios	[½]
[Marks available 8½, maximum 5]	

(ii)

Stress testing looks at the financial impact of a change in one event -	[½]
e.g. market fall of x%	[½]
interest rise of y%. etc	[½]
Stress testing can be used to identify the variables to which the company's financial results are most sensitive	[1]
Unlike scenario testing it is not trying to look at how the world will look in a particular event - which could impact a wide range of variables that will impact the company.	[1]
Stress testing is often used to assess the impact on a company's financial position of a low likelihood but potentially high impact event that might not be captured adequately in a company's normal financial modelling	[1]
For example it can be used to identify killer scenario for company - e.g. interest rates would need to rise by z% for company to go bust	[½]
[Marks available 5, maximum 3]	

[Total 8]

Part (i) was reasonably well answered with some good examples submitted.

Part (ii) was now well answered with few candidates picking up the points on Stress Testing.

Q8

(i)

Portfolio can be diversified by geographical spread/type of car/ etc which reduces volatility of outcomes	[½]
And is therefore insurable law of large numbers	[½]
Risk events should be independent - e.g. insuring a fleet with the same base might attract different premiums to private cars	[1]
Probability of event relatively small - most cars do not crash or get stolen frequently	[1]
Large numbers of risks pooled - market is usually large and developed	[1]
Ultimate limit on liability - up to value of car for loss or damage, more difficult in third party liability cases where costs can be very high	[1½]
Care with terms and conditions to mitigate	[½]
Moral hazard should be eliminated - exclusions if car not locked for example, or if stored somewhere other than stated on application form	[1]
Sufficient data - again a large well developed market in most countries	[1]
	[Marks available 8, maximum 4]

(ii)

Reason:

Claims higher than expected, in amount or frequency	[½]
Owner behaviour different (e.g. celebrity lifestyle)	[½]
Claims likely to be bigger and “lumpier”	[½]
Costs higher , e.g. as fewer policies to cover fixed costs	[½]
Competition reducing market share	[½]
Less data available to price	[½]
	[Marks available 3, maximum 2]

(iii)

How to improve:

Less data available to price	[½]
Amend T&Cs e.g. higher excess	[½]
Incentivise good behaviour by no claims discount	[½]
Make premium vary by lifestyle factors	[½]
Stricter underwriting to price risk correctly	[½]
Reinsurance and other risk management tools	[½]
Amend pricing basis	[½]
If possible, in the commercial environment	[½]
Innovate to be more competitive	[½]
Marketing	[½]
Get data from other sources e.g. reinsurers	[½]
	[Marks available 5½, maximum 3]

[Total 9]

Part (i) was answered reasonably, but better prepared candidates related their answers to the specifics of motor insurance

Part (ii) was answered better than (i) and Part (iii) was answered even better with many candidates drawing out valid interferences from the challenges of insuring high-value cars.

Q9

(i)

Additional data governance issues will arise depending upon whether the company has any existing experience of handling these volumes of data [½]

Assuming little experience:

Issues will arise from the following characteristics of Big data:

Very large data sets (“Volume”)

Data brought together from different sources (“Variety”)

Data which can be analysed very quickly - such as in real time (“Velocity”) [1½]

People:

There will be a need to recruit/train a suitable number of people who understand the unique challenges of big data [½]

A Board-level understanding of the Big data issues will also need to be established [½]

Specific roles and responsibilities of individuals in the organisation with regards to new data will need to be assigned [½]

Documentation of governance standards will also need to be upgraded [½]

Systems:

How the systems will be used to capture, analyse, and process the new data will need to be controlled [1]

Issues with respect to data security and privacy (data governance) [1]

Regulators expect organisations that hold big data to be proactive in considering any information security risks posed by big data. Policyholders will be concerned about privacy issues. Both of these also represent a reputational risk to the company, and the new product. Therefore appropriate additional data governance will be very important [2½]

The data will be personal/sensitive data as well. So potentially anonymise [1]

For the purpose of driving individual rewards, it will not be possible to hold it at an anonymized level [1]

The company will be used (from its existing business) to holding personal data and complying with the relevant data protection rules. However, the specific challenges involved in big data mentioned earlier need careful control. Issues are likely to arise simply from legacy systems being unable to manage the larger data involved [1½]

If big data is new to the company, it may be that a specialist third party (outsourcer) is used to control the big data and its governance [1]

Might need extra controls around how the third party accesses data [½]

Transparency on the use of data:

The company needs to be clear from the outset what they expect to learn or be able to achieve by processing the data, as well as satisfying themselves that the data is relevant and not excessive [1]

Organisations that hold big data also need to be transparent when they collect data and explaining how the data will be used is an important element in complying with data protection principles. [1]

The complexity of big data analytics will not be an acceptable excuse for failing to obtain consent where it is required. [1]

Monitoring:

How the adequacy of the controls will be monitored on an ongoing basis will also need to

be upgraded. External auditors are likely to have a comprehensive approach to Big data based on its use among other companies that they audit. They could be consulted on a suitable data governance approach to the new data [1½]
 [Marks available 18, maximum 6]

(ii)
 Company may not have been transparent enough on how data could be used, preventing its use for valuing the rewards [1]
 Initially there may not be enough credibility in the data to draw conclusions. Even if overall credibility is OK, credibility of homogeneous subgroups may be insufficient. [1½]
 Practical difficulties in making sure data is up to date and accurate (e.g. how often do policyholders upload data [½]
 Even with enough credibility, deciding how to use it to value the rewards will be Difficult (i.e. model error) [1]
 A number of possible wristbands exist. They may each hold different types of data in a different format and frequency [1]
 Fraud - how to know whether the person was wearing the wristband (as opposed to attaching it to their dog!) or to prevent hacking the device's data [1]
 Or if the wristband data is reliable (3rd party wristbands) [1]
 Whatever the theoretical reward value, the rewards offered by competitors may drive the decision [1]
 Competitive pressures may influence the benefits offered [½]
 Risk of anti-selection - policyholders who don't get rewards might surrender [½]
 [Marks available 9, maximum 3]
[Total 9]

Part (i) was answered well. The best responses homed in on the idiosyncrasies of the new data and how this would affect the existing data governance.

Part (ii) was answered very well

As per most questions credit was given where points were made in (ii) which were relevant in part (i).

Q10

(i)
 Data could be available from government sources. For example, traffic data, accident Data (or other reasonable example) [1½]
 Car rental industry data [½]
 Industry data, e.g. ABI [½]
 Data from manufacturers [½]
 Telematics (“black box”) data may be available. This would include information on speed and location [1½]
 Reinsurers [½]
 Competitor - if you are to get a quote and compare with what competitors are charging [½]
 [Marks available 5½, maximum 2]

(ii)

The new data might take into account where and when accidents occur. It may also give reasons for the accident e.g., driver speeding [1½]

Previous assumptions may have considered details of the potential drivers e.g., age, occupation. The new data made may be more give a more accurate measure of the risk as data more granular [1½]

This will mean that the insurance company can price more appropriately [½]

Other companies may already be using this data [½]

May add the ability to identify trends [½]

Existing data might not be credible (more volume of the new data more homogenous groups) [½]

[Marks available 5, maximum 3]

(iii)

The data obtained may not be relevant to the rental companies the insurance company covers. [½]

For example, they may be based in a different part of the country. Drivers may be expected to drive at different times of day. [1]

(½ mark for each example up to 1)

The data will not allow for changes to the driving environment [½]

For example, changes to speed limits, changes to volumes of traffic for environmental reasons [1]

There may be a delay in receiving some of the data [½]

This would mean that any changes would not be allowed for until this data was publicly available. This could mean that pricing isn't adjusted quickly enough. [1]

[Marks available 4½, maximum 3]

(iv)

Positives:

Current data used to price personal motor insurance is likely to be based on historic claims data along with details about the driver and their vehicle. The company is likely to have a large volume of data that it can use to price the risk. [2]

Might not need this data as can also use other means to encourage safe driving and discourage claims for these policyholders e.g., through excesses, no claims discounts [2]

The new data could be used as additional data. This could still be very useful to the insurance company and could supplement the data it already has. For example, relating to location and timing of accidents. [2]

Negatives:

These policies are likely to be annual renewable policies so changes will not be able to be made to the premium until renewal, so cannot act quickly. The policyholder can leave at this point if the renewal quote is not attractive. [2]

Rental car vs experience of owned cars likely to be different [½]

E.g. less care driving a rental car [½]

Different demographics , e.g. less experienced drivers might rent [½]

Different types of car [½]

Any other reasonable examples such as different policy terms (e.g. excess) [½]

Data might not be fit for purpose [½]

[Marks available 11, maximum 5]

[Total 13]

Part (i) was answered well, candidates that outlined the data required as opposed to the sources of data scored less well.

The remaining parts (ii) - (iv) were not answered well with most responses being generic in nature and not covering answers in sufficient depth to score well.

Q11

(i)

The company will need to get permission for the e-scooters to be used in the city	
There is a risk that this is not be granted. Even if the council is satisfied, local citizens may not be happy with having e-scooters on the roads	[2]
Or change their mind afterwards due to bad publicity	[½]
Operational/technology risk, e.g. systems can't cope, helpline, staff training, other valid example (<i>give ½ marks for each reasonable example up to 1</i>)	[1]
The company will need to buy e-scooters to hire out and also fund the infrastructure needed (e.g., charging/parking points). There is a risk that finance, or suitable insurance is not available or is prohibitively expensive	[2]
Liquidity risk at start of project	[½]
There is a risk that the e-scooters are not as popular as expected	[½]
and the expected income from the rental is lower than expected.	[½]
Or too popular and company runs out of scooters	[½]
There may be bad publicity relating to the e-scooters. They may be seen as dangerous	[1]
Competitors may be offering a similar product	[½]
There is a risk of injury from e-scooter use and the company may be liable	[½]
This could be injury to the person hiring the scooter or to a member of the public	[1]
There is also a risk that the re-scooters are not in kept in good condition which may lead to lower selling on costs and may be dangerous	[1]
There is also the risk of loss or damage to the e-scooters	[½]
Ongoing costs greater than expected e.g. repairs	[½]
Electricity prices and risk of outages	[½]

[Marks available 12½, maximum 5]

(ii)

The insurance company will need to identify the risks the policy will be expected to cover	[½]
There will be the risk of injury to a person renting the e-scooter and also to members of the public involved in any collision as well as damage to property/other vehicles	[1½]
The policy may also cover theft and damage to the e-scooters although it is possible that the rental company will self-insure this risk	[1]
The insurance company is unlikely to have relevant data to price these risks	[½]
If it has similar policies relating to bicycle hire it could use this data although adjustments would need to be made to allow for the different vehicles	[1]
If similar schemes operate in different cities or different countries, then data may be available on these. This data could be used although it would need to be adjusted to make it suitable for the city being proposed	[1½]
Reinsurance companies may also be able to provide data	[½]

The insurance company will also need to allow for the expenses involved	[½]
The capital requirement will need to be taken into account	[½]
Level of prudence in the pricing basis	[½]
Any relevant regulation will need to be taken into account. Relating to both e-scooters and insurance	[1]
Any competition will also need to be taken into account and profit margin	[½]
Can also consider the likelihood of longer-term business from this rental company as well as for other e-scooter rentals. This could again influence the profit margin.	[1]
How to set excess and other contractual limits	[½]
Cost of reinsurance	[½]
Cost of scooter	[½]
Maximum speed	[½]
Training, licencing, insist on training of riders or not	[½]
Cost of repairs	[½]
Shared liability so scooter company takes some risk to avoid moral hazard	[½]
Length of policy (frequency of reprice)	[½]
Demographic profile of riders	[½]

[Marks available 15½, maximum 6]

(iii)

Give mark for the actions, not just the risk as these were outlined in part (i)

Risk that e-scooters are not as popular as expected. Marketing will need to be targeted at potential customers. Could offer discounts to early renters.	[1]
Risk that they are more popular than expected and not enough e-scooters are available. The company could arrange to have access to more e-scooters if the scheme is very popular	[1]
Risk of customers riding dangerously. This could make the company liable for injuries and/or damage and could result in bad publicity. Customers could have to read and sign a document stating they have understood and will adhere to all the safety regulations. A financial deposit could be held	[2]
Risk of theft/ damage to e-scooters - a deposit could be held until they are returned.	[½]
Risk that permission is not given by the local council or is given initially but not extended. Could explain the benefits to the local council and work with them to ensure any concerns are addressed. Could ensure the use of e-scooters is managed well so that future problems do not arise.	[1½]
Provision of safety equipment	[½]
Project management to mitigate possible cost overruns	[½]
Manage liquidity risk by having sufficient cash (or facilities like overdraft)	[½]
Data issues - use external experts	[½]
Liability waiver to protect against claims	[½]
Electricity prices - hedge	[½]

[Marks available 9, maximum 3]

[Total 14]

Part (i) was answered well, with the better prepared candidates structuring their answer such that there was limited repetition, whereas less prepared candidates tended to repeat themselves.

Part (ii) was answered reasonably well, but answers were mixed. Those candidates that appreciated the nuances of the question scored well - i.e. the scooter rental company was putting a tender to the insurer.

Part (iii) was not answered well, some ideas were not practical, and some answers didn't focus on the issue at hand.

Q12

(i)

A regulator will want to be prepared itself for a range of potential adverse individual events, sets of events or sequences of events [1]

Some events will be less plausible to occur within one year than within five years.

A five-year time horizon allows is to identify a greater range of plausible events. [1]

For example, currently there may be limited evidence that longevity assumptions need to be strengthened, however, such experience requiring a change could emerge within five years [1]

Five years is a sufficiently short period that the regulator can focus on the risks have a greater financial or operational impact over that period against over risk whilst larger in impact are only likely to emerge over a much longer time period. [1]

It takes time for the regulator to decide and plan the stress and scenario tests it wants insurance firms to test. It takes further time for insurance companies to run these stress and scenario tests. It will then need time to evaluate the results before taking any action. It will then take further time for the regulator and/or insurance companies to take actions so insurance companies are likely to be more resilient. So running them every year (for example) would not be feasible). [2]

Life insurance is a long term business, with policies in force for many years [1]

If we project too far forward, we get more and more subjective and results less valuable [1/2]

[Marks available 7½, maximum 3]

(ii)

Risk of equity price falls - Reason [Capital invested in equities will fall in value in stress, financial guarantees will become more in the money] [1/2]

Risk of property price falls - Reason [Capital invested in property will fall in value in stress, property is an illiquid asset so insurer may be unable to pay claims] [1/2]

Interest rates - Reason [To identify financial impact of mismatch between assets and liabilities] [1/2]

Currency risk - may have overseas investment [1/2]

Risk from credit spreads widening - Reason [Capital invested in corporate bonds will fall in value in stress] [1/2]

Credit rating downgrades and defaults - Reason [There will be losses on corporate bond defaults] [1/2]

Epidemic risk - Reason [Significantly more death claims will need to be paid than expected] [1/2]

Lapse/Surrender risk - Reason [More surrenders lower future profits] [1/2]

Longevity risk - Reason [Cost of increase in annuity reserves from strengthening longevity assumptions] [1/2]

Expense risk - Reason [Financial impact of one-off expenses, or change to reserves for future expenses] [1/2]

Unable to trade assets to due liquidity crunch - Reason [financial impact of being unable to management actions] [½]
 Trend - reason is any variable (e.g. mortality, or surrenders) may not be as expected which could affect solvency [½]
 Any other risk that could be stressed where the impact can be objectively measured, and a reason is given

[Marks available 6, maximum 3]

(iii)

Statutory balance sheet and revenue account (e.g. IFRS, US GAAP etc) - [½]
 Regulatory balance sheet and revenue account (e.g. SII) - [½]
 The statutory and regulator balance sheets may move in different directions and/or different amounts in stress which can result in a mix of messages across stakeholders. [½]
 Regulatory available capital/own funds - [½]
 Solvency capital requirements - [½]
 Minimum capital requirements - [½]
 Solvency ratio [½]
 Debt to equity ratio [½]

[Marks available 4, maximum 3]

(iv)

Scenario analysis looks at the financial impacts of adverse set of events or sequence of events

The proposal covers the main risks impacting life insurance [½]
 The four deterministic steps represent possible stages of an overall adverse event that develops over a period of time [1]
 This approach would allow the regulator to measure to progression of the solvency position of individual insurance companies and the industry as a whole through the scenario [½]
 This also allow it to identify the extent that companies are likely to show similar initial stress impacts and to distinguish those companies that are ultimately more secure once they have had time to implement management actions. This can help the regulator to be better prepared on how to manage individual insurance companies in future though similar scenarios [1½]
 Allows for correlation/interactions between risks by considering them together [1]
 Could roll out process to other insurance companies to compare them [½]
 Does generate a lot of work for the insurance company which might mean costs passed On to policyholders [½]

Stage 1:

Interest rates, credit spreads and equity prices are all asset classes where there is near real time observable prices [½]

Stage 2:

This stage introduces additional stresses to credit rating downgrades and property prices which recognises that from an initial market shock can be a delay before an impact is observing in other risk exposures [1]

Property is an illiquid asset class so relative to more liquid asset classes there is a delay before changes to actual traded prices are observed [½]

There will be a delay before the consequences of the financial shock are experienced by companies and companies will be impacted differently so there will be a time lag before credit ratings change [½]

Credit ratings changes will not occur at the same time. Applying the credit rating stress At a point in time is a simplification and allows the scenario to be expressed with fewer stages [1½]

Calculating the balance sheet and capital requirements immediately following the Stress for stages 1 and 2 shows the immediate impact on solvency before an insurance company management actions. [½]

If insurance firms try to implement management actions fast they are likely to incur a higher cost impact. This could add to general financial market instability increasing the stresses [1]

Having all insurers provide impacts prior to management actions ensures that the initial impacts of the stresses are measured consistently across insurance firms. [1]

Stage 3 does not have any further financial stresses, but allows insurance firms to take management actions to trade financial assets which can improve their balance sheet position, lower capital requirement and thus improve their solvency position. [1]

Separation of stage 2 and 3 reflect management actions take time to implement and the ability to take actions depends on the market liquidity [1]

Insurance companies will individually take different decisions on when and what management actions to implement. This is what would happen in reality so is not an inconsistency [1]

Stage 4 adds stresses to longevity and lapse assumptions. Demographic assumptions are changed when there is evidence that the previous assumptions are no longer appropriate. Judgement is applied which also affects the timing of recognition of the change. [1]

Firms will often have time to plan ahead for changes to demographic assumptions so can also take management actions to coincide with the change, for example, update matching of assets and liabilities. Stage 4 allow both effects to be recognised at the same time [1½]

Separation of stages 3 and 4 allows the impact of management actions related to changed financial conditions to be measured separately from the impact of changed demographic assumptions. This simplifies the explanation of the progression over time of the scenario [1]

[Marks available 17½, maximum 5]

[Total 14]

Candidates tended to leave this question to the end of the exam, and it was clear that questions were not well answered.

Part (i) was answered reasonably, but responses that did not focus on basic principles scored poorly.

Part (ii) was answered better than (i) but still many candidates focused on one point rather than thinking about what the question was asking.

Part (iii) was not answered well.

Part (iv), at a high level candidates grasped the importance of each test but then could not build on their answers to focus on the logical time stages for conducting the tests.

[Paper Total 100]

END OF EXAMINERS' REPORT



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