

EXAMINATION

15 September 2005 (pm)

Subject CA3 — Communications

Time allowed: Two and a half hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have two and a half hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Attempt Question 1 AND Question 2.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.

1 Your friend has recently bought a car for £15,000, and has financed this partly by taking out a car loan with a finance company.

Your friend has signed up to a 4 year loan which was stated as having a flat interest rate of 5%. He has mentioned to you that he believes he negotiated a preferential loan rate with the car dealer, given that bank interest rates were just under 5%.

He has received his opening statement from the loan company explaining the loan and the repayments as follows:

Total cash price of goods	£15,000	A
Deduct:		
Deposit	£1,000	
Trade-in of old car	£500	
	£1,500	B
Amount of finance	£13,500	C=A-B
Interest charge	£2,700	
Acceptance fee	£140	
Settlement fee	£95	
	£2,935	D
Total charge for credit	£16,435	E=C+D
Total amount payable	£17,935	F=B+E
Your repayments		
Basic monthly repayment	£337.50	
First Repayment	£477.50	(including Acceptance Fee)
Followed by: 46 repayments of	£337.50	per month
Plus a final repayment of	£432.50	(including Settlement Fee)
Annual Percentage Rate (APR)	10.6%	
Example early termination payments		
Lump sum repayable if you wish to terminate after 12 payments	£10,784	Sum of repayments already made = £4,190
Lump sum repayable if you wish to terminate after 24 payments	£7,519	Sum of repayments already made = £8,240
Lump sum repayable if you wish to terminate after 36 payments	£3,923	Sum of repayments already made = £12,290

Notes

1. The Annual Percentage Rate is the effective annual compound interest rate underlying the loan, allowing for the Acceptance Fee and the Settlement Fee.
2. The interest charge for the loan is calculated as $\text{Amount of Finance} \times \text{Quoted Interest Rate} \times \text{Term}$.

Your friend wonders whether a mistake has been made, as he can see that the APR is more than double the interest rate he thought he had agreed to.

He has therefore asked you to explain how his repayments have been calculated, and whether he is paying 10.6% or 5% interest.

Draft a letter to your friend in approximately 450 words.

[50]

2 You work for a life insurance company. It offers a 16 year unit-linked endowment, with a review of premium at the 5th and 10th anniversary. When the product was initially introduced 7 years ago, most new customers were aged 25 to 35. Nearly 5 years ago, a niche market was identified which attracted a number of customers aged about 70.

You are concerned that your senior management team may be expecting the impact of the premium reviews for the niche group to be similar to the reviews for the original customer group carried out over the last 2 years.

You have received the following internal technical presentation, which explored the technical aspects and reported on the progress of work within the technical team.

Draft a presentation of 6 to 8 slides for the senior management team explaining the impact for the niche group of customers, and why it is different to the impact for the original group.

Note: No comment is required on the appropriateness of the investment returns and mortality tables.

[50]

Impact of asset returns and mortality charges on product reviews
Technical Assessment
Presentation to the Actuarial Review Group

Date: 1 June 2005
J Smith, Technical Specialist

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Agenda

- Background
- Policy Reviews
- Product description
- Asset Return details
- Asset Return impact
- Mortality charges details
- Mortality charges impact
- Overall impact
- Summary and next steps

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Background to ABC Endowment Plan

Product characteristics

1. Fixed 16 year unit-linked endowment
2. Launched in 1998
3. Premium level set so that maturity value equals the Sum Assured
 - based on appropriate assumptions
4. Premiums reviewed on the 5th and 10th anniversary

Policy characteristics — summary of model points

2 distinct sets of model points:

- Male, age at entry 30 next birthday, premium £1,200 p.a., Sum Assured £30,000
- Male, age at entry 70 next birthday, premium £1,200 p.a., Sum Assured £16,000

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Policy Reviews

- Reviews on 5th and 10th anniversary
- Purpose is to reset the premium level
- Policyholders are advised of the revised level of premium required
 - to enable the projected maturity value to equal the Sum Assured
 - based on appropriate assumptions

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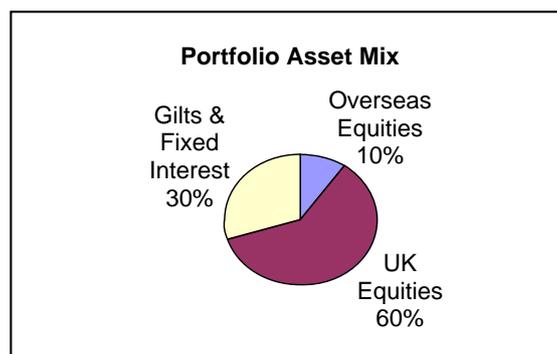
Product description

Charges:

- 50% of 1st and 2nd year premiums
- 5% of premiums in years 3 to 16
- 1% p.a. of funds under management

Investment portfolio:

- managed fund
- no property investment
- portfolio has varied over period



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Asset return details

- Premiums based on assumed growth of 8% p.a. pre-charges.
- Actual returns net of 1% charge:

1998	1999	2000	2001	2002	2003	2004
3.20%	3.00%	2.80%	2.60%	2.80%	3.20%	2.80%

- Actual average growth over last 7 years: 4% p.a. pre-charges.

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Impact of Asset returns

Actual returns over initial 5 years have led to shortfall in fund value e.g. for age 30

Year	Planned	Actual	Shortfall
1	£615	£603	2%
2	£1,273	£1,225	4%
3	£2,548	£2,423	5%
4	£3,911	£3,659	6%
5	£5,371	£4,931	8%

Impact at higher age of 70

Year	Planned	Actual	Shortfall
1	£229	£225	2%
2	£434	£417	4%
3	£1,185	£1,135	4%
4	£1,960	£1,846	6%
5	£2,761	£2,548	8%

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Assumptions — Future Investment Returns

- Original assumption for future growth: 8% p.a. pre-charges.
- Current assumption for future growth: unchanged at 8% p.a. pre-charges.

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Mortality charge details

Original basis: AM92

Mortality charge = mortality rate \times (Sum Assured – Fund Value)

New basis: 85% AM92

Notes:

1. Further details on mortality changes in separate report.
2. Separate report underway into Female life mortality charges.

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Impact of Mortality charges

Mortality rates have decreased.

Impact on model points:

For customers aged 30 next birthday at entry (age 35 next birthday now)

- Mortality charge reduced from £16.97 to £14.98 in the next year.

For customers aged 70 next birthday at entry (age 75 next birthday now)

- Mortality charge reduced from £556.63 to £480.74 in the next year.

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Overall impact

For customers aged 30 next birthday at entry (age 35 next birthday now)

Premium increases of 5% required, on average, to enable maturity value to equal Sum Assured.

Typical profile of year 10 cash flows (age 40 next birthday):

	Investment Amount	Mortality Charge	Investment Growth	Fund at End of Year
Original	£1,163	£15.39	£901.69	£14,356.62
New	£1,221	£13.30	£882.86	£14,098.97

For customers aged 70 next birthday at entry (age 75 next birthday now)

Premium reduction of 5% required, on average, to enable maturity value to equal Sum Assured.

Typical profile of year 10 cash flows (age 80 next birthday):

	Investment Amount	Mortality Charge	Investment Growth	Fund at End of Year
Original	£1,174	£607.29	£463.65	£7,370.70
New	£1,115	£526.18	£451.36	£7,193.99

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Overall impact

- Impact is different for new niche group.
- Because the level of mortality charges is far higher, the 15% reduction has a significantly larger impact. This enables the funds to grow at a faster rate than originally anticipated.
- Current system-generated letters have paragraphs discussing the low investment returns and hence the need to increase premiums. These need to be changed to accommodate the niche group of older customers.

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Summary and next steps

Summary

- Result of policy reviews is different for the 2 groups of customers.
- Existing systems generated letters will not be suitable for older customers.

Next steps

1. Complete investigation into female life mortality charges.
2. Redesign letters to cater for older customers.
3. Continue development of multi-parameterised calculations systems.
4. Further calculations of impact of maintaining current premium levels for niche groups to establish the impact of increase in maturity values.
5. Consider options for offering / encouraging customers to continue to pay at the same level.

END OF PAPER