22. (3.5 points)

The following information is available for an insurance company:

Month	Paid Development Factors to Ultimate	Reported Development Factors to Ultimate
12-Ult	2.22	1.54
15-Ult	1.82	1.33
18-Ult	1.50	1.25
21-Ult	1.35	1.18
24-Ult	1.25	1.11

Accident year 2013 as of March 31, 2014:
* Reported claims: $2,200
* Paid claims: $1,650
* Selected ultimate claims: $3,000

Accident year 2013 as of May 31, 2014:
* Reported claims: $2,500
* Paid claims: $1,875

a. (1.25 points)

Considering the data through March 31, 2014, compare the cumulative expected reported claims to the actual reported claims as of May 31, 2014 for accident year 2013.

b. (1.25 points)

Considering the data through March 31, 2014, compare the cumulative expected paid claims to the actual paid claims as of May 31, 2014 for accident year 2013.

c. (0.5 point)

Given the results calculated in parts a. and b. above, describe a situation in which the actuary would revise the March 31, 2014 estimate of ultimate claims.

d. (0.5 point)

Given the results calculated in parts a. and b. above, describe a situation in which the actuary would not revise the March 31, 2014 estimate of ultimate claims.

QUESTION: 22

TOTAL POINT VALUE: 3.5 points

LEARNING OBJECTIVE(S): B8

SAMPLE/ACCEPTED ANSWERS:

Part a: 1.25 points

Sample 1:

Age	Reported CDF	Reported %
12	1.54	64.94%
15	1.33	75.19%
18	1.25	80%
21	1.18	84.75%
24	1.11	90.09%

As of 3/31/14 IBNR = 3000 - 2200 = 800

Linear interpolated reported % at month 17: $75.19\% + (80\% - 75.19\%) * {}^2\!/_3 = 78.49\%$

@17 CDF = 1.276

Expected loss 3/31~5/31: $800 * \frac{78.4\% - 75.19\%}{1 - 75.19\%} = 103.51$

Cumulative expected as of 5/31: 2200 + 103.51 = 2303.51

Actual as of 5/31: 2500

Difference: 2303.51 − 2500 = -196.49

Sample 2:

3/31 = 15 months

5/31 = 17 months

Unreported at 3/31/14 = 3000 − 2200 = 800

Expected reported between 3/31 and 6/30

$800 * \dfrac{{}^1\!/_{1.25} - {}^1\!/_{1.33}}{1 - {}^1\!/_{1.33}} = 155$

So for 5/31, expect ${}^2\!/_3$ of this = 103

Actual reported = 2500 − 2200 = 300

Significantly more reported than expected

Sample 3:

AY 13

Reported from March 31 – May 31: +300

March 31, 2014 = 15 months

May 31, 2014 = 17 months

Assume linear interpolation

Expected emergence = Ultimate * {% reported @ May 31, 2014 - % reported @ March 31, 2014}

Expected $= 3000 * \{1.25^{-1} - 1.33^{-1}\} * \frac{2}{3} = 96.24$

Difference = 203.76

Sample 4:

Let's assume that between maturities 15 months and 18 months, claims emergence is uniform (since we are not given 17 –Ult CDFs)

Expected claims emergence from 15-18: $2200 * \frac{1.33}{1.25} = 140.8$

from 15-17: $\frac{2}{3} * 140.8 = 93.8667$

Expected reported claims @5/31/14: 2200 + 93.8667 = 2293.87

Actual = 2500

More claims were reported than expected by 206.13

Part b: 1.25 points

Sample 1:

Age	Paid CDF	Paid %
12	2.22	45.05%
15	1.82	54.95%
18	1.5	66.67%

As of 3/31/14 Unpaid = 3000 − 1650 = 1350

Linear interpolated paid % at month 17: $54.95\% + (66.67\% - 54.95\%) * \frac{2}{3} = 62.76\%$

Expected loss paid 3/31~5/31: $1350 * \frac{62.76\% - 54.95\%}{1 - 54.95\%} = 234.04$

Cumulative expected as of 5/31: 1350 + 234.04 = 1884.04

Actual as of 5/31: 1875

Difference: 1884.04 − 1875 = 9.04

Sample 2:

Unpaid at 3/31/14 = 3000 − 1650 = 1350

Expected paid between 3/31 and 6/30

$$1350 * \frac{\frac{1}{1.5} - \frac{1}{1.82}}{1 - \frac{1}{1.82}} = 351$$

So for 5/31, expect $\frac{2}{3}$ of this = 234

Actual reported = 1875 − 1650 = 225

Actual paid slightly lower than expected but mostly in line

Sample 3:

AY 13
Paid from Mar 31 – May 31: +225
March 31, 2014 = 15 months
May 31, 2014 = 17 months
Assume linear interpolation
Expected emergence = Ultimate * {% paid @ May 31, 2014 - % paid @ March 31, 2014}
Expected $= 3000 * \{1.5^{-1} - 1.82^{-1}\} * {}^{2}/_{3} = 234.43$
Difference = 9.43

Sample 4:

Assume claim settlement uniform between 15 - 18
Expected claims emergence from 15-18: $1650 * \frac{1.82}{1.5} = 352$
Expected Paid Claims @5/31/14: $1650 + {}^{2}/_{3} * 352 = 1884.67$
Actual = 1875
Fewer claims paid than expected by 9.67

Part c: 0.5 point

Answers receiving full credit include:

- If it was found that the higher than expected reported claims was due to actual changes in underlying loss ratio that just hadn't yet shown up in the data at 15 months then the actuary should change the estimate of 2013 ultimate.
- If there was an influx of claims explaining the increase (such as unusually stormy season) would have to adjust the ultimates to reflect the expected increase in ultimate claims.
- It could be a large loss reported but not paid. Since this is not anticipated, increase estimate.
- If you think there has been a material change causing reported to come in higher than expected such as change in laws to increase minimum limits which may not show in paid claims immediately (will show in reported before paid) we may want to increase our ultimate to reflect the higher ultimate implied by actual reported emergence.

Part d: 0.5 point

Answers receiving full credit include:

- Actuary would not revise the estimate if there was a change in case reserve philosophy (strengthening). Paid losses (actual) were in line with expected, and reported increase is due to case strengthening with no expected impact on ultimate settlement value.
- Claims reporting pattern change but no impact on ultimate settlement (ie more reported earlier)

- If there was a change in the claims department to get claims into the system quicker (claims in transit was previously higher) there would be no reason to change the ultimate.

EXAMINER'S REPORT:

General Commentary

- Candidates were expected to perform an actual versus expected calculation, including interpolation of loss development factors, and interpret the results, citing examples of scenarios that may cause such results
- Candidates generally performed well on parts a & b and did not perform as well on parts c & d. Parts a & b required relatively straightforward calculations (with the added complexity of interpolation) while parts c & d were more open-ended.

Parts a & b

- Candidates were expected to understand actual versus expected formulae, including the calculation of accident year age and interpolation of loss development factors.
- Multiple methods of calculating expected reported and paid were accepted as correct calculations.
- Candidates generally performed well on these parts of the question. Common mistakes included:
  - Using the incorrect loss development factors (incorrect ages or confusing paid and reported)
  - Not interpolating the loss development factors or interpolating incorrectly
  - Mistakes in applying the actual versus expected formula
  - Failing to compare actual and expected results

Parts c & d

- Candidates were expected to interpret the results derived in parts a & b and identify logical scenarios that may explain those results and whether an actuary would consider modifying original selected ultimate claims.
- Candidates did not perform well on these parts of the question. Common mistakes included:
  - Identifying changes in case adequacy or claim settlement during the quarter as situations to revise ultimate estimated claims (as opposed to situations to leave ultimate estimated claims as originally selected since changes in operations do not necessarily change the ultimate claims value)
  - Identifying deteriorating loss ratio or unexpected large loss(es) as situations to leave ultimate estimated claims as originally selected (as opposed to situations to revised ultimate estimated claims)
  - Speaking to the results from a & b incorrectly:
    - Citing case reserve weakening when part a showed higher actual reported than expected

- Citing changes in settlement process/speed when part b showed actual paid close to expected