18. (2.75 points)

An actuary is estimating unpaid claims for a company using the data below as of December 31, 2015.

| | | | Unpaid Claims Estimate | |
Accident Year	On-Level Earned Premium ($000)	Paid Claims ($000)	Paid Bornhuetter-Ferguson Technique ($000)	Paid Development Technique ($000)
2012	2,000	1,450	0	0
2013	2,000	1,000	102	100
2014	2,000	700	373	350
2015	2,000	400	622	500

- The actuary uses the same expected claims ratio for all years.

a. (0.75 point)

Calculate the expected claims ratio used in the Bornhuetter-Ferguson technique.

b. (0.5 point)

Select an unpaid claims estimate for accident year 2015 from the two techniques given above and justify the selection.

c. (1.5 points)

After constructing these estimates, the actuary learns of a change in the claims department in 2014 that has led to slower claims payments. Discuss whether the unpaid claims estimate from each technique below would be overstated or understated when calculated without making any adjustments to recognize the slower claims payments:

      i.   Expected claims technique

      ii. Paid Bornhuetter-Ferguson technique

      iii. Paid development technique

QUESTION 18	
TOTAL POINT VALUE: 2.75	**LEARNING OBJECTIVE: B3, B5, B8**
SAMPLE ANSWERS	

Part a: 0.75 point

AY	Paid CDF	% Unpaid	ECR
12	1	0	NA
13	1.1	9.09%	0.561
14	1.5	33.30%	0.5595
15	(500+400)/400 = 2.25	1 - 1/2.25 = 55.5%	0.5598
		Avg =	0.5601

ECR = .56 is approximately equal for each AY. Selected avg and rounded to .01.

Part b: 0.5 point

Sample Answer 1

The implied 12-ultimate CDF from the paid development method is 900/400 = 2.25, which is somewhat high and could be leveraged to impact our ultimates and unpaid. Furthermore, the paid BF method consistently produces higher estimates than the paid development method despite no change in premiums, thus I assume there was a decrease in the settlement rate. The BF method won't react to this as much so I will select its AY 2015 unpaid amount, $622,000.

Sample Answer 2

AY	BF Implied LR	Paid Dev Implied LR
	1450/2000 =	1450/2000 =
2012	.725	.725
2013	0.551	0.55
2014	0.5365	0.525
2015	0.511	0.45

Both methods show that the loss ratio is declining. Since the BF method is not fully responsive to the changes, the paid development method is preferred. Selection for AY 2015 unpaid claims estimate = $500,000.

Part c: 1.5 points

Subpart (i)

Unpaid claims would be correct; emergence is low because of slower payments, but we still expect the same ultimate. E(claims) ultimate is unresponsive to emergence.

Subpart (ii)

Sample Answer 1

The paid BF technique will underestimate unpaid claims as the % unpaid will be too high (development factors too low). The BF will underestimate less than paid development as the unpaid amounts are determined by an a priori claims ratio and % unpaid.

Sample Answer 2
The paid BF method would be understated, but to a lesser extent than the paid development technique, because it is a credibility weighted average of the expected claims technique and the paid development technique.

Subpart (iii)
Paid development technique will apply historical LDF that assumed a faster payment to a lower amount paid, which will understate unpaid claims.

EXAMINER'S REPORT

Part a

Candidates were expected to use their knowledge of the development and BF technique to back into the ECR used in the expected claims method.

Common mistakes included:
- Using BF unpaid to infer the claim development factor instead of the development method.
- Using the paid development unpaid when setting up the BF formula
- Setting unpaid equal to paid + OLEP*EP*%unpaid, which is the formula for the ultimate.
- Dividing the ultimate claims by the OLEP and inferring the ECR from that

Part b

Candidates were expected to choose one of two provided unpaid claim estimates and use their knowledge of either the paid development method or the BF method to justify their selection. Averages (such as a simple, weighted, or Benktander) were accepted for full credit.

Common mistakes included:
- Selecting the BF unpaid claim estimate and explaining that it is more stable without explaining why it provides stability.
- Selecting the ultimate loss instead of an unpaid claims choice.
- Observing that decreasing paids down the column represent a slowdown in claims when actually these are claim payments at y/e 2015 and thus reflect paids in different stages of development.
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Part c

Subpart (i)
Candidates were expected to know that the unpaid claims estimate for the EC method is EP * ECR - Paid. The first term remains unchanged with the slowdown in payments but the paid decreases. Therefore the unpaid claims estimate will respond to the increase and will neither be over or understated.

Common mistakes included:
- Describing that the ultimate claim estimate remains unchanged without discussing how the paid responds.
- Asserting that the ECR is incorrect because it might be based on data influenced by the slowdown.
- Properly identifying that the paid claims decreases but instead stating that the unpaid claims estimate is over or understated.
- Phrasing the answer in terms of ultimates and not unpaids (though if candidates didn't specify either ultimate or unpaid we gave them the benefit of the doubt)

- Simply stating the position without any kind of discussion

Subpart (ii)
Candidates were expected to know either that the paid BF technique is a credibility weighted average between the paid DM and the ECM technique or that the BF unpaid estimate = EP * ECR * % unpaid and that the % unpaid is lower because the historical development factors used in the paid DM are too low. Candidates did not lose credit for deviating from the language used in the question so long as it was clear that the correct direction was intended.

Common mistakes included:
- Discussing that a method understates "but not as much as the paid DM".
- Discussing only that the ultimates are under/overstated with discussing how the unpaids will be as well
- Phrasing the answer in terms of ultimates and not unpaids (though if candidates didn't specify either ultimate or unpaid we gave them the benefit of the doubt)
- Simply stating the position without any kind of discussion

Subpart (iii)
Candidates were expected to know that the historical claim development factors are too low to be used in the current environment where payments are developing at a slower rate. Candidates were also expected to know that the unpaid claims estimate will be lower because the payments made to date are also lower.

Common mistakes included:
- Using knowledge that the paid BF is understated but the paid DM will understate more.
- Confusing the direction of the claim development factors due to the slowdown
- Phrasing the answer in terms of ultimates and not unpaids (though if candidates didn't specify either ultimate or unpaid we gave them the benefit of the doubt)
- Simply stating the position without any kind of discussion