**Reading:** Friedland 16 (ALAE) (Fr16.ALAE) 02a-Question
**Model:** 2019.Spring #24
**Problem Type:** Additive or Multiplicative approach for ALAE

**Problem** Use the additive approach to estimate the ultimate ALAE for AY 2018

cumulative paid claims:

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2015 | 3,800 | 10,640 | 15,960 | 17,556 |
| 2016 | 3,900 | 10,920 | 15,600 | |
| 2017 | 3,850 | 11,858 | | |
| 2018 | 4,050 | | | |

cumulative paid ALAE:

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2015 | 77 | 316 | 512 | 571 |
| 2016 | 81 | 337 | 517 | |
| 2017 | 75 | 334 | | |
| 2018 | 82 | | | |

selected ultimate claims by AY

| AY | ult clms |
|---|---|
| 2015 | 17,500 |
| 2016 | 17,900 |
| 2017 | 17,600 |
| 2018 | 18,500 |

<=== *sometimes you are not given the ultimate claims*
*- you would then have to calculate them using an appropriate method*
*- see 2016.Spring #23*

Step 1: Ratio of *cumulative* paid ALAE to *cumulative* paid claims:

| AY | 12 | 24 | 36 | 48 |
|---|---|---|---|---|
| 2015 | 2.03% | 2.97% | 3.21% | 3.25% |
| 2016 | 2.08% | 3.09% | 3.31% | |
| 2017 | 1.95% | 2.82% | | |
| 2018 | 2.02% | | | |

Step 2: Development triangle *(either additive or multiplicative as appropriate):*

| AY | 12-24 | 24-36 | 36-48 | 48- | | |
|---|---|---|---|---|---|---|
| 2015 | 0.0094 | 0.002 | 0.000 | | <=== | ADDITIVE development |
| 2016 | 0.0101 | 0.0022 | | | | |
| 2017 | 0.0087 | | | | | |
| 2018 | | | | | | |
| selected | 0.0094 | 0.0023 | 0.0004 | 0.0000 | <=== | tail = 0.0 if additive OR 1.0 if multiplicative |
| cum | 0.0121 | 0.0027 | 0.0004 | 0.0000 | <=== | ADDITIVE: selected + (previous cum) |
| Ult Ratio | 3.23% | 3.09% | 3.35% | 3.25% | <=== | ADDITIVE: cum + (latest diagonal from Step 1) |

| AY | 2018 | 2017 | 2016 | 2015 | <=== | given information |
|---|---|---|---|---|---|---|
| ult clms | 18,500 | 17,600 | 17,900 | 17,500 | | *(provided here for convenience)* |
| pd ALAE | 82 | 334 | 517 | 571 | | |

Step 3:
Ultimate ALAE = (Ultimate Ratio) x (Ultimate Claims)
Unpad ALAE = (Ultimate ALAE) - (Paid ALAE)

| AY | Ult ALAE | UnPd ALAE |
|---|---|---|
| 2015 | 568.8 | (2.3) |
| 2016 | 599.7 | 82.7 |
| 2017 | 543.8 | 209.8 |
| 2018 | 597.6 | 515.6 |
| | 2,309.8 | 805.8 |

Step 4: ultimate ALAE for AY 2018 = 597.6 <=== final answer