**1. AK-Estimator (Optimized by minimizing CV)**

Sample Population of size 15,000 is created though binomial distribution each month with mean form monthly unemployment rate from the data given.

Rotation Sampling is used to predict population mean. (total of 1,500 samples; each month 100 new cohort sample is added and oldest 100 cohort sample is withdrawn.)

AK-estimator is used to predict expected unemployment rate. Optimal value for A and K are drawn by minimizing CV of the data.

**Simulation = 1000, Bootstrap = 1000, Time = 606.03.27min**

**Standard Deviation difference ratio**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ak2/ak3** | **ak2/ak4** | **ak3/ak4** | **SRS / ak2** | **SRS / ak3** | **SRS / ak4** |
| 1.005316 | 1.096542 | 1.090743 | 36.26415 | 36.45693 | 39.76516 |

ak2 = 2 time period, ak3= 3 time period, ak4 = 4 time period, SRS = simple random sampling

**Mean difference**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SRS–ak2** | **SRS–ak3** | **SRS–ak4** | **Popul-SRS** | **Popul–ak2** | **Popul–ak3** | **Popul–ak4** |
| -0.004344 | -0.0036624 | -0.0002914 | 0.00246 | -0.00185 | -0.000988 | 0.0023937 |

Popul = Population

**Bootstrap Check**

|  |  |  |
| --- | --- | --- |
| **ak\_1step** | **ak\_2step** | **ak\_3step** |
| 1.1121 | 1.001187 | 1.026571 |

Driving Formula :

**2. AK-Estimator (Local optimization vs Global optimization)**

**Simulation = 100, Bootstrap = 1000, Time = 73.234min**

**Standard Deviation difference ratio**

|  |  |  |
| --- | --- | --- |
| **Simple / Local** | **Simple / Global** | **Global / Local** |
| 47.06867 | 44.44425 | 1.05905 |

Simple : SRS, Local : Local minimum, Global : Global minimum

**Mean difference**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SRS–ak2** | **SRS–ak3** | **SRS–ak4** | **Popul-SRS** | **Popul–ak2** | **Popul–ak3** | **Popul–ak4** | **Popul-Global** |
| 0.020003 | 0.019847 | 0.018714 | -0.019947 | 0.001336 | -0.000240 | -0.000123 | -0.001304 |

Popul = Population

**Bootstrap Check**

|  |  |  |
| --- | --- | --- |
| **ak\_1step** | **ak\_2step** | **ak\_3step** |
| 1.29702 | 1.291835 | 1.548909 |

Driving Formula :

**GitHub homepage**

<https://github.com/junghonglee/AK_Estimator_practice>

**다음 미팅까지 진행 해야할 작업 (1월 18일 미팅)**

1. Mean difference를 Percent 차이로 보도록

2. AK-estimator step이 증가함에 따라 변화하는 방향이 Monotonic 하는지 확인

3. <Simulation Setting 추가>

Rotation sample 가정 but Missing 으로 인해 Rotation sample과 비슷하게 되는 경우가 빠지고 있다. 이것으로 보기 위해 Sample 탈락/추가 개수를 평균 100으로 한 random값으로 Design 해보도록