calculate bias in each scenario, stratified by C

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# Write functions

# Bias

## Get results for correlated data

### Get quantiles  
S.by.quantiles <- lapply(quantiles.list, function(x) {get\_quantiles\_by\_C(x[1],x[2])})  
S.all <- get\_quantiles\_by\_C(0,1)  
  
### Put into a table  
S.by.quantiles <- lapply(S.by.quantiles, function(x) {  
 out <- rbind(x[[1]], x[[2]])  
 rownames(out) <- c("S\_VH", "S\_boot")  
 return(out)  
})  
S.all <- rbind(S.all[[1]], S.all[[2]])  
  
  
### Print S\_pop by quantiles  
knitr::kable(S.all)

|  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- |
| -0.263 | -0.006 | 0.014 | 0.060 | 0.323 | 0.026 (0.130) |
| -0.150 | -0.003 | 0.003 | 0.013 | 0.082 | -0.015 (1.377) |

knitr::kable(S.by.quantiles[[1]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.580 | -0.208 | -0.081 | -0.035 | -0.007 | -0.144 (0.159) |
| S\_boot | -0.053 | -0.005 | 0.005 | 0.022 | 0.161 | 0.017 (0.058) |

knitr::kable(S.by.quantiles[[2]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.358 | -0.091 | -0.034 | -0.013 | 0.003 | -0.073 (0.102) |
| S\_boot | -0.023 | -0.002 | 0.006 | 0.028 | 0.128 | 0.020 (0.040) |

knitr::kable(S.by.quantiles[[3]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.129 | -0.015 | -0.002 | 0.008 | 0.089 | -0.005 (0.049) |
| S\_boot | -0.011 | 0.000 | 0.007 | 0.031 | 0.091 | 0.018 (0.028) |

knitr::kable(S.by.quantiles[[4]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.010 | 0.007 | 0.020 | 0.067 | 0.246 | 0.049 (0.069) |
| S\_boot | -0.088 | -0.001 | 0.005 | 0.017 | 0.049 | 0.005 (0.028) |

knitr::kable(S.by.quantiles[[5]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.005 | 0.019 | 0.049 | 0.139 | 0.387 | 0.097 (0.107) |
| S\_boot | -0.174 | -0.005 | 0.001 | 0.006 | 0.021 | -0.018 (0.052) |

knitr::kable(S.by.quantiles[[6]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.009 | 0.026 | 0.075 | 0.179 | 0.487 | 0.131 (0.141) |
| S\_boot | -0.204 | -0.026 | -0.002 | 0.002 | 0.010 | -0.033 (0.064) |

### Get N values  
get\_N(0,1)

## [1] "N= 14161"

lapply(quantiles.list, function(x) {get\_N(x[1],x[2])})

## [[1]]  
## [1] "N= 818"  
##   
## [[2]]  
## [1] "N= 1469"  
##   
## [[3]]  
## [1] "N= 2488"  
##   
## [[4]]  
## [1] "N= 4140"  
##   
## [[5]]  
## [1] "N= 4295"  
##   
## [[6]]  
## [1] "N= 598"

# Get results for uncorrelated data

### Get quantiles  
S.by.quantiles <- lapply(quantiles.list, function(x) {get\_quantiles\_by\_C(x[1],x[2], correlated = FALSE)})  
S.all <- get\_quantiles\_by\_C(0,1, correlated = FALSE)  
  
### Put into a table  
S.by.quantiles <- lapply(S.by.quantiles, function(x) {  
 out <- rbind(x[[1]], x[[2]])  
 rownames(out) <- c("S\_VH", "S\_boot")  
 return(out)  
})  
S.all <- rbind(S.all[[1]], S.all[[2]])  
  
  
### Print S\_pop by quantiles  
knitr::kable(S.all)

|  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- |
| -0.304 | -0.017 | 0.008 | 0.041 | 0.251 | 0.006 (0.125) |
| -0.101 | -0.000 | 0.007 | 0.030 | 0.126 | 0.016 (0.124) |

knitr::kable(S.by.quantiles[[1]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.500 | -0.185 | -0.076 | -0.032 | -0.007 | -0.131 (0.140) |
| S\_boot | -0.027 | -0.002 | 0.008 | 0.034 | 0.184 | 0.028 (0.061) |

knitr::kable(S.by.quantiles[[2]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.244 | -0.053 | -0.019 | -0.006 | 0.029 | -0.041 (0.066) |
| S\_boot | -0.010 | 0.001 | 0.011 | 0.058 | 0.151 | 0.035 (0.048) |

knitr::kable(S.by.quantiles[[3]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | -0.042 | -0.001 | 0.009 | 0.033 | 0.170 | 0.024 (0.052) |
| S\_boot | -0.012 | 0.002 | 0.011 | 0.046 | 0.100 | 0.025 (0.033) |

knitr::kable(S.by.quantiles[[4]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.001 | 0.014 | 0.036 | 0.106 | 0.289 | 0.072 (0.083) |
| S\_boot | -0.119 | -0.001 | 0.006 | 0.020 | 0.052 | 0.001 (0.038) |

knitr::kable(S.by.quantiles[[5]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.007 | 0.022 | 0.051 | 0.164 | 0.412 | 0.109 (0.120) |
| S\_boot | -0.166 | -0.007 | 0.002 | 0.008 | 0.024 | -0.021 (0.054) |

knitr::kable(S.by.quantiles[[6]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.045 | 0.084 | 0.123 | 0.194 | 0.316 | 0.154 (0.125) |
| S\_boot | -0.168 | -0.044 | 0.004 | 0.008 | 0.012 | -0.040 (0.094) |

### Get N values  
get\_N(0,1, correlated = FALSE)

## [1] "N= 13903"

lapply(quantiles.list, function(x) {get\_N(x[1],x[2], correlated = FALSE)})

## [[1]]  
## [1] "N= 1460"  
##   
## [[2]]  
## [1] "N= 2594"  
##   
## [[3]]  
## [1] "N= 4117"  
##   
## [[4]]  
## [1] "N= 4323"  
##   
## [[5]]  
## [1] "N= 884"  
##   
## [[6]]  
## [1] "N= 4"

# Magnatude of Bias

## Get results for correlated data

### Get quantiles  
S.by.quantiles <- lapply(quantiles.list, function(x) {get\_quantiles\_by\_C(x[1],x[2], magnitude = TRUE)})  
S.all <- get\_quantiles\_by\_C(0,1, magnitude = TRUE)  
  
### Put into a table  
S.by.quantiles <- lapply(S.by.quantiles, function(x) {  
 out <- rbind(x[[1]], x[[2]])  
 rownames(out) <- c("S\_VH", "S\_boot")  
 return(out)  
})  
S.all <- rbind(S.all[[1]], S.all[[2]])  
  
  
### Print S\_pop by quantiles  
knitr::kable(S.all)

|  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- |
| 0.001 | 0.011 | 0.032 | 0.097 | 0.385 | 0.077 (0.108) |
| 0.000 | 0.003 | 0.007 | 0.024 | 0.156 | 0.040 (1.376) |

knitr::kable(S.by.quantiles[[1]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.008 | 0.035 | 0.081 | 0.208 | 0.580 | 0.144 (0.159) |
| S\_boot | 0.000 | 0.005 | 0.011 | 0.033 | 0.164 | 0.031 (0.052) |

knitr::kable(S.by.quantiles[[2]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.001 | 0.013 | 0.035 | 0.091 | 0.358 | 0.074 (0.101) |
| S\_boot | 0.000 | 0.004 | 0.010 | 0.031 | 0.129 | 0.026 (0.037) |

knitr::kable(S.by.quantiles[[3]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.000 | 0.004 | 0.011 | 0.031 | 0.140 | 0.027 (0.041) |
| S\_boot | 0.000 | 0.003 | 0.009 | 0.032 | 0.091 | 0.021 (0.026) |

knitr::kable(S.by.quantiles[[4]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.001 | 0.008 | 0.022 | 0.068 | 0.246 | 0.051 (0.068) |
| S\_boot | 0.000 | 0.003 | 0.008 | 0.022 | 0.088 | 0.017 (0.023) |

knitr::kable(S.by.quantiles[[5]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.005 | 0.019 | 0.049 | 0.139 | 0.387 | 0.097 (0.107) |
| S\_boot | 0.000 | 0.002 | 0.006 | 0.016 | 0.174 | 0.026 (0.048) |

knitr::kable(S.by.quantiles[[6]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.009 | 0.026 | 0.075 | 0.179 | 0.487 | 0.131 (0.141) |
| S\_boot | 0.000 | 0.002 | 0.005 | 0.026 | 0.204 | 0.036 (0.063) |

### Get N values  
get\_N(0,1)

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lapply(quantiles.list, function(x) {get\_N(x[1],x[2])})

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## Get results for uncorrelated data

### Get quantiles  
S.by.quantiles <- lapply(quantiles.list, function(x) {get\_quantiles\_by\_C(x[1],x[2], correlated = FALSE, magnitude = TRUE)})  
S.all <- get\_quantiles\_by\_C(0,1, correlated = FALSE, magnitude = TRUE)  
  
### Put into a table  
S.by.quantiles <- lapply(S.by.quantiles, function(x) {  
 out <- rbind(x[[1]], x[[2]])  
 rownames(out) <- c("S\_VH", "S\_boot")  
 return(out)  
})  
S.all <- rbind(S.all[[1]], S.all[[2]])  
  
  
### Print S\_pop by quantiles  
knitr::kable(S.all)

|  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- |
| 0.001 | 0.010 | 0.029 | 0.088 | 0.355 | 0.071 (0.103) |
| 0.000 | 0.004 | 0.012 | 0.040 | 0.140 | 0.031 (0.121) |

knitr::kable(S.by.quantiles[[1]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.007 | 0.032 | 0.076 | 0.185 | 0.500 | 0.131 (0.140) |
| S\_boot | 0.001 | 0.005 | 0.012 | 0.040 | 0.186 | 0.037 (0.056) |

knitr::kable(S.by.quantiles[[2]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.001 | 0.008 | 0.021 | 0.055 | 0.244 | 0.046 (0.063) |
| S\_boot | 0.000 | 0.004 | 0.012 | 0.058 | 0.151 | 0.037 (0.046) |

knitr::kable(S.by.quantiles[[3]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.000 | 0.005 | 0.013 | 0.040 | 0.173 | 0.033 (0.046) |
| S\_boot | 0.000 | 0.004 | 0.013 | 0.048 | 0.100 | 0.028 (0.030) |

knitr::kable(S.by.quantiles[[4]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.002 | 0.014 | 0.036 | 0.106 | 0.289 | 0.072 (0.083) |
| S\_boot | 0.000 | 0.004 | 0.011 | 0.032 | 0.119 | 0.023 (0.030) |

knitr::kable(S.by.quantiles[[5]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.007 | 0.022 | 0.051 | 0.164 | 0.412 | 0.109 (0.120) |
| S\_boot | 0.000 | 0.003 | 0.008 | 0.023 | 0.166 | 0.030 (0.049) |

knitr::kable(S.by.quantiles[[6]])

|  |  |  |  |  |  | mean |
| --- | --- | --- | --- | --- | --- | --- |
| S\_VH | 0.045 | 0.084 | 0.123 | 0.194 | 0.316 | 0.154 (0.125) |
| S\_boot | 0.002 | 0.006 | 0.009 | 0.054 | 0.169 | 0.050 (0.088) |

### Get N values  
get\_N(0,1, correlated = FALSE)

## [1] "N= 13903"

lapply(quantiles.list, function(x) {get\_N(x[1],x[2], correlated = FALSE)})

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## [[5]]  
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##   
## [[6]]  
## [1] "N= 4"