# betaMC: Internal Tests

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## Tests

```
#> test-betaMC-beta-mc-methods
#> Call:
#> BetaMC(object = object, R = R)
#>
#> Standardized regression slopes
#> type = "hc3"
#>           est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> NARTIC  0.4951 0.0994 10 0.2701 0.2747 0.2952 0.6007 0.6044 0.6052
#> PCTGRT  0.3915 0.0678 10 0.3286 0.3289 0.3302 0.5193 0.5318 0.5346
#> PCTSUPP 0.2632 0.0894 10 0.1064 0.1087 0.1190 0.3988 0.4016 0.4023
#> Call:
#> BetaMC(object = object, R = R)
#>
#> Standardized regression slopes
#> type = "hc3"
#> Call:
#> BetaMC(object = object, R = R)
#>
#> Standardized regression slopes
#> type = "hc3"
#>          est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> NARTIC 0.7622 0.0515 10 0.7084 0.7085 0.7093 0.8612 0.8748 0.8779
#> Call:
#> BetaMC(object = object, R = R)
#>
#> Standardized regression slopes
#> type = "hc3"

#> test-betaMC-diff-beta-mc-methods

#> Difference between standardized regression coefficients
#> type = "mvn"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1226 10 -0.1464 -0.1419 -0.1217 0.2297 0.2369 0.2385
#> NARTIC-PCTSUPP 0.2319 0.1245 10  0.0578  0.0614  0.0774 0.4445 0.4475 0.4482
```

```
#> PCTGRT-PCTSUPP 0.1282 0.0777 10  0.0544  0.0550  0.0577 0.2857 0.2917 0.2930
#> Difference between standardized regression coefficients
#> type = "mvn"
#> Difference between standardized regression coefficients
#> type = "adf"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1531 10 -0.1670 -0.1642 -0.1519 0.2987 0.3064 0.3082
#> NARTIC-PCTSUPP 0.2319 0.1466 10  0.0246  0.0252  0.0276 0.4160 0.4232 0.4248
#> PCTGRT-PCTSUPP 0.1282 0.1343 10 -0.2035 -0.1921 -0.1414 0.2518 0.2557 0.2566
#> Difference between standardized regression coefficients
#> type = "adf"
#> Difference between standardized regression coefficients
#> type = "hc0"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.0768 10 -0.0179 -0.0140  0.0035 0.2621 0.2806 0.2848
#> NARTIC-PCTSUPP 0.2319 0.1454 10 -0.0260 -0.0228 -0.0084 0.3668 0.3712 0.3722
#> PCTGRT-PCTSUPP 0.1282 0.1386 10 -0.1663 -0.1642 -0.1547 0.2178 0.2209 0.2215
#> Difference between standardized regression coefficients
#> type = "hc0"
#> Difference between standardized regression coefficients
#> type = "hc1"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1319 10 -0.1320 -0.1284 -0.1124 0.2796 0.2889 0.2910
#> NARTIC-PCTSUPP 0.2319 0.1229 10 -0.0277 -0.0261 -0.0187 0.3663 0.3932 0.3993
#> PCTGRT-PCTSUPP 0.1282 0.1984 10 -0.2496 -0.2413 -0.2044 0.4339 0.5126 0.5304
#> Difference between standardized regression coefficients
#> type = "hc1"
#> Difference between standardized regression coefficients
#> type = "hc2"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1730 10 -0.1411 -0.1397 -0.1335 0.3766 0.4066 0.4133
#> NARTIC-PCTSUPP 0.2319 0.2012 10 -0.0685 -0.0630 -0.0383 0.5378 0.5524 0.5557
#> PCTGRT-PCTSUPP 0.1282 0.1566 10 -0.1344 -0.1299 -0.1097 0.3012 0.3070 0.3083
#> Difference between standardized regression coefficients
#> type = "hc2"
#> Difference between standardized regression coefficients
#> type = "hc3"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1511 10 -0.0378 -0.0344 -0.0194 0.4334 0.4437 0.4460
#> NARTIC-PCTSUPP 0.2319 0.1511 10 -0.0323 -0.0268 -0.0024 0.4794 0.4977 0.5019
#> PCTGRT-PCTSUPP 0.1282 0.1553 10 -0.1964 -0.1953 -0.1904 0.2926 0.3131 0.3177
#> Difference between standardized regression coefficients
#> type = "hc3"
#> Difference between standardized regression coefficients
#> type = "hc4"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
```

```
#> NARTIC-PCTGRT  0.1037 0.1375 10 -0.1041 -0.1039 -0.1027 0.2478 0.2565 0.2585
#> NARTIC-PCTSUPP 0.2319 0.1313 10 -0.0461 -0.0424 -0.0257 0.3505 0.3622 0.3649
#> PCTGRT-PCTSUPP 0.1282 0.0747 10 -0.0160 -0.0144 -0.0076 0.2038 0.2056 0.2060
#> Difference between standardized regression coefficients
#> type = "hc4"
#> Difference between standardized regression coefficients
#> type = "hc4m"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1466 10 -0.0527 -0.0505 -0.0411 0.3960 0.4149 0.4191
#> NARTIC-PCTSUPP 0.2319 0.0683 10  0.1673  0.1683  0.1725 0.3629 0.3688 0.3701
#> PCTGRT-PCTSUPP 0.1282 0.1527 10 -0.2148 -0.2092 -0.1844 0.2793 0.2970 0.3010
#> Difference between standardized regression coefficients
#> type = "hc4m"
#> Difference between standardized regression coefficients
#> type = "hc5"
#>                   est     se  R   0.05%    0.5%    2.5%  97.5%  99.5% 99.95%
#> NARTIC-PCTGRT  0.1037 0.1264 10 -0.1012 -0.0996 -0.0927 0.2867 0.3160 0.3226
#> NARTIC-PCTSUPP 0.2319 0.1159 10  0.0228  0.0234  0.0261 0.3564 0.3601 0.3609
#> PCTGRT-PCTSUPP 0.1282 0.1047 10  0.0378  0.0390  0.0442 0.3019 0.3084 0.3098
#> Difference between standardized regression coefficients
#> type = "hc5"
```

*#> test-betaMC-diff-beta-mc*

```
#> Difference between standardized regression coefficients
#> type = "mvn"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "adf"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc0"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc1"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc2"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc3"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc4"
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc4m"
```

```
#> Test passed
#> Difference between standardized regression coefficients
#> type = "hc5"
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
```

*#> test-betaMC-r-sq-beta-mc-methods*

```
#> Multiple correlation
#> type = "mvn"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0760 10 0.6510 0.6529 0.6614 0.8859 0.8901 0.8910
#> adj 0.7906 0.0814 10 0.6261 0.6281 0.6372 0.8777 0.8822 0.8832
#> Multiple correlation
#> type = "mvn"
#> Multiple correlation
#> type = "adf"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0334 10 0.7446 0.7451 0.7475 0.8451 0.8457 0.8459
#> adj 0.7906 0.0357 10 0.7263 0.7269 0.7295 0.8341 0.8347 0.8349
#> Multiple correlation
#> type = "adf"
#> Multiple correlation
#> type = "hc0"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0408 10 0.6937 0.6944 0.6976 0.8186 0.8223 0.8232
#> adj 0.7906 0.0437 10 0.6718 0.6726 0.6760 0.8056 0.8096 0.8105
#> Multiple correlation
#> type = "hc0"
#> Multiple correlation
#> type = "hc1"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.1803 10 0.2573 0.2766 0.3625 0.8594 0.8595 0.8595
#> adj 0.7906 0.1932 10 0.2043 0.2250 0.3169 0.8493 0.8495 0.8495
#> Multiple correlation
#> type = "hc1"
#> Multiple correlation
#> type = "hc2"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
```

```
#> rsq 0.8045 0.0794 10 0.6185 0.6228 0.6418 0.8754 0.8799 0.8809
#> adj 0.7906 0.0851 10 0.5912 0.5958 0.6162 0.8665 0.8714 0.8724
#> Multiple correlation
#> type = "hc2"
#> Multiple correlation
#> type = "hc3"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0448 10 0.7389 0.7400 0.7450 0.8807 0.8894 0.8914
#> adj 0.7906 0.0481 10 0.7202 0.7214 0.7268 0.8721 0.8815 0.8836
#> Multiple correlation
#> type = "hc3"
#> Multiple correlation
#> type = "hc4"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0454 10 0.7159 0.7167 0.7201 0.8474 0.8506 0.8513
#> adj 0.7906 0.0486 10 0.6956 0.6965 0.7001 0.8365 0.8399 0.8407
#> Multiple correlation
#> type = "hc4"
#> Multiple correlation
#> type = "hc4m"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0572 10 0.7106 0.7110 0.7127 0.8563 0.8566 0.8567
#> adj 0.7906 0.0612 10 0.6899 0.6903 0.6922 0.8460 0.8463 0.8464
#> Multiple correlation
#> type = "hc4m"
#> Multiple correlation
#> type = "hc5"
#>        est     se  R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> rsq 0.8045 0.0685 10 0.6758 0.6764 0.6788 0.8675 0.8737 0.8751
#> adj 0.7906 0.0734 10 0.6527 0.6533 0.6559 0.8580 0.8647 0.8662
#> Multiple correlation
#> type = "hc5"
```

*#> test-betaMC-r-sq-beta-mc*

```
#> Multiple correlation
#> type = "mvn"
#> Test passed
#> Multiple correlation
#> type = "adf"
#> Test passed
#> Multiple correlation
#> type = "hc0"
#> Test passed
#> Multiple correlation
#> type = "hc1"
#> Test passed
```

```
#> Multiple correlation
#> type = "hc2"
#> Test passed
#> Multiple correlation
#> type = "hc3"
#> Test passed
#> Multiple correlation
#> type = "hc4"
#> Test passed
#> Multiple correlation
#> type = "hc4m"
#> Test passed
#> Multiple correlation
#> type = "hc5"
#> Test passed
#> Multiple correlation
#> type = "mvn"
#> Test passed
#> Multiple correlation
#> type = "adf"
#> Test passed
#> Multiple correlation
#> type = "hc0"
#> Test passed
#> Multiple correlation
#> type = "hc1"
#> Test passed
#> Multiple correlation
#> type = "hc2"
#> Test passed
#> Multiple correlation
#> type = "hc3"
#> Test passed
#> Multiple correlation
#> type = "hc4"
#> Test passed
#> Multiple correlation
#> type = "hc4m"
#> Test passed
#> Multiple correlation
#> type = "hc5"
#> Test passed
#> test-betaMC-vcov
#> Test passed
#> Test passed
```

```
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> Test passed
#> [[1]]
#> [[1]][[1]]
#> [[1]][[1]]$value
#> [[1]][[1]]$value[[1]]
#>      2.5%     97.5%
#> 0.7092652 0.8611891
#>
#>
#> [[1]][[1]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[2]]
#> [[1]][[2]]$value
#> [[1]][[2]]$value[[1]]
#>                         2.5%     97.5%
#> NARTIC-PCTGRT  -0.09271675 0.2866621
#> NARTIC-PCTSUPP  0.02609960 0.3563650
#> PCTGRT-PCTSUPP  0.04424265 0.3018828
#>
#>
#> [[1]][[2]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[3]]
#> [[1]][[3]]$value
#> [[1]][[3]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[3]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[4]]
#> [[1]][[4]]$value
#> [[1]][[4]]$value[[1]]
#>          2.5%     97.5%
#> rsq 0.6788217 0.8674571
```

```
#> adj 0.6558804 0.8579897
#>
#>
#> [[1]][[4]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[5]]
#> [[1]][[5]]$value
#> [[1]][[5]]$value[[1]]
#> [1] TRUE
#>
#>
#> [[1]][[5]]$visible
#> [1] TRUE
#>
#>
#> [[1]][[6]]
#> [[1]][[6]]$value
#> [[1]][[6]]$value[[1]]
#> Call:
#> BetaMC(object = object, decomposition = "svd")
#>
#> Standardized regression slopes
#> type = "hc3"
#>       est     se     R  0.05%   0.5%   2.5%  97.5%  99.5% 99.95%
#> x1 0.4830 0.0210 20000 0.4139 0.4273 0.4403 0.5233 0.5370 0.5508
#> x2 0.4857 0.0215 20000 0.4132 0.4292 0.4426 0.5272 0.5402 0.5559
#>
#>
#> [[1]][[6]]$visible
#> [1] TRUE
```

## Environment

```
ls()

#> [1] "nas1982"  "root"     "tex_file"
```

## Class

```
#> [[1]]
#> [1] "data.frame"
#>
#> [[2]]
#> [1] "root_criterion"
#>
#> [[3]]
#> [1] "character"
```

## References

R Core Team. (2022). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. Vienna, Austria. https://www.R-project.org/