Zane_Alderfer_IST772_Final

Zane

2023-09-16

dummy variables created above

```
#question2
public_dummy_mean <- mean(public_dummy)
hi_enrollment_mean <- mean(hi_enrollment)
relig_exempt_mean <- mean(relig_exempt)
show(public_dummy_mean)
```

```
## [1] 0.8381089
```

```
show(hi_enrollment_mean)
```

```
## [1] 0.4799427
```

```
show(relig_exempt_mean)
```

```
## [1] 0.5673352
```

means for dummy variables above

```
#question3
library(BayesFactor)
```

```
## Loading required package: coda
```

```
## Loading required package: Matrix
```

```
## ************
## Welcome to BayesFactor 0.9.12-4.4. If you have questions, please contact Richard Morey (richarddmorey
##
## Type BFManual() to open the manual.
## ************
```

```
linear_regression <- lm(medical ~ pubpriv + enrollment, data = schoolvax)
BF_linear_regression <- lmBF(medical ~ pubpriv + enrollment, data = schoolvax, posterior = TRUE, iterati
```

```
## Warning: data coerced from tibble to data frame
```

```r
summary(linear_regression)
```

```
##
## Call:
## lm(formula = medical ~ pubpriv + enrollment, data = schoolvax)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.3657 -0.2363 -0.1751 -0.1206 15.1251
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.2128964  0.0853441   2.495   0.0128 *
## pubprivPUBLIC -0.1841863  0.1019180  -1.807   0.0712 .
## enrollment     0.0017019  0.0009059   1.879   0.0607 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.8555 on 695 degrees of freedom
## Multiple R-squared:  0.006456,   Adjusted R-squared:  0.003597
## F-statistic: 2.258 on 2 and 695 DF,  p-value: 0.1053
```

```r
summary(BF_linear_regression)
```

```
##
## Iterations = 1:10000
## Thinning interval = 1
## Number of chains = 1
## Sample size per chain = 10000
##
## 1. Empirical mean and standard deviation for each variable,
##    plus standard error of the mean:
##
##                            Mean        SD  Naive SE Time-series SE
## mu                     0.251022 4.653e-02 4.653e-04      4.863e-04
## pubpriv-PRIVATE        0.085628 4.986e-02 4.986e-04      5.058e-04
## pubpriv-PUBLIC        -0.085628 4.986e-02 4.986e-04      5.058e-04
## enrollment-enrollment  0.001622 8.952e-04 8.952e-06      9.054e-06
## sig2                   0.732056 4.000e-02 4.000e-04      4.000e-04
## g_pubpriv              1.121861 1.203e+01 1.203e-01      1.203e-01
## g_continuous           0.677820 9.511e+00 9.511e-02      9.511e-02
##
## 2. Quantiles for each variable:
##
##                             2.5%       25%       50%       75%    97.5%
## mu                     1.599e-01  0.219992  0.250987  0.282441 0.341877
## pubpriv-PRIVATE       -1.379e-02  0.052270  0.085769  0.118832 0.183389
## pubpriv-PUBLIC        -1.834e-01 -0.118832 -0.085769 -0.052270 0.013790
## enrollment-enrollment -9.533e-05  0.001011  0.001618  0.002223 0.003401
## sig2                   6.582e-01  0.704267  0.730791  0.757846 0.814608
## g_pubpriv              3.696e-02  0.096824  0.196978  0.471650 5.370837
## g_continuous           1.816e-02  0.047076  0.092320  0.220348 2.753783
```

```r
#question5
library(mcmc)
library(MCMCpack)
```

```
## Loading required package: MASS
```

```
## ##
## ## Markov Chain Monte Carlo Package (MCMCpack)
```

```
## ## Copyright (C) 2003-2023 Andrew D. Martin, Kevin M. Quinn, and Jong Hee Park
```

```
## ##
## ## Support provided by the U.S. National Science Foundation
```

```
## ## (Grants SES-0350646 and SES-0350613)
## ##
```

```r
logistic_model <- glm(relig_exempt ~ public_dummy + hi_enrollment, family = binomial(),
                      data = schoolvax)
summary(logistic_model)
```

```
##
## Call:
## glm(formula = relig_exempt ~ public_dummy + hi_enrollment, family = binomial(),
##     data = schoolvax)
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)    0.19102    0.18909   1.010    0.312
## public_dummy  -0.04449    0.22596  -0.197    0.844
## hi_enrollment  0.24624    0.16753   1.470    0.142
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 954.94  on 697  degrees of freedom
## Residual deviance: 952.58  on 695  degrees of freedom
## AIC: 958.58
##
## Number of Fisher Scoring iterations: 4
```

```r
exp(coef(logistic_model))
```

```
##   (Intercept)  public_dummy hi_enrollment
##     1.2104854     0.9564884     1.2792108
```

```r
vax_mcmc <- MCMClogit(formula = relig_exempt ~ public_dummy + hi_enrollment,
                      data = schoolvax)
summary(vax_mcmc)
```

```
##
## Iterations = 1001:11000
## Thinning interval = 1
## Number of chains = 1
## Sample size per chain = 10000
##
## 1. Empirical mean and standard deviation for each variable,
##    plus standard error of the mean:
##
##                   Mean     SD Naive SE Time-series SE
## (Intercept)    0.19470 0.1914 0.001914       0.006247
## public_dummy  -0.04457 0.2295 0.002295       0.007631
## hi_enrollment  0.24281 0.1683 0.001683       0.005541
##
## 2. Quantiles for each variable:
##
##                    2.5%      25%      50%    75%  97.5%
## (Intercept)   -0.19071  0.06551  0.19859 0.3243 0.5631
## public_dummy  -0.48206 -0.20380 -0.04667 0.1032 0.4171
## hi_enrollment -0.08911  0.13332  0.24158 0.3564 0.5700
```

```
plot(vax_mcmc)
```