PS02 Claire

mooneyc3

February 2022

1 Introduction

climatesupport ¡- read.csv("datasets/climateSupport.RData")

install.packages("ggplot2")
library("ggplot2")

climateSupport ¡-load(url("https://github.com/ASDS-TCD/StatsII$_{Spring}2022/blob/main/datasets/clim$
$true$"))

2 Question 1

summary(climateSupport)

climateSupport$choice < -as.numeric(as.factor(climateSupport$choice))-1
climateSupport$sanctions < -as.numeric(as.factor(climateSupport$sanctions))-
1
climateSupport$countries < -as.numeric(as.factor(climateSupport$countries))-
1

climateSupport$choice$

sanctions line 2 is 15

1 is 5

climateSupport

model$_1 < -glm(choice\ ., periodfunctionsasomnibusselector(kitchensinkadditivemodel)$
$data = climateSupport, family = "binomial"(link = "logit")))$

$summary(model_1)$

$-0,14458 = intercept$
$countries = 0.32436$
$-0.12353 = sanctions$

$plot(model_1)$

$exp(coef(model_1))$

$exponentialcoefficientsreturns$
$intercept = 0.8653845$
$countries = 1.03831405$
$sanctions = 0.8837921$

$countries$

0	20
1	80
2	160

$sanctions$

0	5
1	15
2	20

$model_null <- glm(as.factor(choice)\ 1, data = climateSupport, family = "binomial")1 = fitaninterceptonly(i.e.sortofa"mean")$
$anova(model_1, test = "Chisq")$
$runningananovaofmodelone$

$anova(model_1)$

$runningananovamodelshowsthatthemodelreturnsasmallpvalue$

$thenullhypothesisisthatanindividualhasanaffectonsupportforpolicytakingintoaccountthenumberofcou$

$exp(confint(model_1))Transformtooddsratiousingexp()$

$Anoptionformakingadata.frameofconfintsandcoefficients$

$conf_reg <- data.frame(cbind(lower = exp(confint(model_1)[, 1]), coefs = exp(coef(model_1)), upper = exp(confint(model_1)[, 2])))$

$thiscreatesaconfidenceintervalofthemodel$

$thisreturnsconfidenceintervalvalues$
$Intercept =$

$lower = 0.791$

$coefs = 0.865$

$upper = 0.945$

$confidenceintervalforcountries$

$lower = 1.312$

$coefs = 1.383$

1.458

$sanctionsconfidenceinterval$

$lower = 0.850$

$coefs = 0.884$

$upper = 0.918$

$ggplot(data = conf_reg, mapping = aes(x = row.names(conf_reg), y = coefs))+$ $geom_point() + geom_errorbar(aes(ymin = lower, ymax = upper), colour = $ $"red") + coord_flip()$

3 Question2

3.1 Part A

above 160 use number 2
5 use 1
15 use 2

Y = bO + b1x1 + b1X2 + X3
Y = -0.14458 + 0.32436*countries + -0.12353*sanctions
Y ¡- -0.14458 + 0.032436*2 + -0.12353*1
Y1 ¡- -0.14458 + 0.032436*2 + -0.12353*2
DIFF ¡- Y1 - Y
DIFF

0.12353 Y - Y1 = 0.12353
-0.12353 when diff = Y1 - Y
exp(0.12353)
exp(0.12353) = 1.131484

exp(0.12353) = 1.131484
for the policy for when nearly all countries participate and increasing sanctions from 5 to 15 percent it changes the log odds of support for the policy by 1.131484 from the baseline odds ratio
this suggests that the more countries that participate the more the log odds are affected

3.2 Part B

20 OF 192
5-15 use 1

Y2 = bO + b1x1 + b1X2 + X3
-0.14458 + 0.32436*countries + -0.12353*sanctions
Y2 ¡- -0.14458 + 0.032436*0 + -0.12353*1
Y3 ¡- -0.14458 + 0.032436*0 + -0.12353*2
DIFF2 ¡- Y3 - Y2
DIFF2

DIFF Y3 -Y2 = -0.12353
DIFF2 Y2 - Y3 = 0.012353
exp(-0.12353)
exp(-0.12353) = 0.8837951

for the policy for when very few countries participate and there is the same increase in policy from 5 to 15 percent it changes the log odds that they will support the policy to 0.8837951 from the basline odds ratio
This may suggest that sampling fewer countries perhaps if they are all of a certain economic status may have an impact on support

3.3 Part C

Y = bO + b1x1 + b1X2 + X3
-0.14458 + 0.32436*countries + -0.12353*sanctions + choice*countries*sanctions
Y8 ¡- -0.14458 + 0.32436*1 + -0.12353*0 + 1*1
Y8

Y8 is equal to 1.17978
exp(1.17978)
exp(1.17978) = 3.253658

the estimated probability that if there is no account taken for sanctions that an individual will support policy has a log odds that is much higher of 3.252658 this suggests that sanctions do play a part in peoples support for policy

3.4 Part D

Y = -0.14458 + 0.32436*countries + -0.12353*sanctions + choice*countries*sanctions
Y4 ¡- -0.14458 + 0.032436*2 + -0.12353*1 + 0*2*1
Y5 ¡- -0.14458 + 0.032436*2 + -0.12353*2 + 1*2*1
DIFF3 ¡- Y5 - Y4
DIFF3

1.87647
exp(1.87647)
exp 1.18647 = 6.530412

$\hat{Y} = -0.14458 + 0.32436 * countries + -0.12353 * sanctions + choice * countries * sanctions$
$Y6 < - -0.14458 + 0.032436 * 0 + -0.12353 * 1 + 0 * 0 * 1$
$Y7 < - -0.14458 + 0.032436 * 0 + -0.12353 * 2 + 1 * 0 * 2$
DIFF4 ¡- Y7 - Y6
DIFF4

DIFF4 =-0.12353
exp(-0.12353) = 0.8837951

this shows us the adding in the interaction to 2b is not effected as if returns the same expoential log odd however it does affect 2a.
if individual choice was accounted for on a large scale it would suggest there would be greater variation in support for policy and in choice.

plot1 ¡- interaction.plot(model$_1, pred = countries, modx = sanctions$)

$predicted_data < -with(climateSupport, expand.grid(choice = unique(choice), countries = unique(countries), sanctions = unique(sanctions)))$

$predicted_data < -cbind(predicted_data, predict(model_1, newdata = predicted_data, type = "response", se = TRUE))$

$predicted_data$

$predicted_data < -within(predicted_data, PredictedProb < -plogis(fit)LL < -plogis(fit - (1.96 * se.fit)$

$predicted_data$