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library(stats)
library(MASS)


data <- read.csv("gdpChange.csv")


# we create the classes
data$GDPWdiff <- ifelse(data$GDPWdiff > 0, "positive",
                        ifelse(data$GDPWdiff < 0, "negative", "no change"))
data$GDPWdiff <- ifelse(data$GDPWdiff == "positive", 1,
                 ifelse(data$GDPWdiff == "negative", 2, 3))

# we create the factor
data$GDPWdiff <- factor(data$GDPWdiff)

# Ajustar el modelo de regresión logística multinomial no ordenado
gdp_model <- multinom(GDPWdiff ~ REG + OIL, data = data)

# Imprimir los resultados del modelo
print(summary(gdp_model)$coefficients)

#The REG coefficient (-0.389) indicates the change in the probabilities of category 1
("positive")
#in democratic countries compared to non-democratic countries, holding constant the effect
of the OIL variable.

#The OIL coefficient (0.208) indicates the change in the probabilities of category 1
("positive")
#in countries with significant oil exports compared to countries without significant oil
exports, holding constant the effect of the REG variable.

#In category 2 ("negative"), the coefficient of the intercept is -4.530,
#which indicates the natural logarithm of the probabilities that the difference in GDP is
negative in non-democratic countries and without significant oil exports. The REG and OIL
coefficients in category 2 are interpreted similarly to category 1.

gdp2_model <- polr(GDPWdiff ~ REG + OIL, data = data)
# Imprimir los resultados del modelo
print(summary(gdp2_model)$coefficients)

#The REG coefficient in the first column (-0.410) is interpreted as the change
#in the probabilities that the difference in GDP is from category 1 to category 2, for
democratic countries
#compared to non-democratic countries, holding constant the effect of the OIL variable.

#The OIL coefficient in the second column (0.179) indicates the change in the probabilities
that the difference
#in GDP will be from category 1 to category 2, for countries with significant oil exports
compared to countries
#without significant oil exports. , keeping constant the effect of the variable REG.

#The coefficient in the third column (0.704) is interpreted as the natural logarithm of the
odds that
#the difference in GDP will be category 1 ("positive"), compared to category 3 ("no
change"),
#holding constant the effect of the variables REG and OIL.

#The coefficient in the fourth column (5.320) is interpreted as the natural logarithm of
the odds that
#the difference in GDP will be category 2 ("negative"), compared to category 3 ("no
```

```
change"),
#holding constant the effect of the variables REG and OIL.

datamex = read.csv("MexicoMuniData.csv")

# we fit the model
model <- glm(PAN.visits.06 ~ competitive.district + marginality.06 + PAN.governor.06,
             data = datamex, family = "poisson")

# we adjust the we obtain the test statistic and the value of p
test_stat <- summary(model)$coef["competitive.district", "z value"]
p_value <- summary(model)$coef["competitive.district", "Pr(>|z|)"]
cat("test statistic:", test_stat, "\n")
cat("p value:", p_value, "\n")
alpha <- 0.05
if (p_value < alpha) {
  cat("There is evidence to reject the null hypothesis. PAN presidential candidates visit
contested districts more frequently than safe districts. \n")
} else {
  cat("There is not enough evidence to reject the null hypothesis. It cannot be concluded
that PAN presidential candidates visit contested districts more frequently than safe
districts.\n")
}

print("the coefficients are:")
print(summary(model)$coefficients)

#The marginality coefficient (marginality.06) is -2.080,
#which means that an increase in marginality by one unit is associated with an 87.8%
#decrease in the expected number of visits by a PAN presidential candidate to a
municipality.

#The coefficient for PAN.governor.06 is -0.312,
#which means that in municipalities where the PAN-affiliated governor was in power,
#the number of visits by the PAN presidential candidate would be expected to decrease by
26.3%.

pre <- data.frame(competitive.district = 1, marginality.06 = 0, PAN.governor.06 = 1)


predicted <- predict(model, pre, type="response")
print(paste("The estimated number of visits is:",predicted))
```