Homework10

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2024-04-24

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github link: https://github.com/AnishRavi5/SDS315HW10

Question 1

Part 1

What is the association between FAIR polices and racial demographic of a ZIP code, adjusting for fire accidents, age of housing units, and median family income.

Part 2

The approach to this question is to use linear regression to test the association between the FAIR policies and the racial demographic. The dependent variable is the FAIR policies while the independent variables are the racial demographic, fire accidents, age of house, and median family income.

Part 3

```
##
## Call:
## lm(formula = policies ~ minority + fire + age + income, data = redlining)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.93218 -0.21134  0.02478  0.21927  0.85424
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.124873   0.633095  -0.197  0.84478
## minority     0.008359   0.002864   2.918  0.00611 **
## fire         0.021739   0.008785   2.475  0.01833 *
## age          0.005623   0.003755   1.497  0.14323
## income      -0.015965   0.038209  -0.418  0.67863
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4069 on 35 degrees of freedom
## Multiple R-squared:  0.6624, Adjusted R-squared:  0.6238
## F-statistic: 17.17 on 4 and 35 DF,  p-value: 7.041e-08
```

```
##                    2.5 %     97.5 %
## (Intercept) -1.410125111 1.16037900
## minority     0.002544164 0.01417293
```

```
## fire          0.003904606 0.03957406
## age          -0.002000042 0.01324683
## income       -0.093533129 0.06160356
```

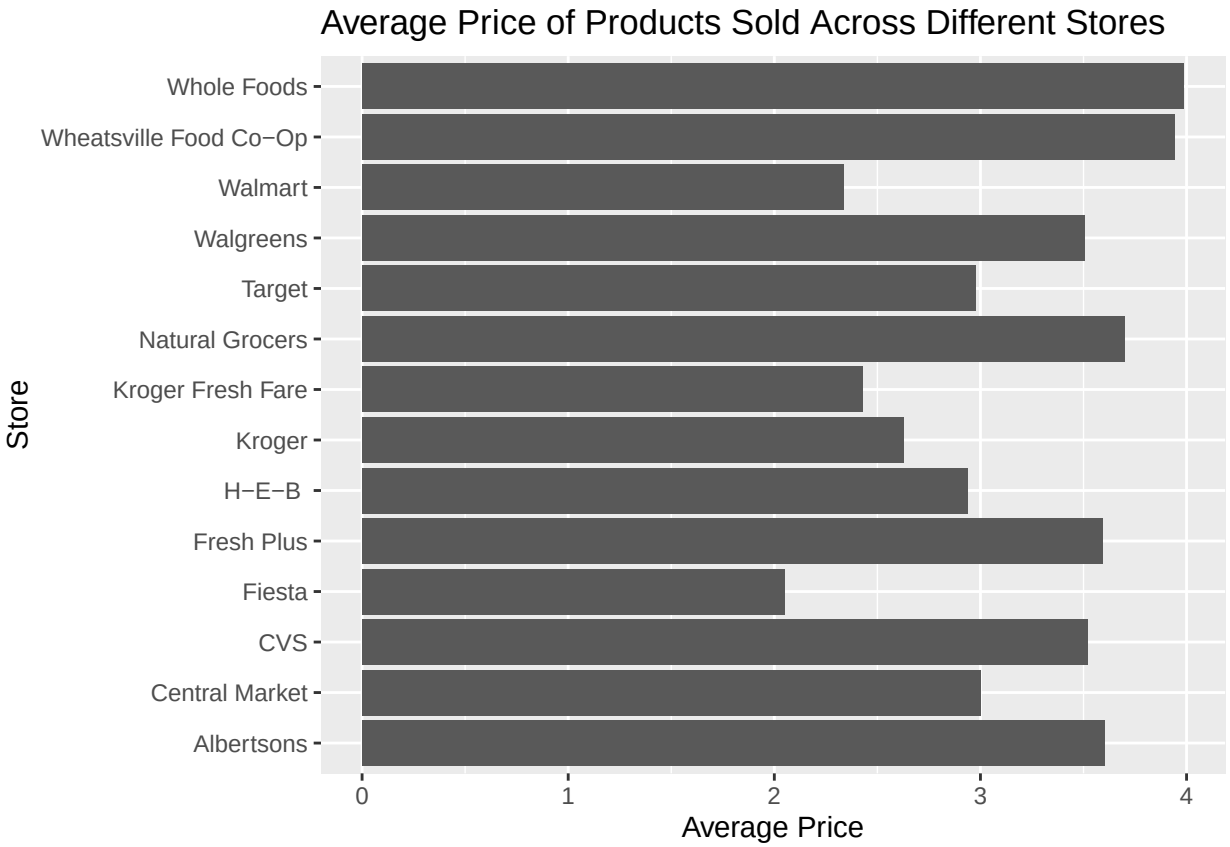
The results show a confidence interval of 0.254 to 1.417 for the minority variable. These numbers don't contain 0 showing a positive and statistically significant value at the 0.05 level.

Part 4

When taking a look at the association between FAIR policies and racial demographic of a ZIP code, adjusting for fire accidents, age of housing units, and median family income we notice some trends. When account for the other variables the percentage of minorities that have a positive partial relationship in the amount of FAIR policies issued it 0.836. This indicates that the higher minority percentage in a zip code there is a higher number of FAIR policies. This is important for stakeholders as it shows that there is discirmination and people who are interested in this situation would want to fix that.

Problem 2

Part A



The bar graph shows the average prices of products that are being sold in differnt stores. The bar graph is useful for the customers as it shows the stores that have higher prices and stores that have lower prices. There are probably valid reasons for the differing prices but this bar graph can help the customers make a decision for a store based on their financial situation.

Part B

This bar graph shows the number of stores that sell a certain type of product. This is important as it shows which products are more accessible and which products are more niche products that are sold at fewer stores.

Part C

Compared to ordinary grocery stores convenience stores charge somewhere between 41.31 cents to 91.54 cents more for the same item.

Part D

When performing a linear regression on the price versus the product and the store we can see which stores charge lower and higher prices for the same products. The two stores that have the lowest prices are Kroger Fresh Fare and Walmart. The two stores that have the highest prices are Wheatsville FOod Co-Op and Whole Foods.

Part E

When comparing HEB and Central Market we see that there is an average of 6 cents of difference per item in the two stores with Cnentral Market being more expensive. This shows us that Central Market charges more than HEB for the same product.

Part F

When comparing price to product and the income10K statistic we see that consumers in poorer zip codes end up paying more compared to consumers in more wealthy zip codes. This is seen as the linear regression gives us a value of -0.0131 which tells us that is wealth in a zip code decreases the price spent on an item increases.

A one-stadard deviation increase int he income of a zip code seems to be associated with a -0.01 standard deviation chnage in the price that consumers in that zip code expect to pay for that same product.