

# Homework 10

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Link to GitHub: [https://github.com/laurenmaurer4/SDS\\_315.git](https://github.com/laurenmaurer4/SDS_315.git)

## Problem 1: Redlining

**Question:** The question that we are trying to answer is whether there is an association between the number of FAIR policies and that racial/ethnic composition of a ZIP code.

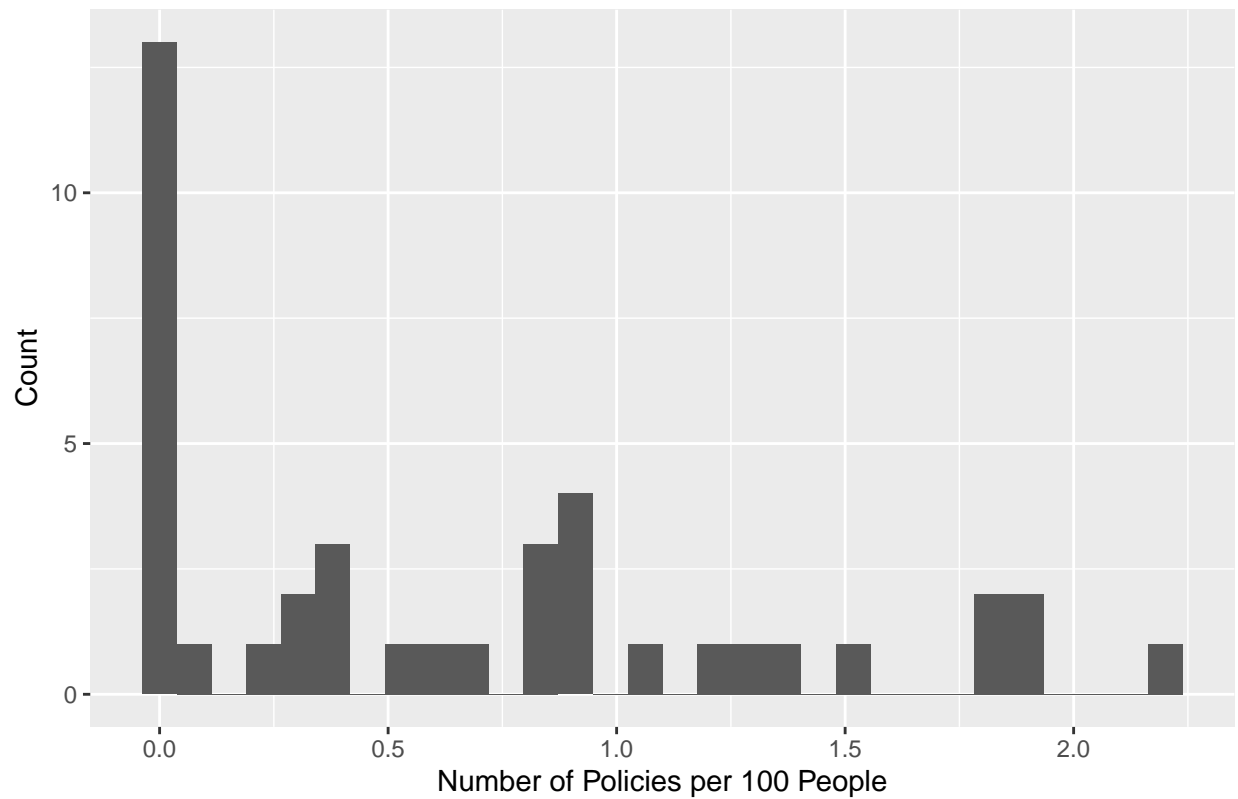
**Approach:** A linear regression was used to answer the question. To account for confounding variables we adjusted for fire, age, and income.

**Results:**

Table 1: Redlining Regression Table

term	estimate	std_error	statistic	p_value	lower_ci	upper_ci
intercept	-0.125	0.633	-0.197	0.845	-1.410	1.160
minority	0.008	0.003	2.918	0.006	0.003	0.014
fire	0.022	0.009	2.475	0.018	0.004	0.040
age	0.006	0.004	1.497	0.143	-0.002	0.013
income	-0.016	0.038	-0.418	0.679	-0.094	0.062

Distribution of Number of Policies



**Conclusion:** There is an association between the number of FAIR policies and the racial/ethnic composition of a ZIP code. When there is a 1% change in minority there is a 0.008 increase in the number of FAIR policies per 100 residents in a ZIP code. The 95% confidence interval for the change in policies is between 0.003 and 0.014. This isn't a significant change but also not a small change. In the data, the number of policies per 100 people ranges from zero to a little over 2. If the minority population increases by 50% then there are 0.4 policies per 100 people. That increase covers a little under 1/5 of the range of all policies per 100 people in the data set.

## Problem 2: Grocery Store Prices

### Part A



The average price of all products in this plot range from 2 to 4. Whole Foods and Wheatsville Food Co-op have the highest average. Fiesta and Walmart have the lowest averages.

## Part B



The plot above shows the number of stores that sell each product. Eggs and milk are sold in all 16 stores.

## Part C

Compared with ordinary grocery stores (like Albertsons, H-E-B, or Krogers), convenience stores charge somewhere between 0.41 and 0.92 dollars more for the same product.

## Part D

Walmart and Kroger Fresh Fare charge the least when comparing the same product. Whole Foods and Wheatsville Food Co-op charge the most when comparing the same product.

## Part E

H-E-B and Central Market are similar. Central Market charges an estimated \$0.07 more for the same product. This is a small difference compared to Central Market and Whole Foods where Whole Foods charges an estimated \$0.94 more for the same product.

## **Part F**

As income increases by 10K the amount that people spend on food decreases by \$0.13. People in poorer ZIP codes on average pay more for the same product. A one-standard deviation increase in the income of a ZIP code seems to be associated with a -0.03 standard-deviation change in the price that consumers in that ZIP code expect to pay for the same product.