

Insurance Redlining

Chicago

Presenter

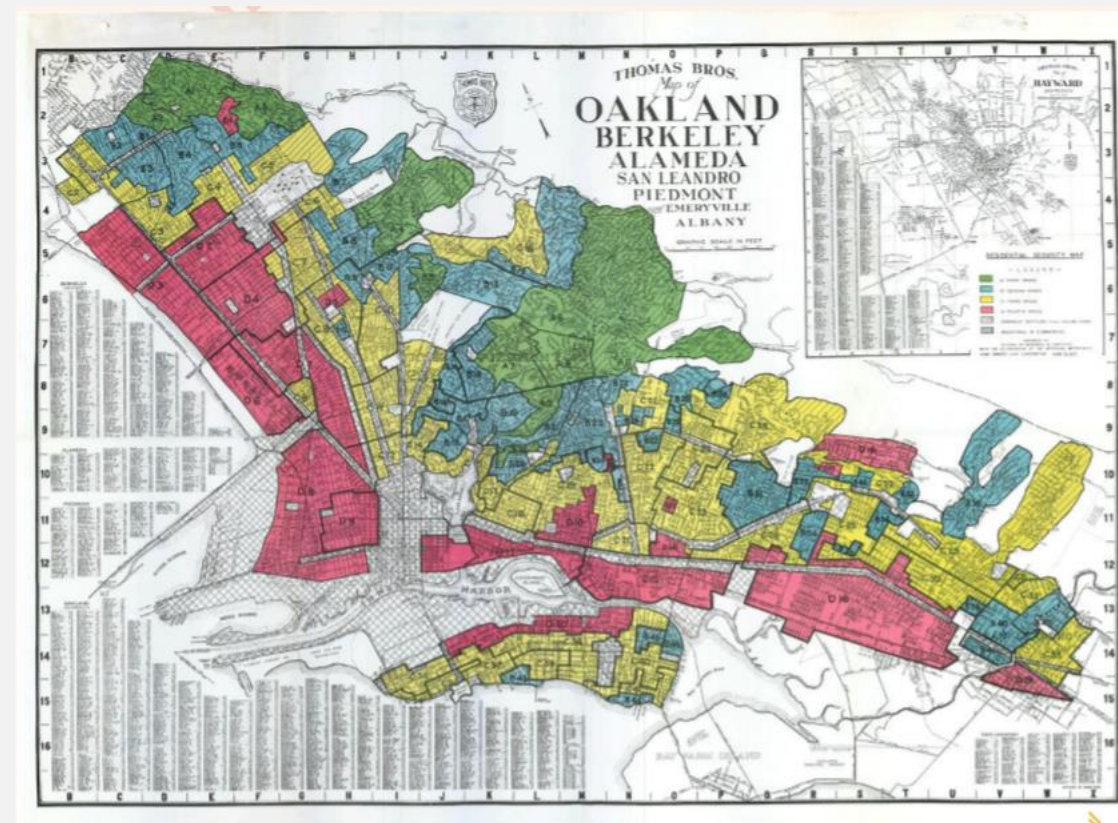
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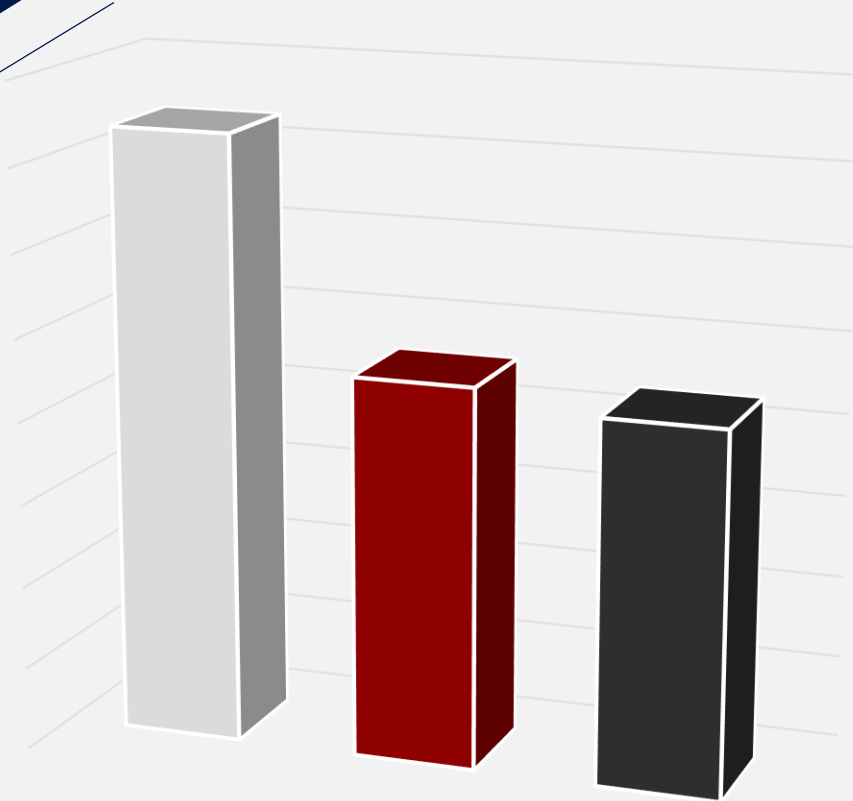
What is Redlining?

- The Term originates from the 1930s practice of color coding maps of cities based on different neighborhoods' eligibility to receive a loan or mortgage.
- The lowest ranked neighborhoods were often literally lined in red, and were almost always a community of color or other marginalized identity.



A red lined map of Oakland, California, created by Home Owner's Loan Corporation.

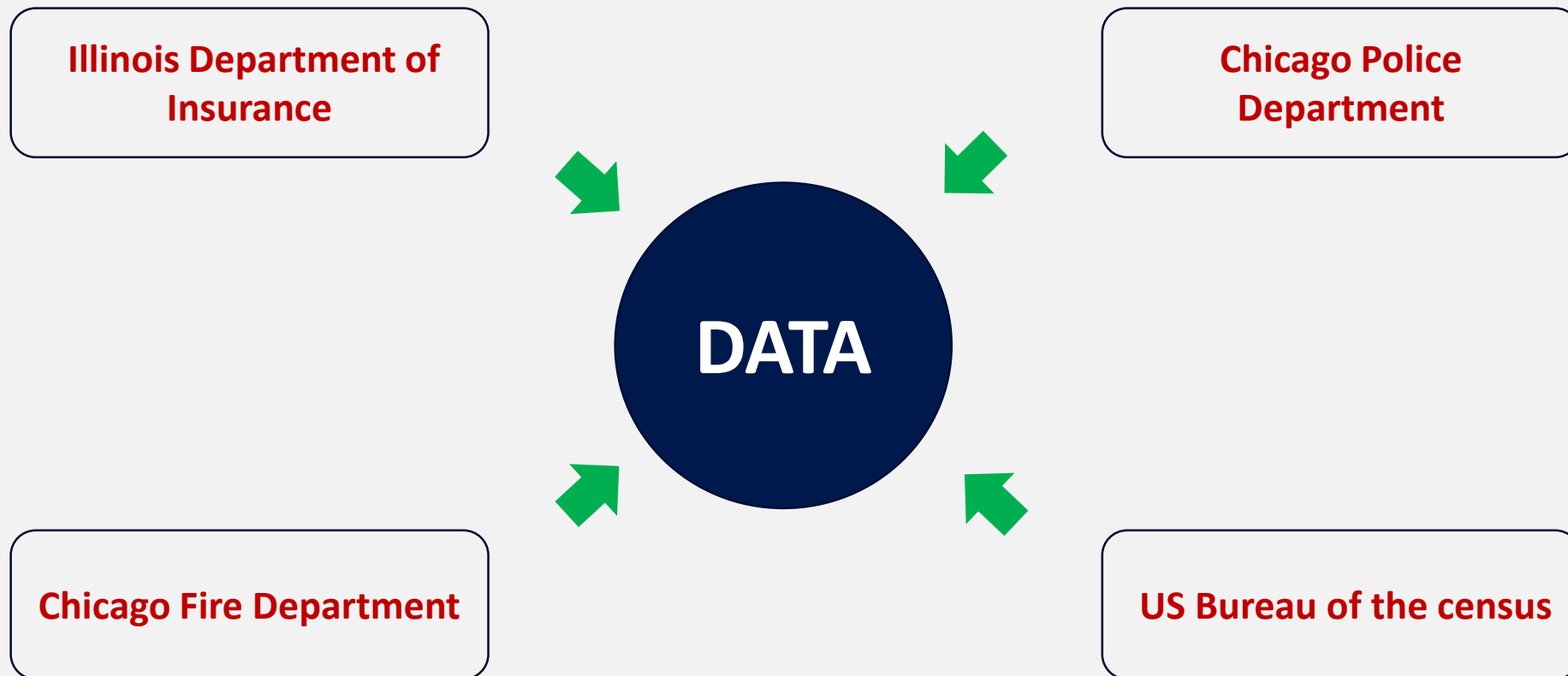
HomeOwership Rate (2014)



Center for Global Policy Solutions, 2014

White	73%
Hispanic	46%
Black	44%

U.S. Commission Civil Rights (Study)



Variables

race racial: composition in percent minority

fire: fires per 100 housing units

theft: theft per 1000 population

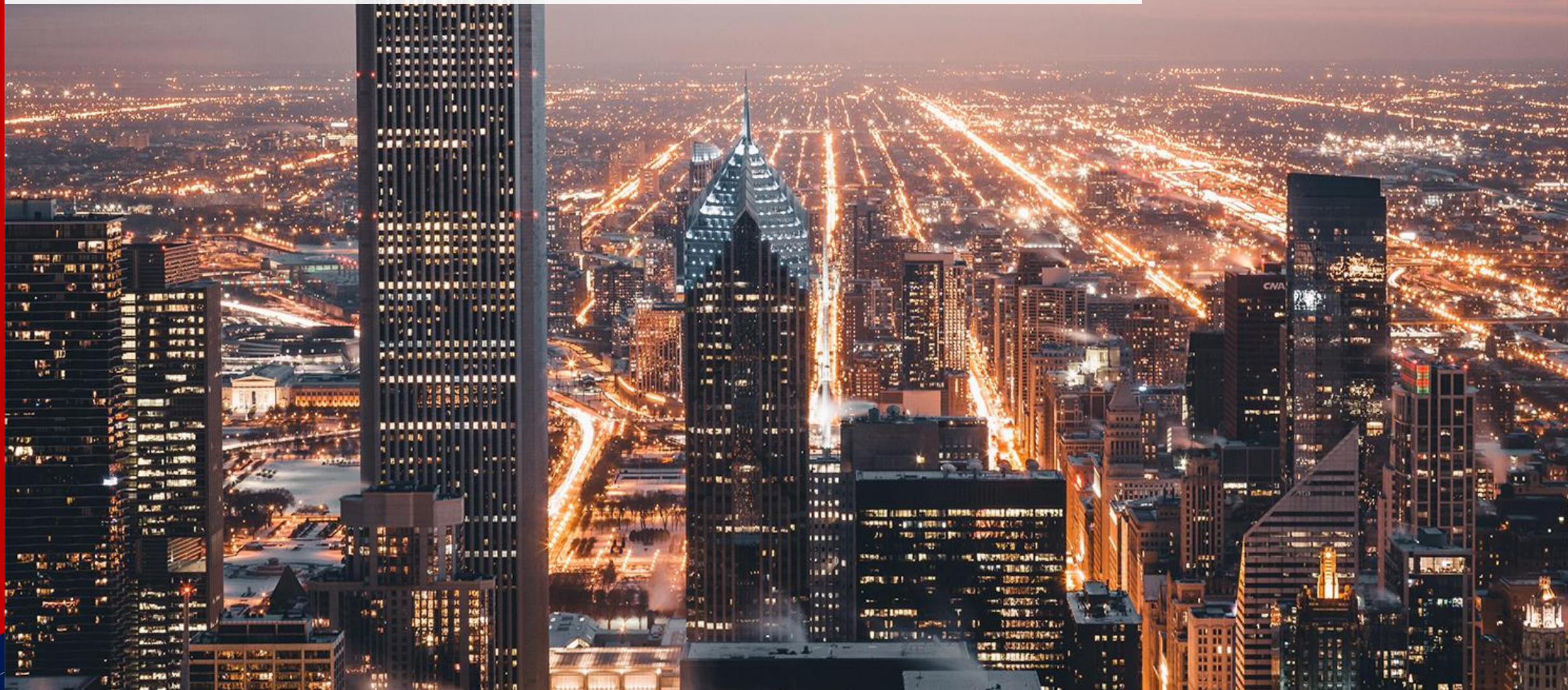
age: percent of housing units built before 1939

volact: new homeowner policies plus renewals minus cancellations and non-renewals per 100 housing units

involact: new FAIR plan policies and renewals per 100 housing units

income: median family income

Business Goal!

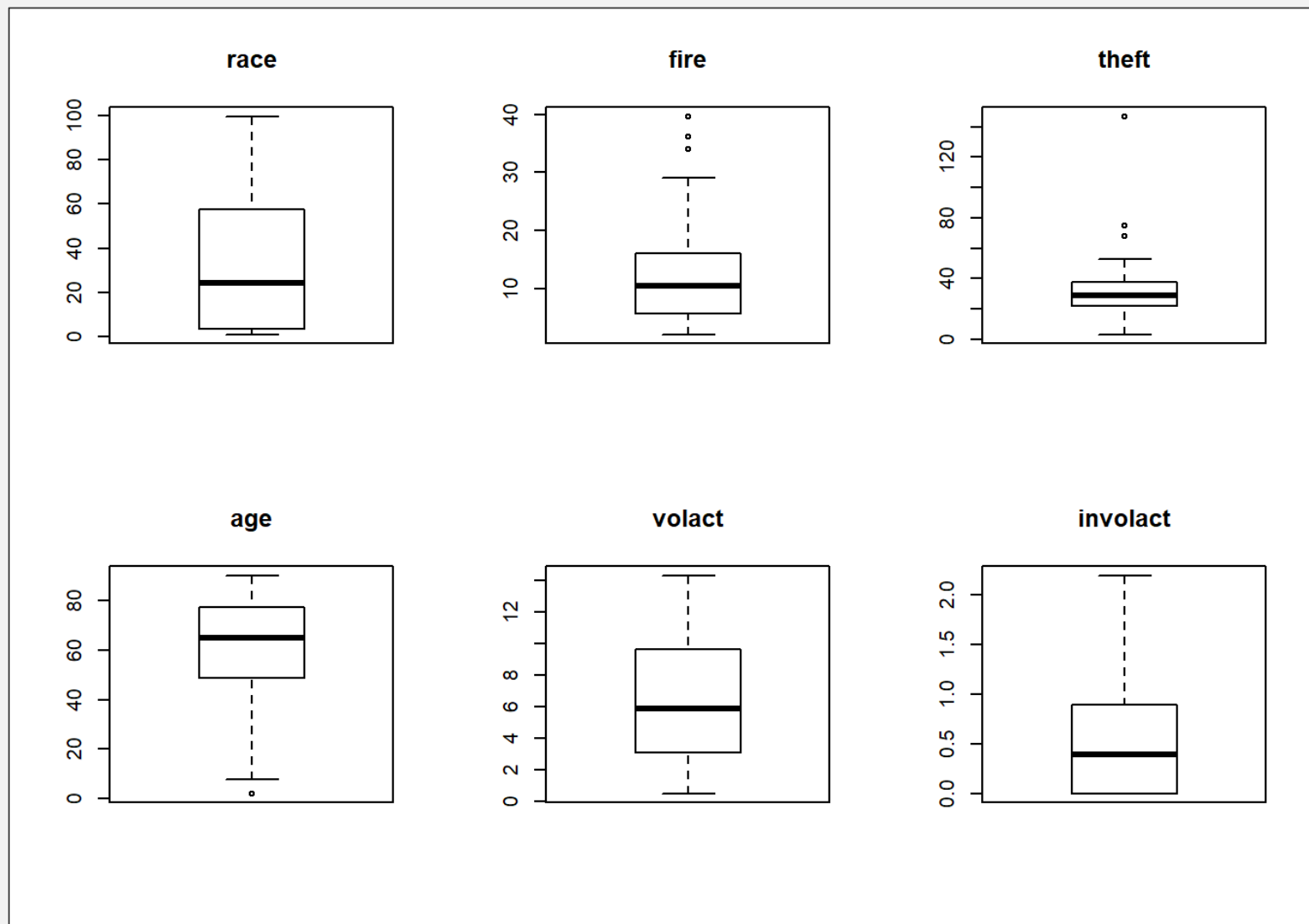


Initial Data Analysis

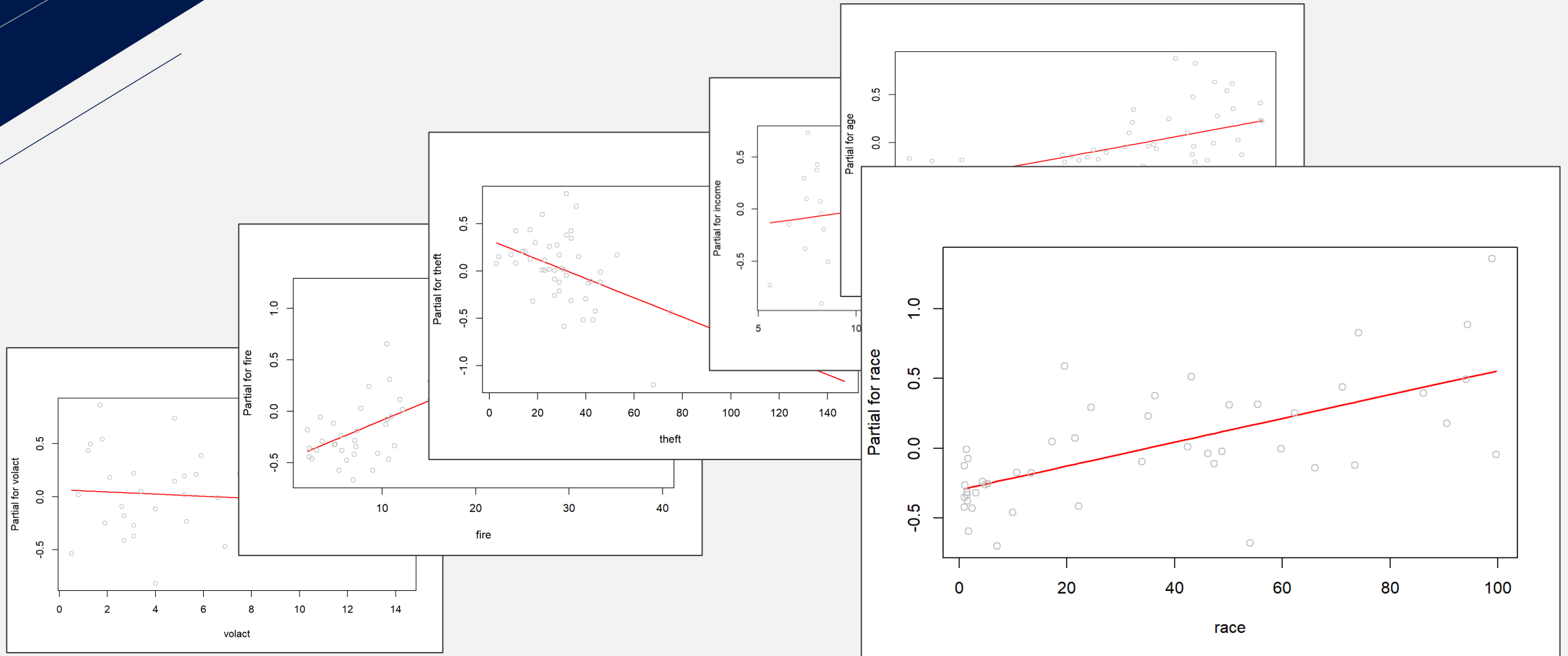
summary(chicago)				
##	race	fire	theft	age
##	Min. : 1.00	Min. : 2.00	Min. : 3.00	Min. : 2.00
##	1st Qu.: 3.75	1st Qu.: 5.65	1st Qu.: 22.00	1st Qu.:48.60
##	Median :24.50	Median :10.40	Median : 29.00	Median :65.00
##	Mean :34.99	Mean :12.28	Mean : 32.36	Mean :60.33
##	3rd Qu.:57.65	3rd Qu.:16.05	3rd Qu.: 38.00	3rd Qu.:77.30
##	Max. :99.70	Max. :39.70	Max. :147.00	Max. :90.10
##	volact	involact	income	
##	Min. : 0.50	Min. :0.0000	Min. : 5583	
##	1st Qu.: 3.10	1st Qu.:0.0000	1st Qu.: 8447	
##	Median : 5.90	Median :0.4000	Median :10694	
##	Mean : 6.53	Mean :0.6149	Mean :10696	
##	3rd Qu.: 9.65	3rd Qu.:0.9000	3rd Qu.:11989	
##	Max. :14.30	Max. :2.2000	Max. :21480	

summary(ch)				
##	race	fire	theft	age
##	Min. : 1.00	Min. : 2.00	Min. : 3.00	Min. : 2.00
##	1st Qu.: 3.75	1st Qu.: 5.65	1st Qu.: 22.00	1st Qu.:48.60
##	Median :24.50	Median :10.40	Median : 29.00	Median :65.00
##	Mean :34.99	Mean :12.28	Mean : 32.36	Mean :60.33
##	3rd Qu.:57.65	3rd Qu.:16.05	3rd Qu.: 38.00	3rd Qu.:77.30
##	Max. :99.70	Max. :39.70	Max. :147.00	Max. :90.10
##	volact	involact	income	
##	Min. : 0.50	Min. :0.0000	Min. : 5.583	
##	1st Qu.: 3.10	1st Qu.:0.0000	1st Qu.: 8.447	
##	Median : 5.90	Median :0.4000	Median :10.694	
##	Mean : 6.53	Mean :0.6149	Mean :10.696	
##	3rd Qu.: 9.65	3rd Qu.:0.9000	3rd Qu.:11.989	
##	Max. :14.30	Max. :2.2000	Max. :21.480	

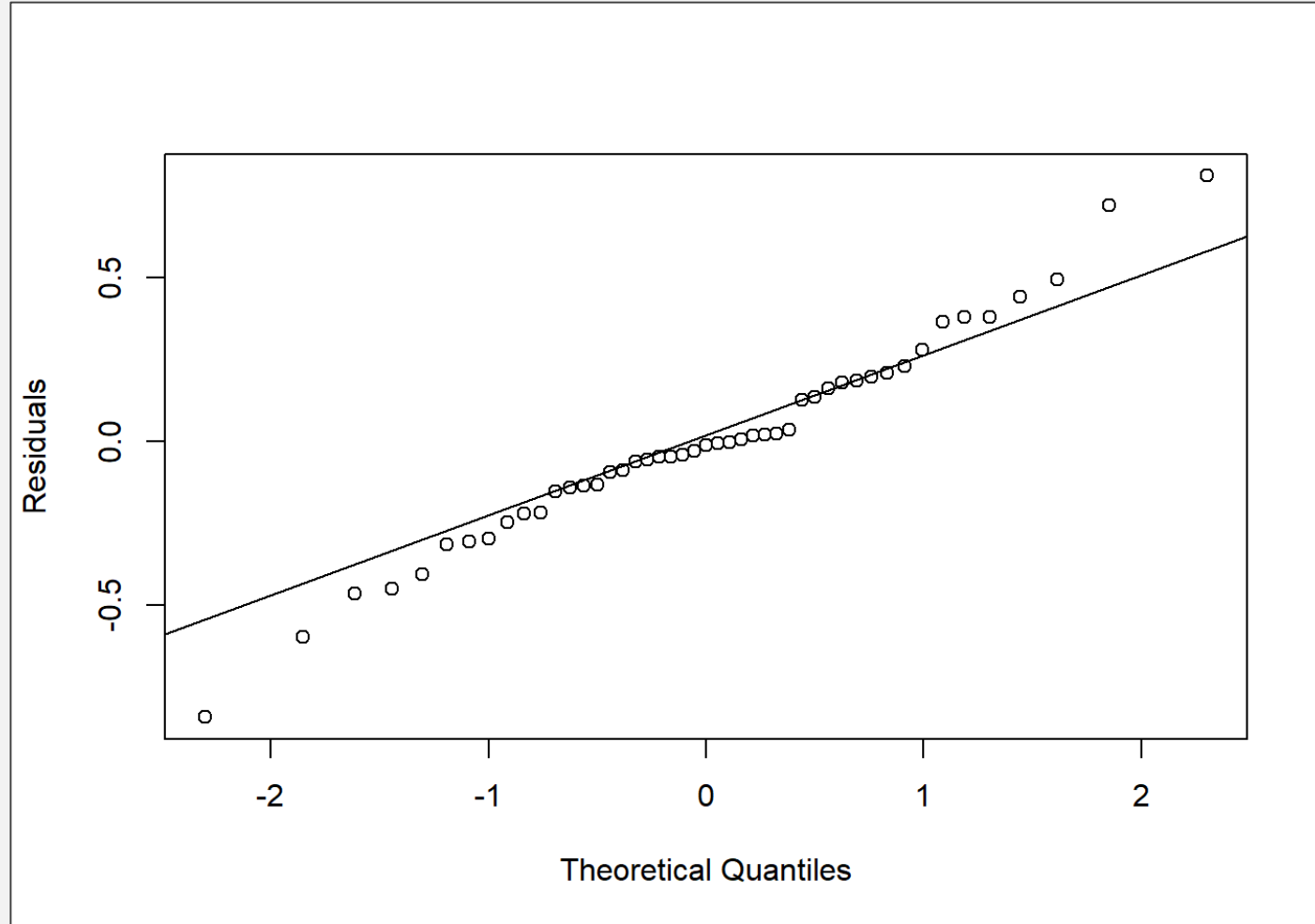
Initial Data Analysis



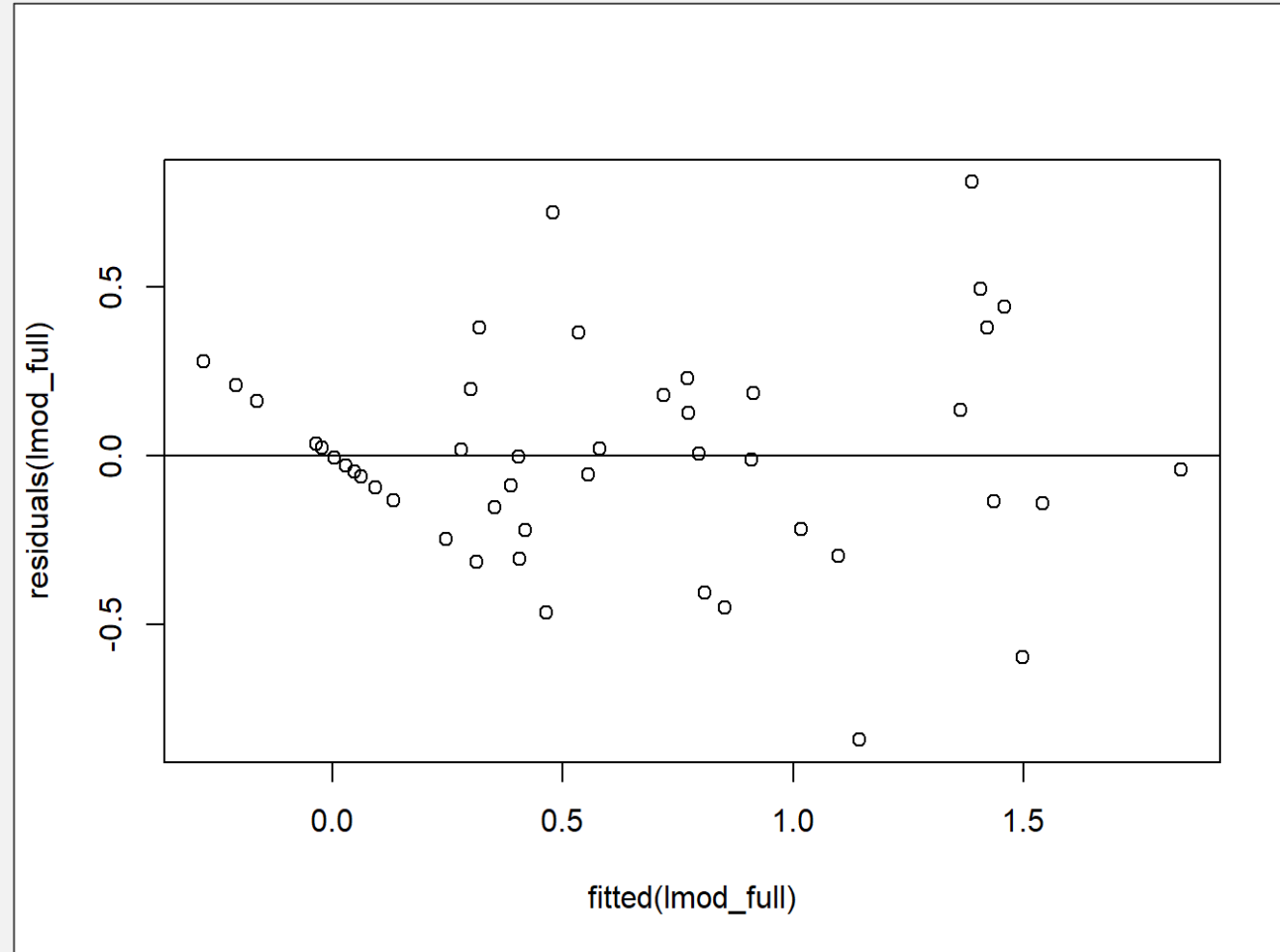
Assumption: Linearity



Assumption: Normality



Assumption: Constant Variance



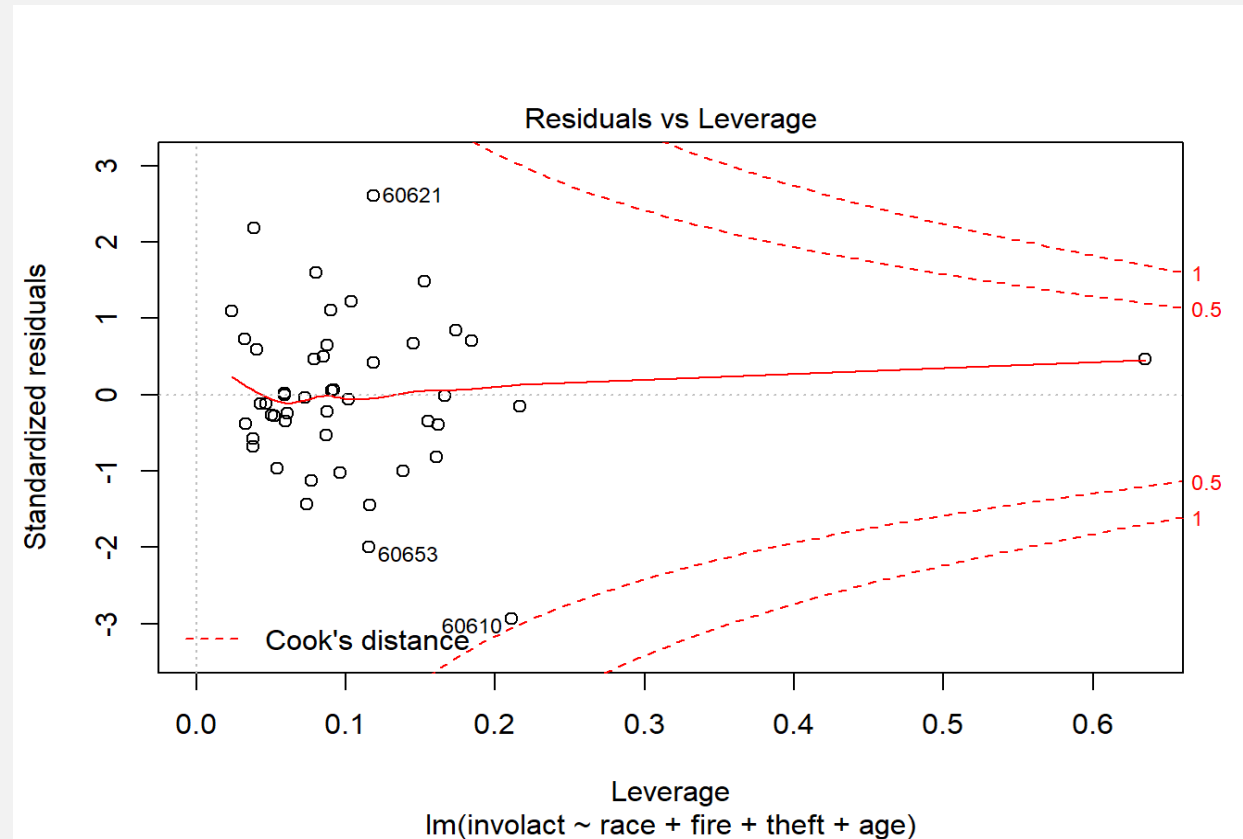
Collinearity Check

```
vif(X)
##      race      fire      theft      age      volact      income
## 3.491088 2.798840 1.684571 2.266203 4.851903 3.153110
```

Model without **Volact** performs well as it have relatively high VIF

Income also proved to be insignificant

Influential Observations



After validating by removing and adding back different outliers
No Influential Observations

Final Model

involact ~ 0.008104 x **race**
+ 0.039080 x **fire**
+ (-0.009592) x **theft**
+ 0.007210x **age**

R-squared: 0.7472, Adjusted R-squared: 0.7231

References

- Jackson, Kenneth T. *Crabgrass Frontier: The Suburbanization of the United States*. New York: Oxford UP, 1985. Print.
- Squires, Gregory D. "Racial Profiling, Insurance Style: Insurance Redlining and the Uneven Development of Metropolitan Areas." *Journal of Urban Affairs* 25.4 (2003): 391-410. Print.
- Badger, Emily. "Redlining: Still a thing." *The Washington Post*. WP Company, 28 May 2015. Web. 19 Dec. 2016.
- Tootell, G. M. B. "Redlining in Boston: Do Mortgage Lenders Discriminate Against Neighborhoods?" *The Quarterly Journal of Economics* 111.4 (1996): 1049-079. Print.

Full Report

www.doctordatah.com/Chicago-redlining-regression-report





Thank You 😊



Any Questions?