Effect of County Population Size on Median Income & Unemployment

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What is the effect of county populations?

- Will the population size of a county affect the following metrics?
  - Median Household Income
  - Unemployment Rate
- Use two-tailed z-tests to determine if county population size creates a statistically significant change in mean, as compared to the US mean.
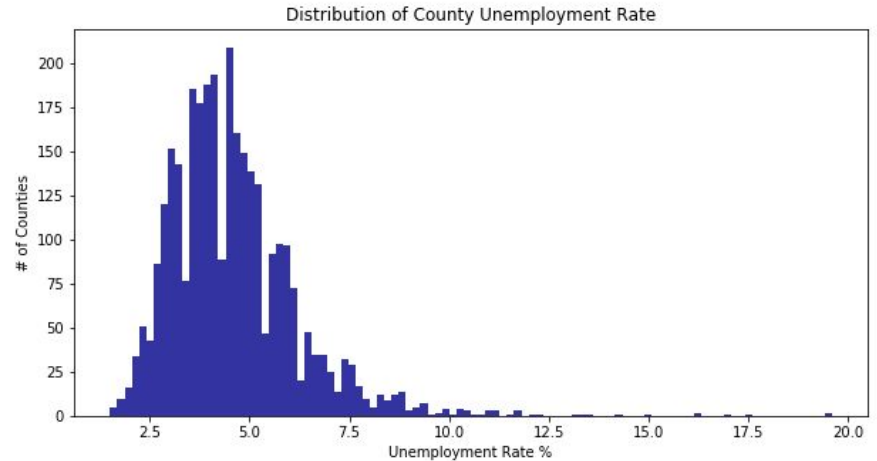- Evaluate tests by comparing the p-values with our alpha (0.05).

Data Sources

- US Census Bureau API:
  - API: http://api.census.gov/data/2018/pep/population
  - County Populations

- USDA County Level Dataset:
  - https://www.ers.usda.gov/data-products/county-level-data-sets/download-data/
  - County unemployment rate
  - County Median Income

Population Dataset - All US Counties

Distribution of County Median Income
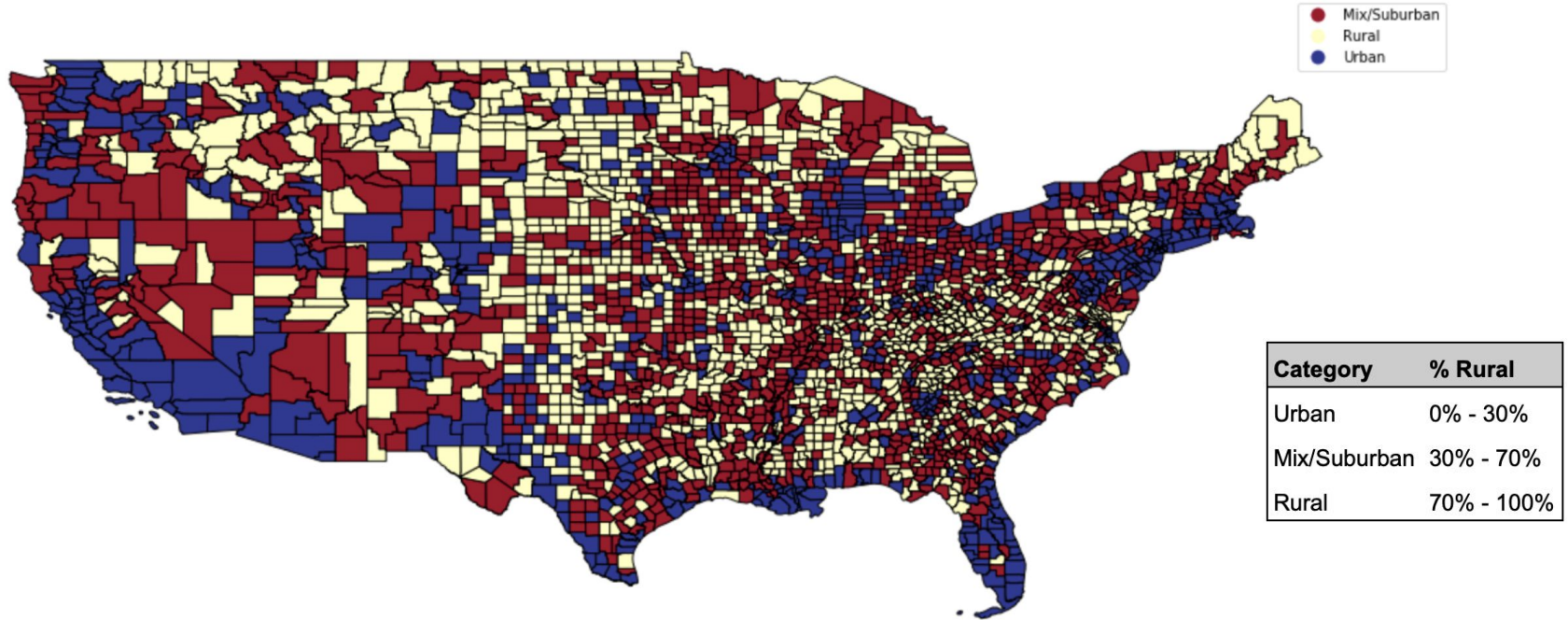
Distribution of County Unemployment Rate
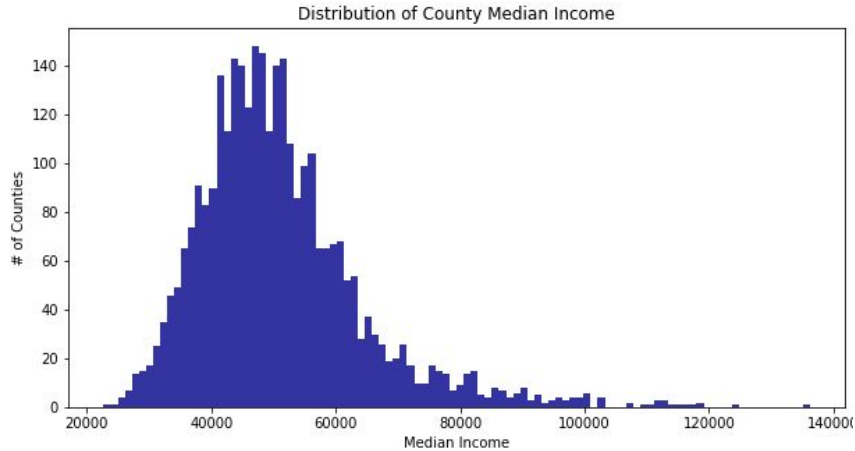
- # of counties: 3,141
- Median Income Summary Stats:
  - μ: $51,090.53
  - σ: $13,497.97

- # of counties: 3,141
- Unemployment Summary Stats:
  - μ: 4.60%
  - σ: 1.67%

County Population Categories

Legend:
- Mix/Suburban
- Rural
- Urban

Category	% Rural
Urban	0% - 30%
Mix/Suburban	30% - 70%
Rural	70% - 100%

Urban

H_0 : County median income is not affected by urban populations
H_1 : County median income is affected by urban populations

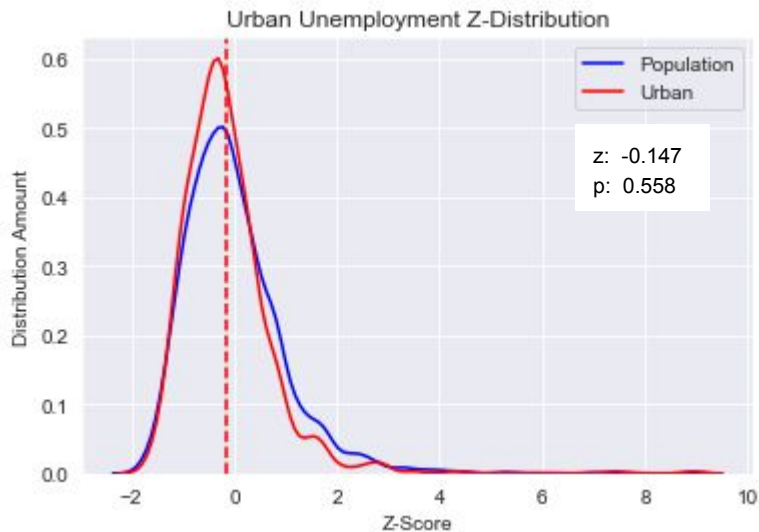|	
μ:	$51,090
σ:	$13,497
x̄:	$60,977

Fail to Reject H_0

H_0 : County unemployment rate is not affected by urban populations (pop_mean == urban_mean)
H_1 : County unemployment rate is affected by urban populations (pop_mean ≠ urban_mean)

μ:	4.59%
σ:	1.66%
x̄:	4.35%

Fail to Reject H_0

Urban Income Z-Distribution

z: 0.732
p: 0.232

Urban Unemployment Z-Distribution

z: -0.147
p: 0.558

Mixed / Suburban

H_0 : County median income is not affected by mixed / suburban populations

H_1 : County median income is affected by mixed / suburban populations

μ:	$50,090
σ:	$13,497
x̄:	$50,167

Fail to Reject H_0
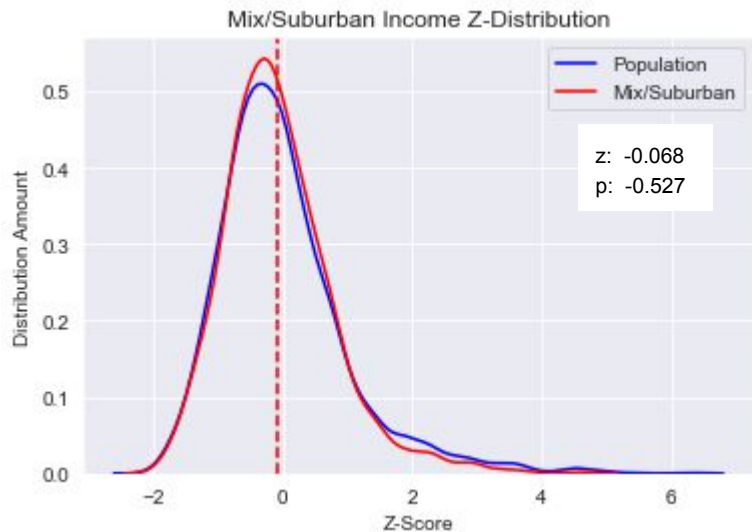
z: -0.068
p: -0.527

H_0 : County unemployment rate is not affected by mixed / suburban populations (pop_mean == mixed /suburban_mean)

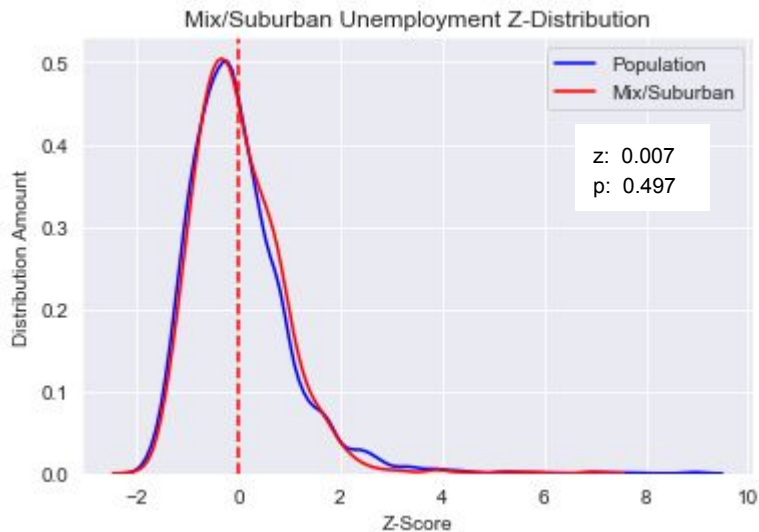H_1 : County unemployment rate is affected by mixed suburban populations (pop_mean ≠ mixed /suburban_mean)

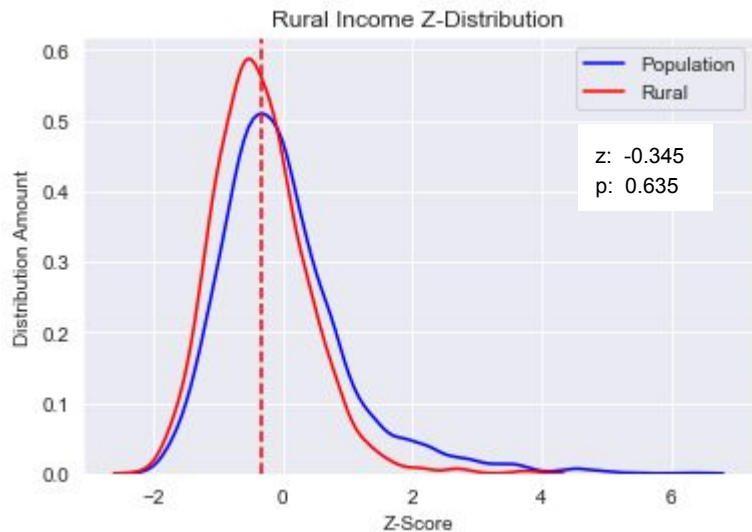|	
μ:	4.59%
σ:	1.66%
x̄:	4.60%

Fail to Reject H_0

z: 0.007
p: 0.497

Rural

H_0 : County median income is not affected by rural populations
H_1 : County median income is affected by rural populations

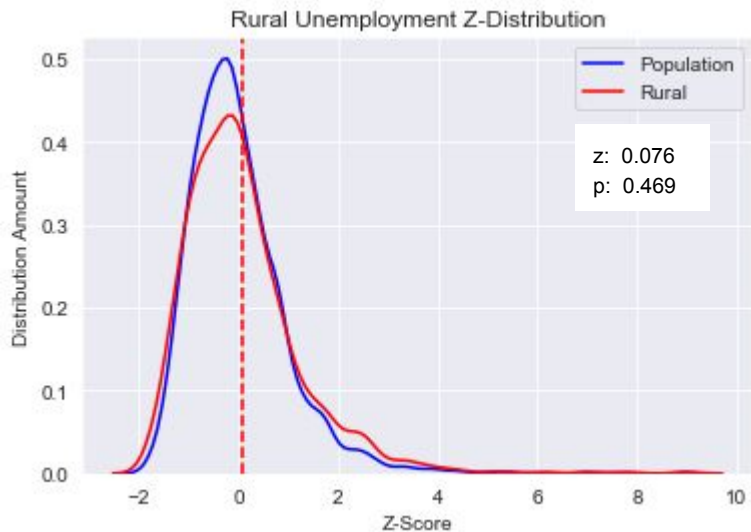|	
μ:	$51,090
σ:	$13,497
x̄:	$46,423

Fail to Reject H_0

H_0 : County unemployment rate is not affected by rural populations (pop_mean == rural_mean)
H_1 : County unemployment rate is affected by rural populations (pop_mean ≠ rural_mean)

μ:	4.59%
σ:	1.66%
x̄:	4.72%

Fail to Reject H_0

Rural Income Z-Distribution

z: -0.345
p: 0.635

Rural Unemployment Z-Distribution

z: 0.076
p: 0.469

Conclusion

- The population size of a county does not create a significantly different change in median income or unemployment metrics
- Urban counties have a higher median income by $9k, lower unemployment rate by .35% from our sample
- Rural counties have a lower median income by $4k, higher unemployment rate by .20% from our sample