

STAT506 Problem Set 3

Meng-Ni Ho

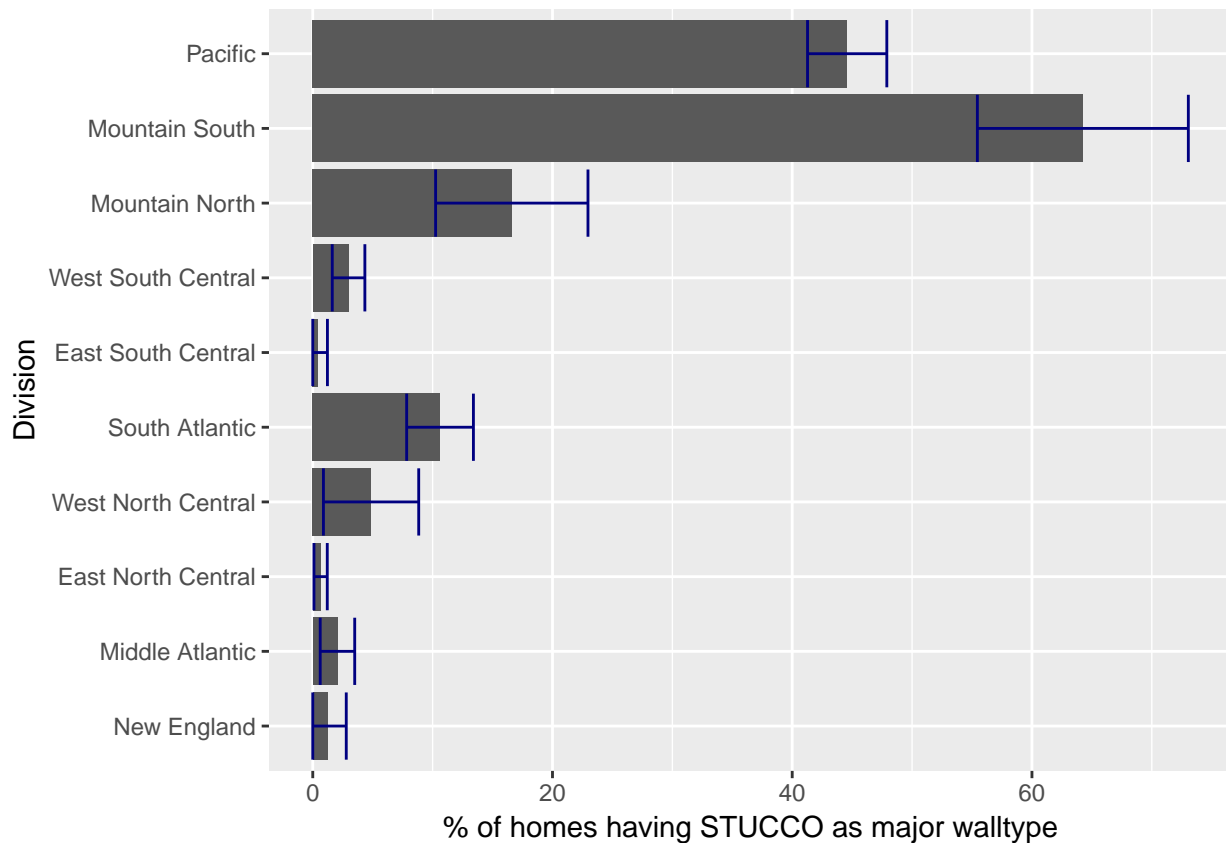
11/17/2018

Question 1

part a: What percent of homes have stucco construction as the major outside wall material within each division? Which division has the highest proportion? Which the lowest?

Answer: highest = Mountain South; lowest: East South Central

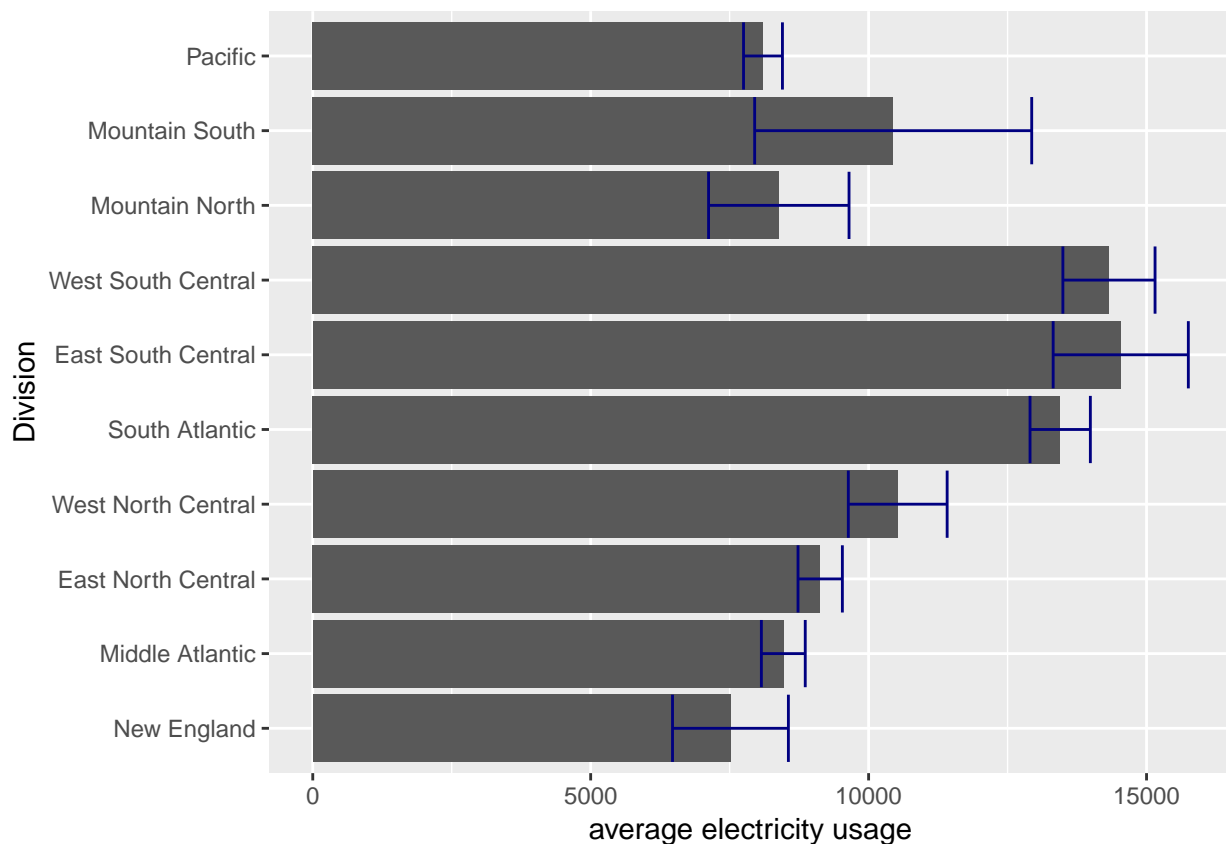
```
##           division    point_estimate
## 1: East South Central 0.4%( 0.0,  1.2)
## 2: East North Central 0.7%( 0.1,  1.2)
## 3:      New England  1.2%( 0.0,  2.8)
## 4:  Middle Atlantic  2.1%( 0.6,  3.5)
## 5: West South Central 3.0%( 1.6,  4.3)
## 6: West North Central 4.9%( 0.9,  8.8)
## 7:   South Atlantic 10.6%( 7.8, 13.4)
## 8:   Mountain North 16.6%(10.2, 23.0)
## 9:      Pacific 44.6%(41.3, 47.9)
## 10:  Mountain South 64.2%(55.4, 73.0)
```



**Part b: What is average total electricity usage in kilowatt hours in each division?
Answer the same question stratified by urban and rural status.**

1. Average total electricity usage in kilowatt hours in each division

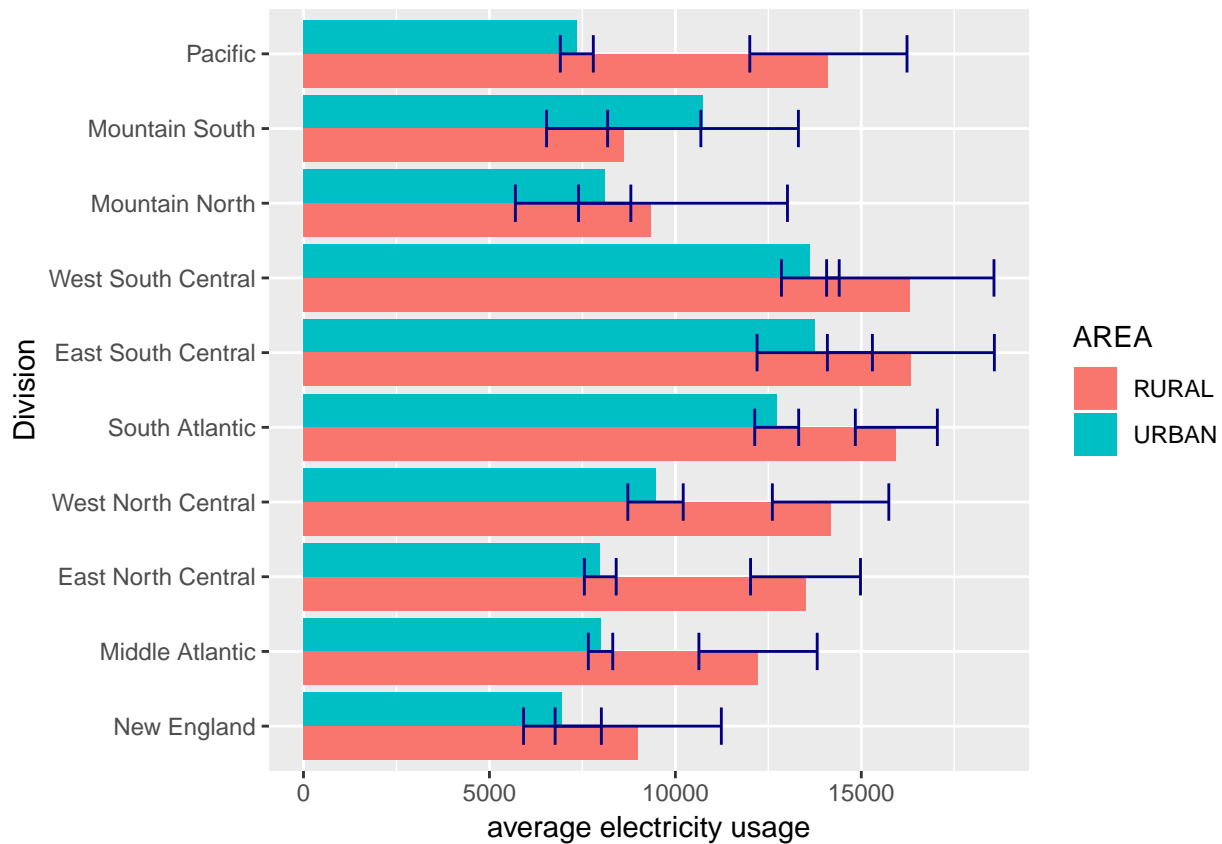
```
##          division      point_estimate
## 1: East South Central 14536(13320, 15752)
## 2: West South Central 14324(13495, 15153)
## 3:   South Atlantic  13447(12904, 13989)
## 4: West North Central 10524(9635, 11413)
## 5:   Mountain South  10442(7950, 12934)
## 6: East North Central  9129(8730, 9528)
## 7:   Middle Atlantic  8465(8071, 8860)
## 8:   Mountain North  8384(7121, 9648)
## 9:         Pacific    8100(7750, 8450)
## 10:   New England    7515(6472, 8557)
```



2. Average total electricity usage in kilowatt hours in each division, stratify by urban and rural status

```
##          division      RURAL      URBAN
## 1   New England    9001(6766, 11236)  6964(5918, 8010)
## 2   Middle Atlantic 12223(10633, 13814)  7987(7659, 8316)
## 3   East North Central 13500(12022, 14978)  7980(7552, 8408)
## 4   West North Central 14174(12608, 15740)  9467(8722, 10211)
## 5   South Atlantic  15942(14839, 17045) 12725(12134, 13316)
## 6   East South Central 16333(14088, 18578) 13747(12197, 15298)
## 7   West South Central 16317(14067, 18567) 13629(12852, 14405)
## 8   Mountain North   9356(5698, 13014)  8099(7396, 8803)
```

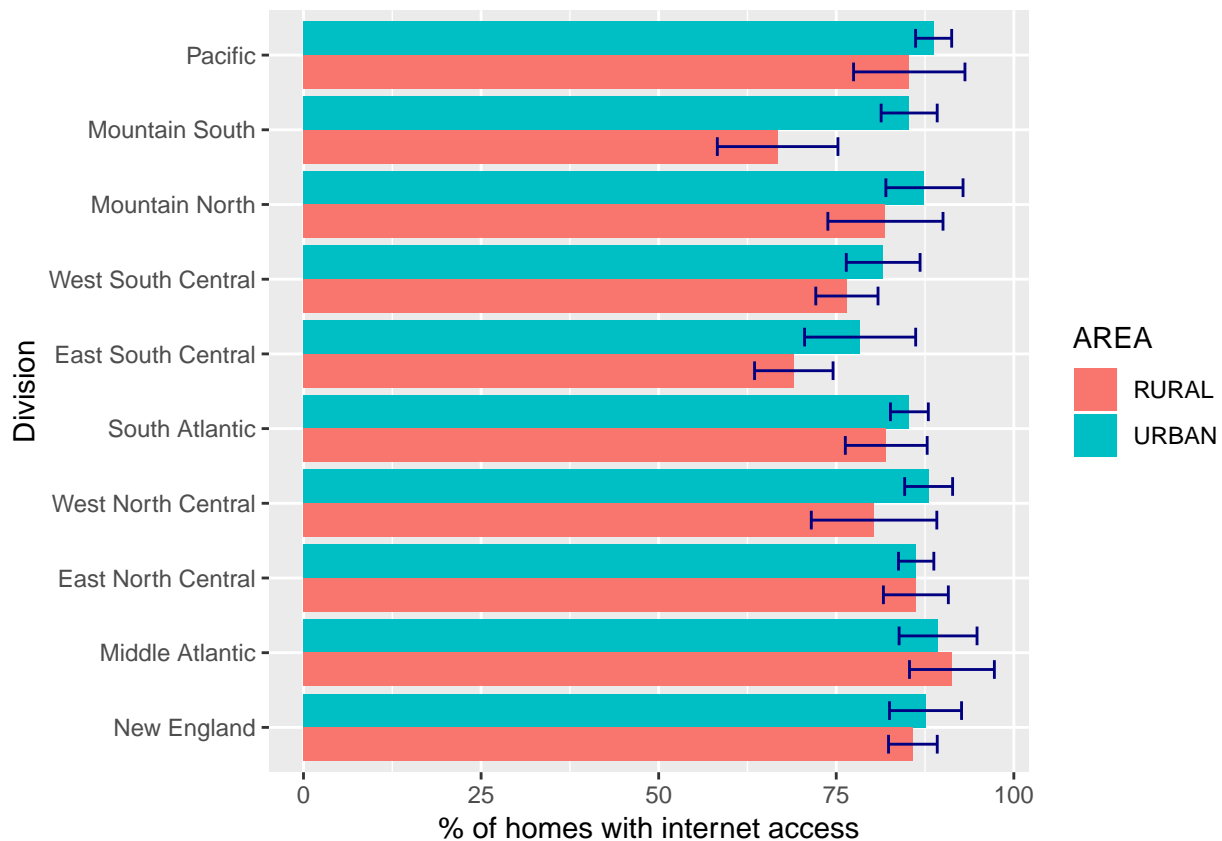
```
## 9      Mountain South  8610(6536, 10685) 10743(8178, 13308)
## 10      Pacific 14115(12001, 16229) 7349(6905, 7793)
```



Part c: Which division has the largest disparity between urban and rural areas in terms of the proportion of homes with internet access?

Answer: Mountain South

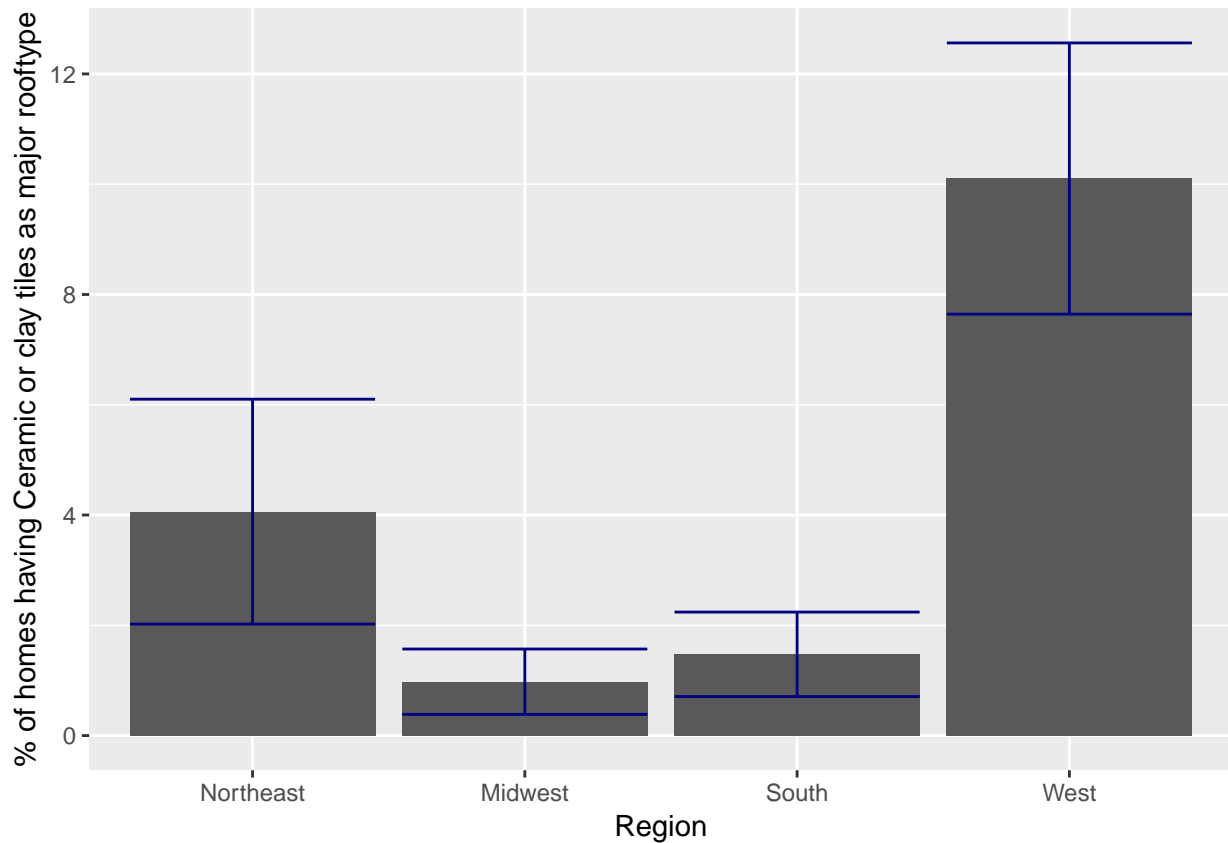
##	division	RURAL	URBAN	DISPARITY
## 1:	New England	85.8%(82.4, 89.2)	87.6%(82.5, 92.6)	1.78
## 2:	Middle Atlantic	91.3%(85.3, 97.3)	89.3%(83.8, 94.8)	-1.95
## 3:	East North Central	86.2%(81.6, 90.8)	86.2%(83.8, 88.7)	0.04
## 4:	West North Central	80.3%(71.5, 89.2)	88.0%(84.6, 91.4)	7.67
## 5:	South Atlantic	82.0%(76.3, 87.8)	85.3%(82.6, 88.0)	3.26
## 6:	East South Central	69.0%(63.5, 74.5)	78.4%(70.5, 86.2)	9.33
## 7:	West South Central	76.5%(72.1, 80.9)	81.6%(76.4, 86.8)	5.11
## 8:	Mountain North	81.9%(73.8, 90.0)	87.4%(82.0, 92.8)	5.49
## 9:	Mountain South	66.8%(58.3, 75.2)	85.3%(81.3, 89.2)	18.52
## 10:	Pacific	85.3%(77.4, 93.1)	88.7%(86.2, 91.2)	3.43



Part d: What percent of homes have Ceramic or clay tiles as the major outside ROOFTYPE within each region? Which region has the highest proportion? Which the lowest?

Answer: highest = West; lowest: Midwest

```
##      region    point_estimate
## 1:  Midwest  1.0%( 0.4,  1.6)
## 2:   South  1.5%( 0.7,  2.2)
## 3: Northeast  4.1%( 2.0,  6.1)
## 4:    West 10.1%( 7.6, 12.6)
```



Question 2

```
##
##
##          FWER          FDR    Sensitivity    Specificity
## -----
## uncorrected  0.989  0.2944306          1    0.9500889
## Bonferroni   0.045  0.0042424          1    0.9994778
## Holm         0.049  0.0046818          1    0.9994222
## BH          0.375  0.0444600          1    0.9942333
## BY          0.089  0.0086970          1    0.9989222
```

Comment: Since FWER should be less than or equal to 0.05, using Bonferroni and Holm perform a better adjustment comparing to BH, BY. Additionally, the multiple correction test is not modify for sensitivity and specificity, therefore, the corrected results in specificity and sensitivity do not differ much from corrected result.