

College tuition, diversity, and pay

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Contents

0.1	Introduction	1
0.2	Diversity dataset	2
0.3	Tuition cost dataset	7
0.4	The historical tuition dataset	16
0.5	Salary potential dataset	18
0.6	Conclusions	23

0.1 Introduction

- Many people are interested to know about the tuition, costs, diversity and potential salary when searching for college.
- In this project, we want to analyze:
 1. Diversity among schools across US
 2. Tuition costs across different states
 3. Historical trends of tuition
 4. Average potential salary for graduates from different universities
- We have 4 datasets with 23 variables and more than 50000 observations.

0.2 Diversity dataset

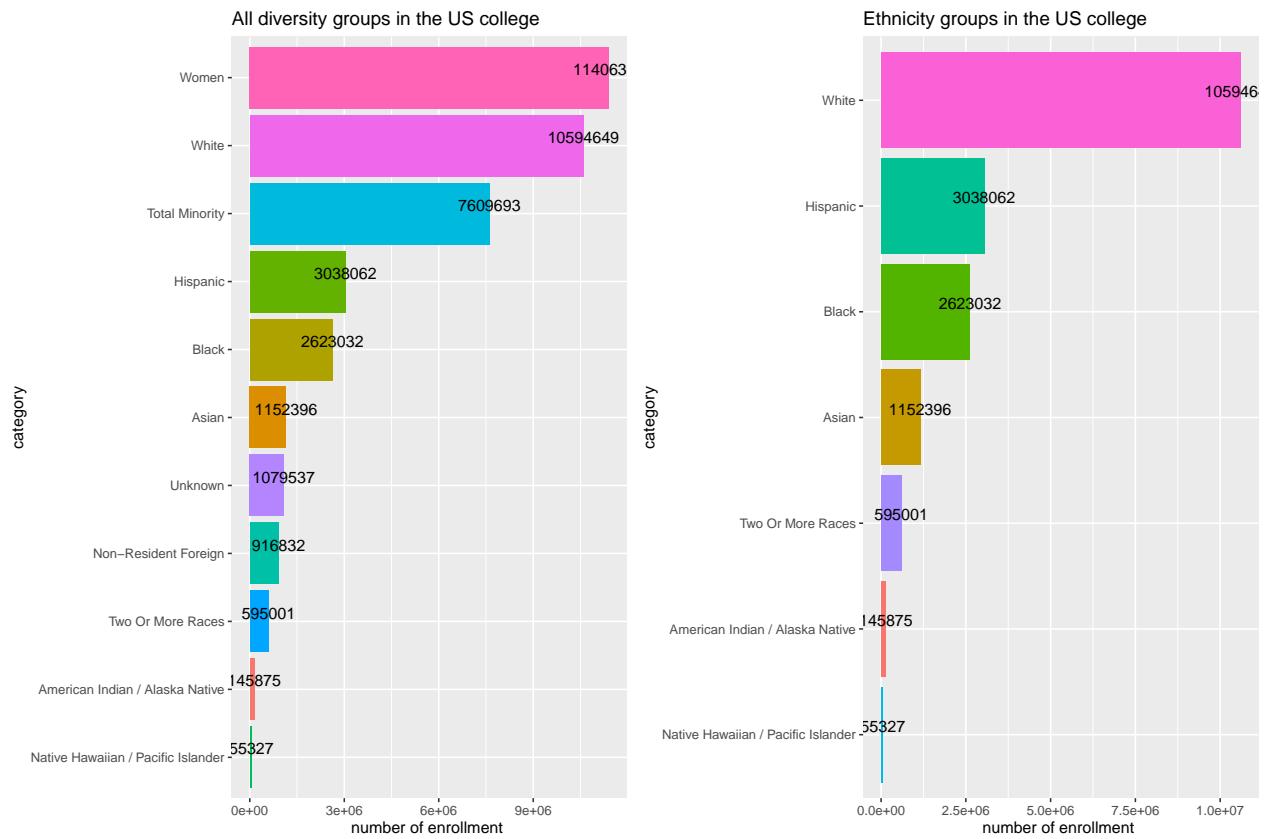
```
diversity_school %>% glimpse()

## #> #> #> #> #> #>
```

```
## #> Rows: 50,655
## #> Columns: 5
## #> #> #> #> #>
## #> $ name <chr> "University of Phoenix-Arizona", "University of Ph...
## #> $ total_enrollment <dbl> 195059, 195059, 195059, 195059, 195059, 19...
## #> $ state <chr> "Arizona", "Arizona", "Arizona", "Arizona", "Arizo...
## #> $ category <chr> "Women", "American Indian / Alaska Native", "Asian...
## #> $ enrollment <dbl> 134722, 876, 1959, 31455, 13984, 1019, 58209, 1903...
```

name	total_enrollment	state	category	enrollment
University of Phoenix-Arizona	195059	Arizona	Women	134722
University of Phoenix-Arizona	195059	Arizona	American Indian / Alaska Native	876
University of Phoenix-Arizona	195059	Arizona	Asian	1959
University of Phoenix-Arizona	195059	Arizona	Black	31455
University of Phoenix-Arizona	195059	Arizona	Hispanic	13984
University of Phoenix-Arizona	195059	Arizona	Native Hawaiian / Pacific Islander	1019

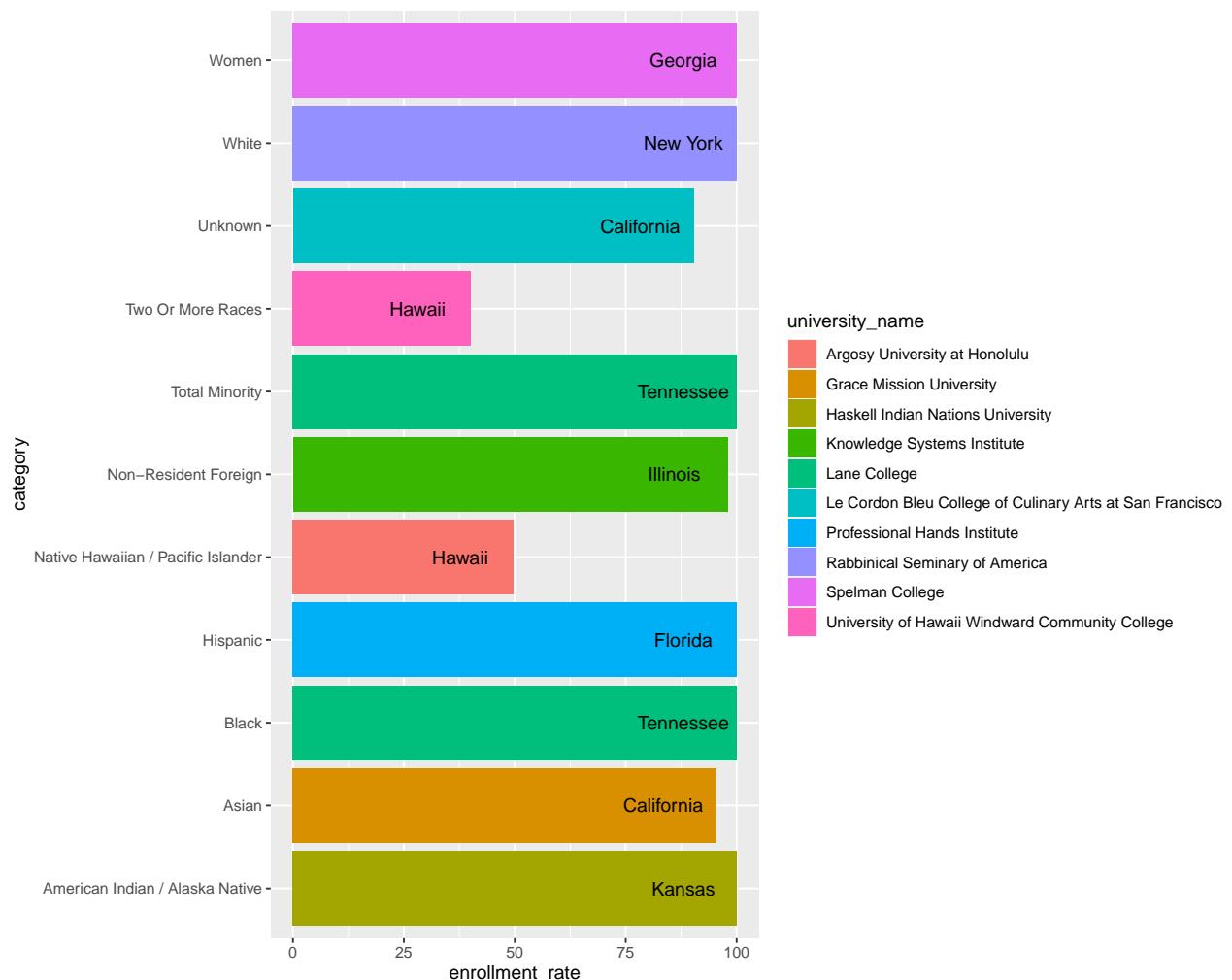
0.2.1 Bar chart of all diversity categories and ethnicity groups in the US college



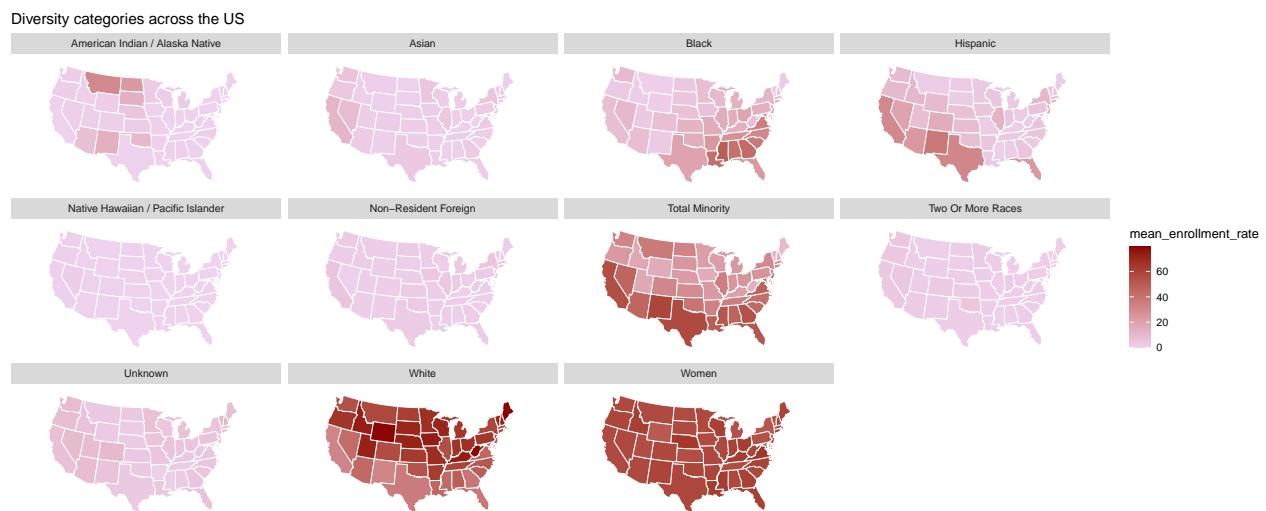
0.2.2 Finding the most diverse campus for each diversity category

category	university_name	state	etc
American Indian / Alaska Native	Haskell Indian Nations University	Kansas	
Asian	Grace Mission University	California	
Black	Lane College	Tennessee	
Hispanic	Professional Hands Institute	Florida	
Native Hawaiian / Pacific Islander	Argosy University at Honolulu	Hawaii	
Non-Resident Foreign	Knowledge Systems Institute	Illinois	
Total Minority	Lane College	Tennessee	
Two Or More Races	University of Hawaii Windward Community College	Hawaii	
Unknown	Le Cordon Bleu College of Culinary Arts at San Francisco	California	
White	Rabbinical Seminary of America	New York	
Women	Spelman College	Georgia	

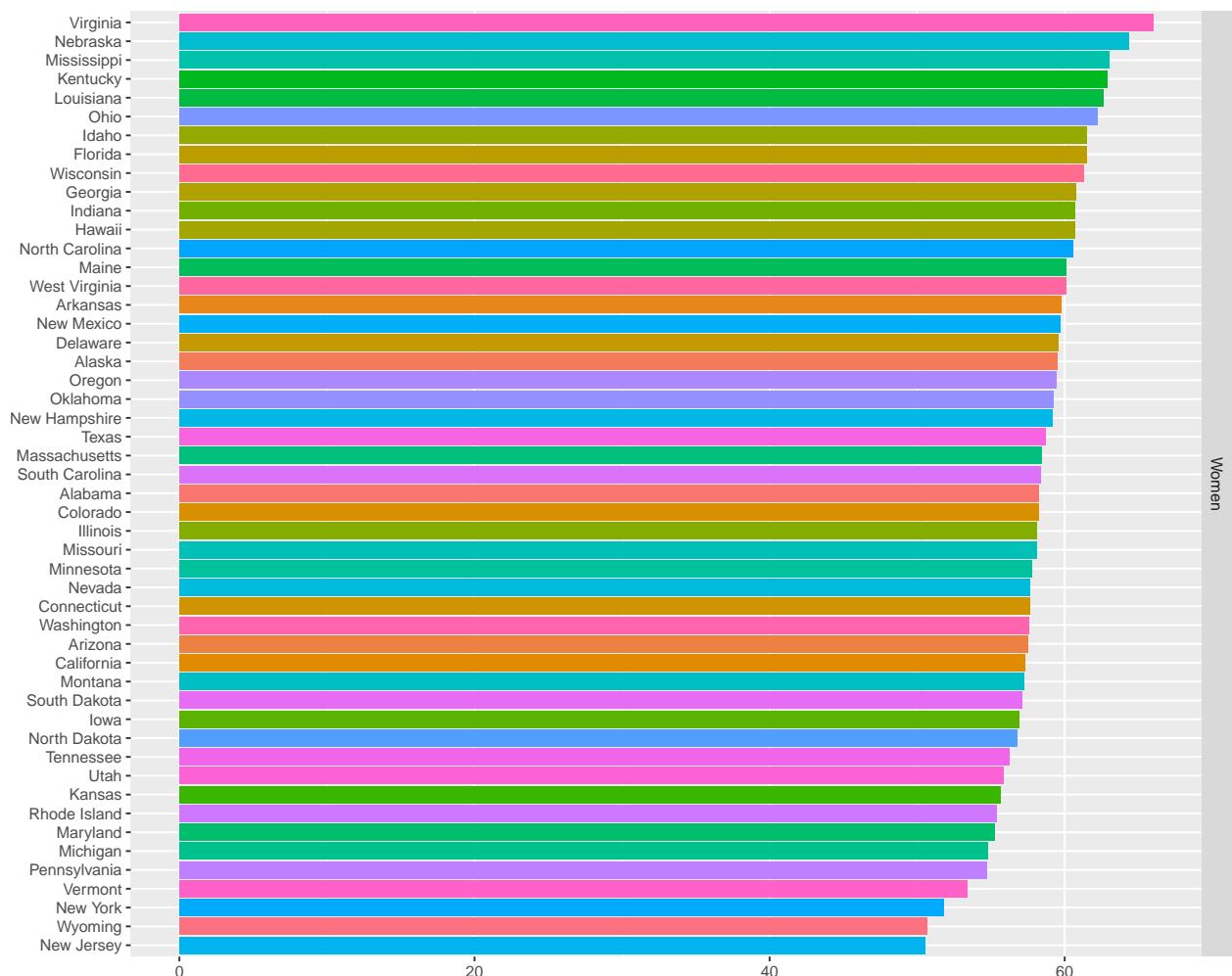
0.2.3 Finding the most diverse campus for each diversity category



0.2.4 Diversity map of the US for each diversity group



0.2.5 Women enrollment rate across the US



0.3 Tuition cost dataset

```
tuition_cost %>% glimpse()

## # Rows: 2,973

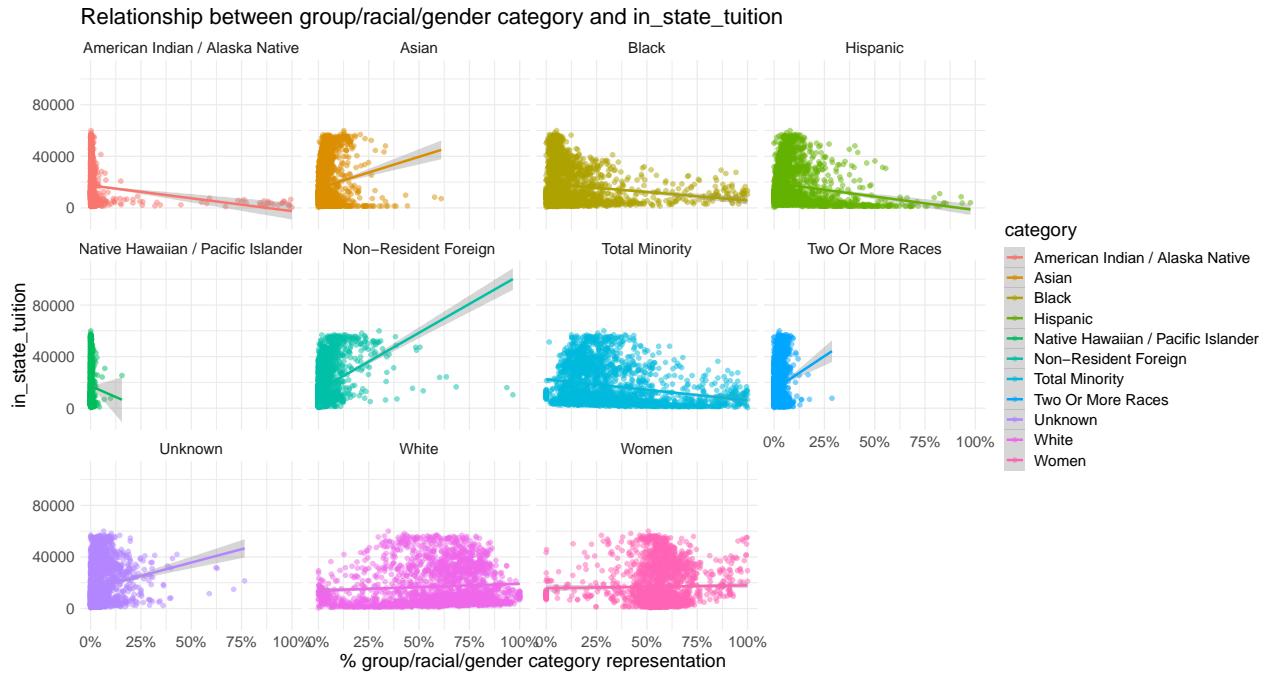
## # Columns: 10

## $ name           <chr> "Aaniiih Nakoda College", "Abilene Christian U...
## $ state          <chr> "Montana", "Texas", "Georgia", "Minnesota", "C...
## $ state_code     <chr> "MT", "TX", "GA", "MN", "CA", "CO", "NY", "NY"...
## $ type           <chr> "Public", "Private", "Public", "For Profit", "...
## $ degree_length  <chr> "2 Year", "4 Year", "2 Year", "2 Year", "4 Yea...
## $ room_and_board <dbl> NA, 10350, 8474, NA, 16648, 8782, 16030, 11660...
## $ in_state_tuition <dbl> 2380, 34850, 4128, 17661, 27810, 9440, 38660, ...
## $ in_state_total    <dbl> 2380, 45200, 12602, 17661, 44458, 18222, 54690...
## $ out_of_state_tuition <dbl> 2380, 34850, 12550, 17661, 27810, 20456, 38660...
## $ out_of_state_total   <dbl> 2380, 45200, 21024, 17661, 44458, 29238, 54690...
```

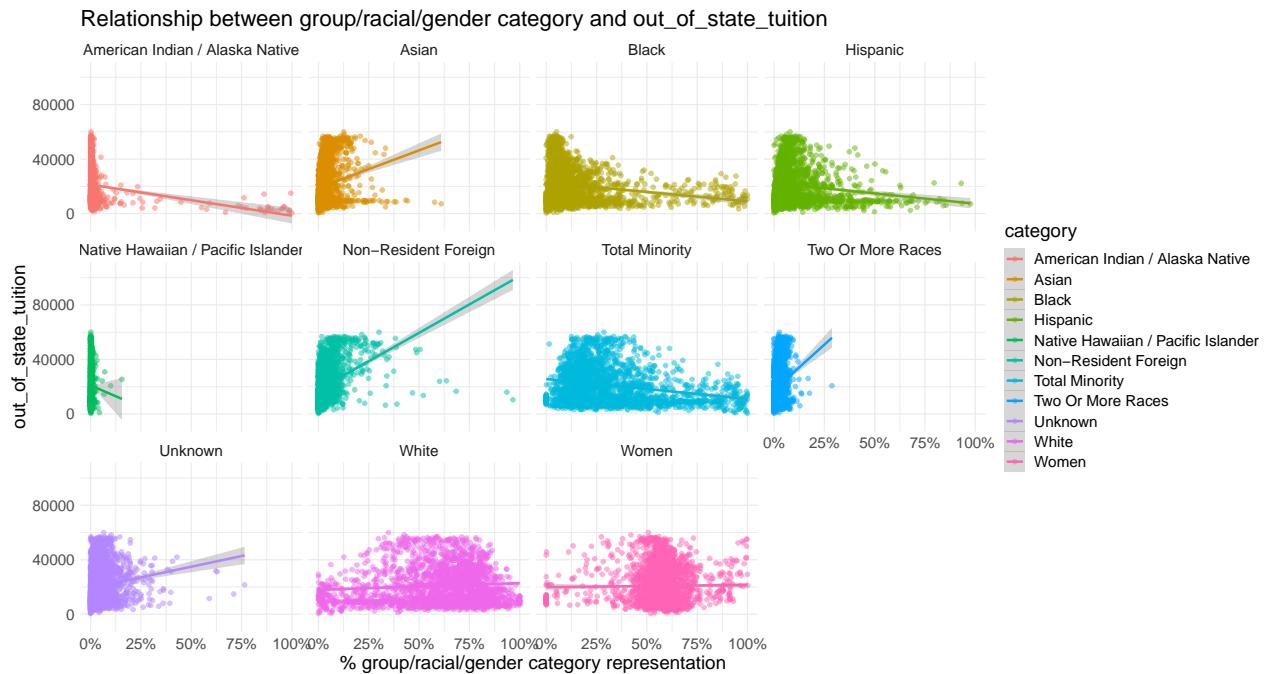
0.3.1 Merge tuition cost dataset and diversity dataset

- We are interested to know whether there is any correlation between enrollment rate and each diversity group
 - We have done analysis for both in state and out of state tuition in the next slides

0.3.2 Relationship between enrollment rate and in-state-tuition per each diversity group

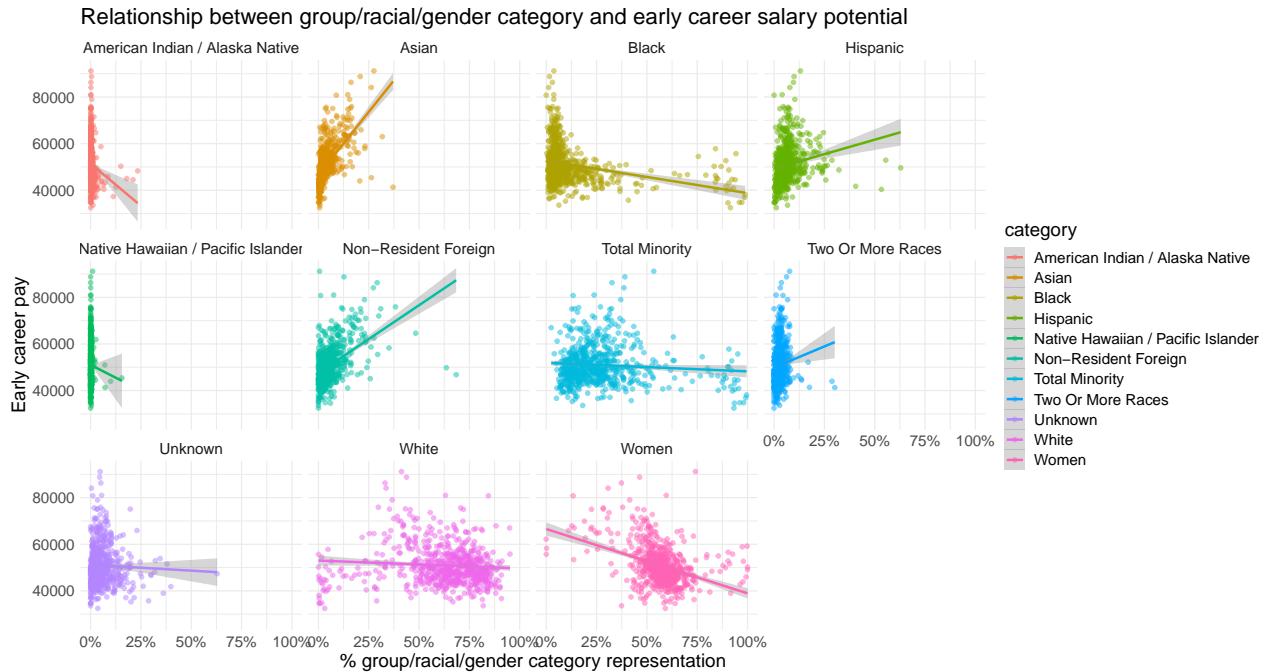


0.3.3 Relationship between enrollment rate and out-of-state tuition per each diversity group

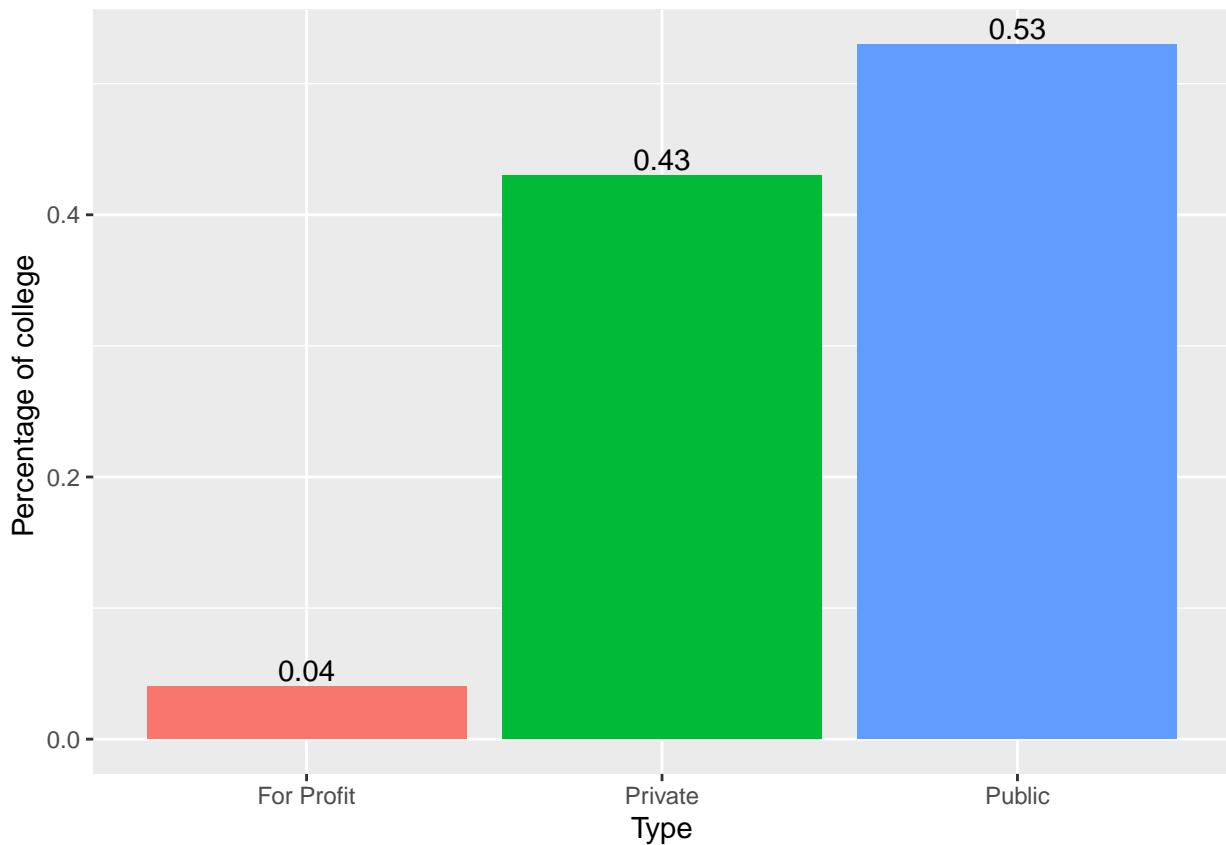


0.3.4 Relationship between diversity groups enrollment rate and early career salary

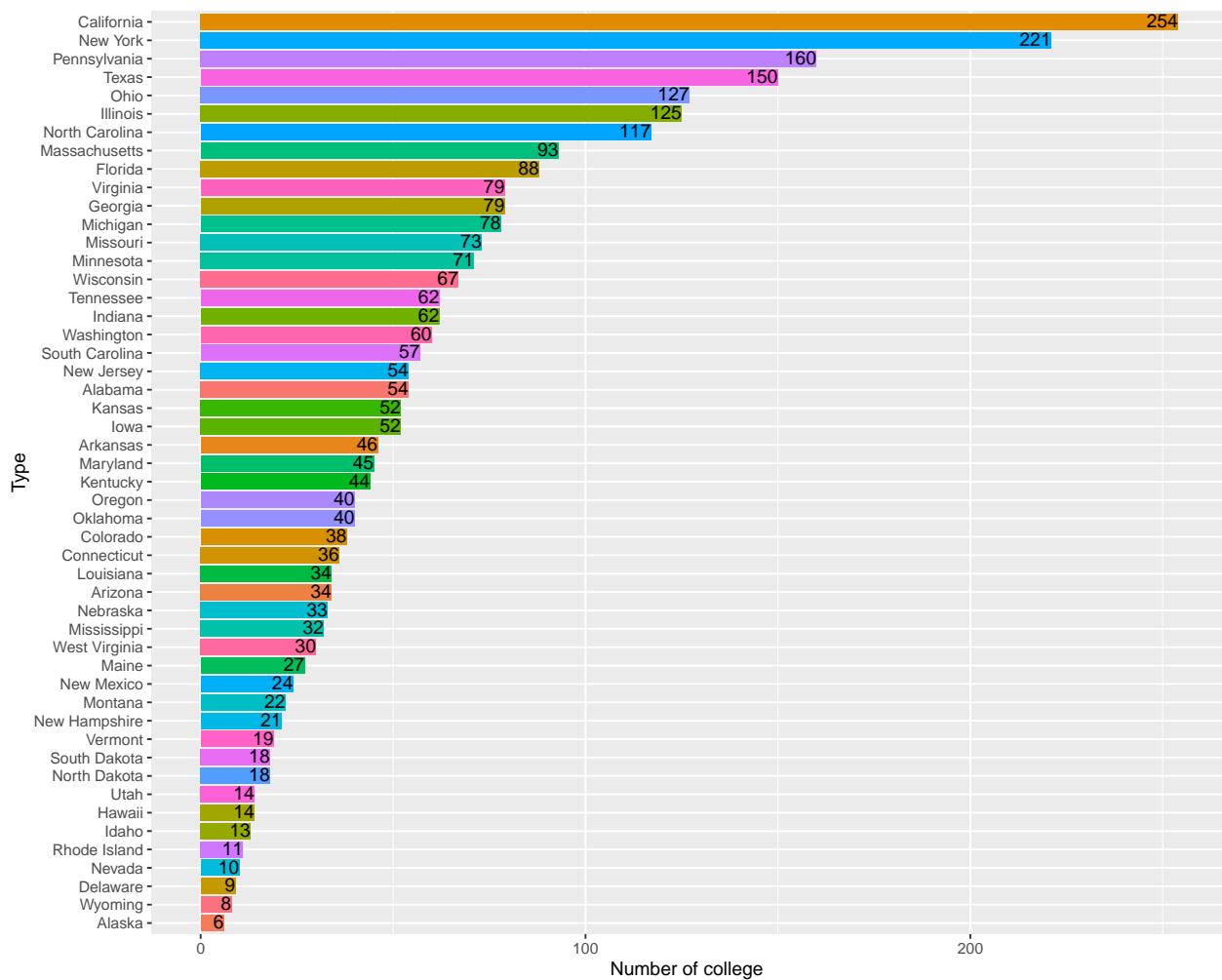
- we need to merge diversity dataset and salary dataset.



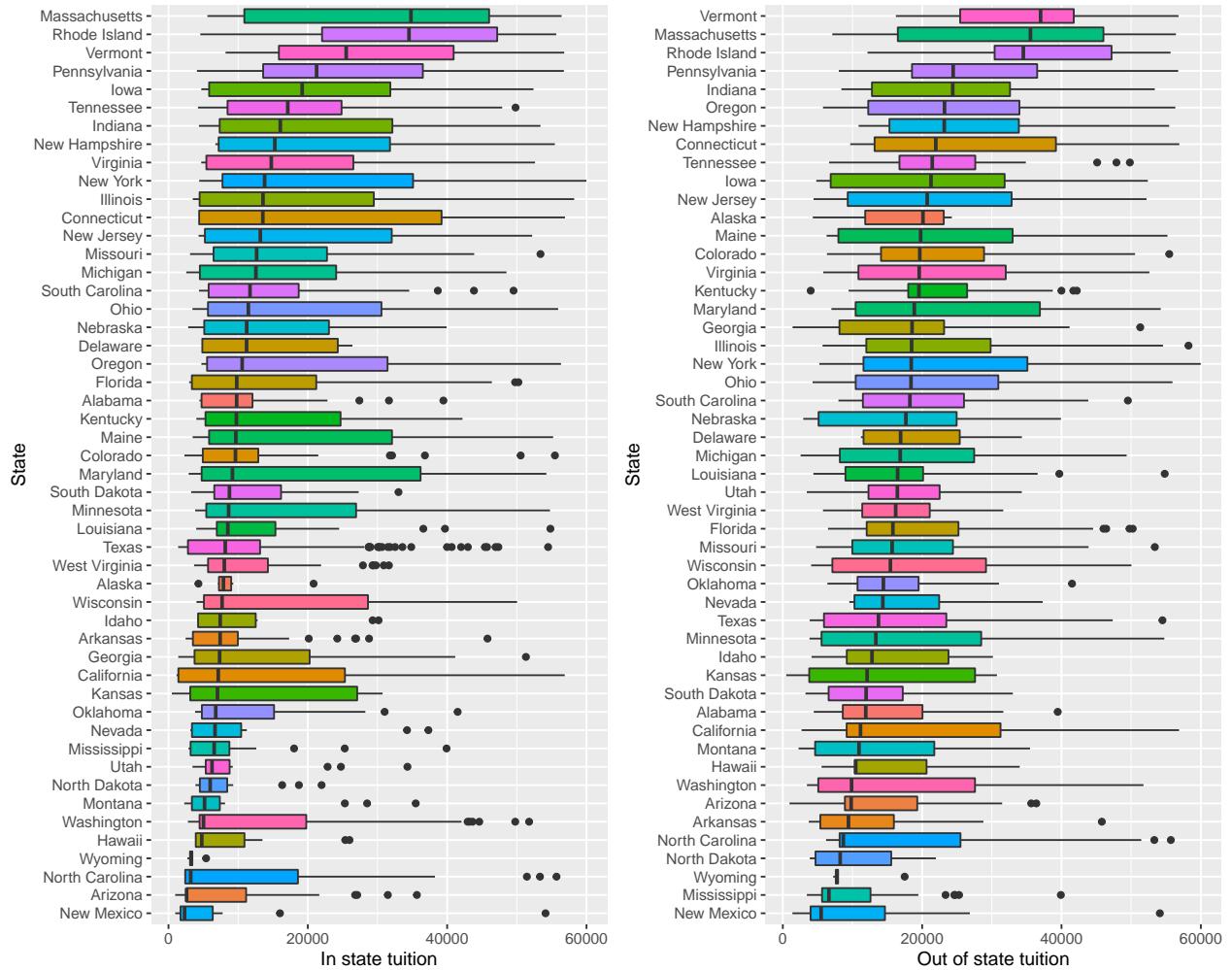
0.3.5 Different types of colleges in US



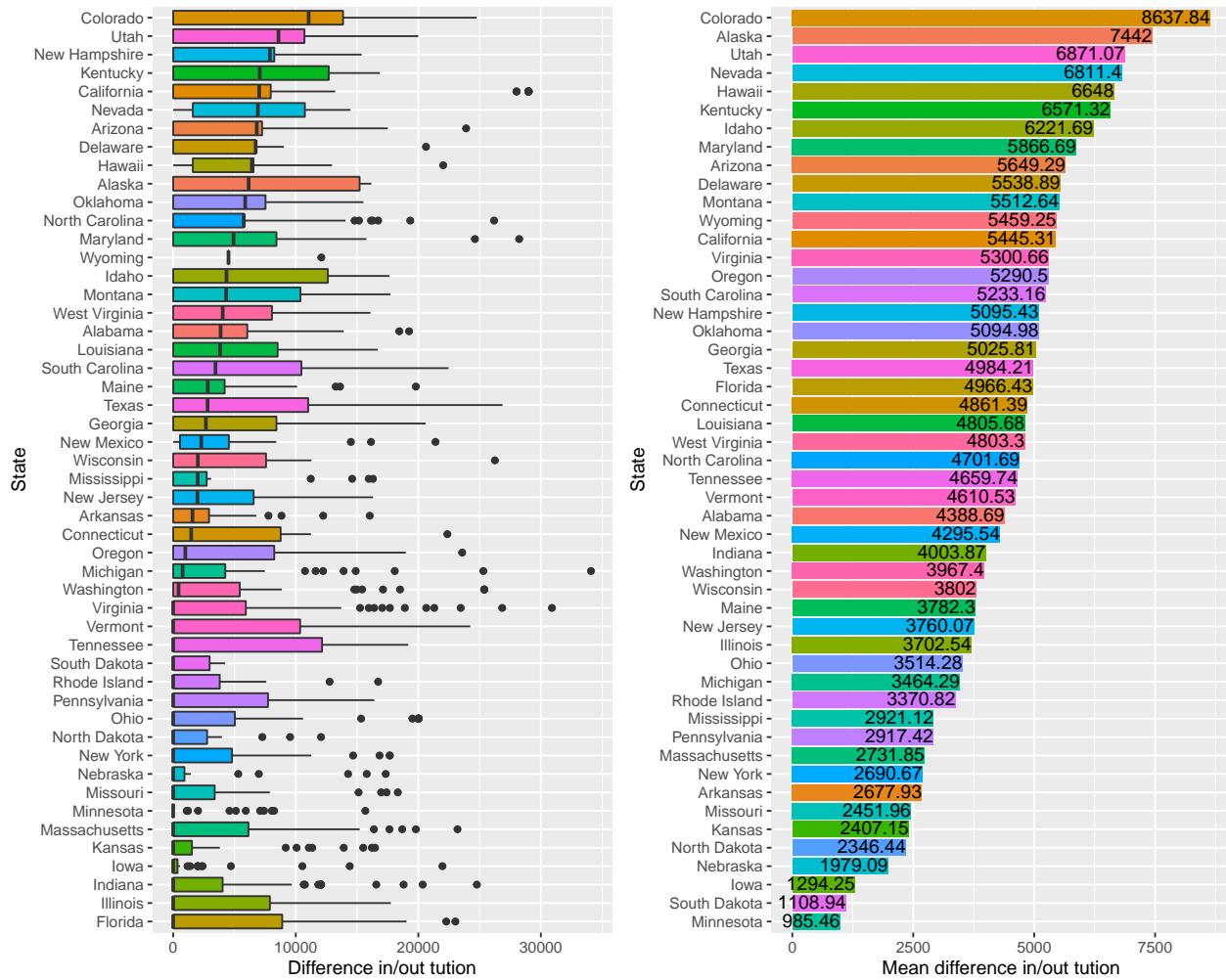
0.3.6 How many colleges are there in each state?



0.3.7 Comparing different states in terms of in state and out of state tuition

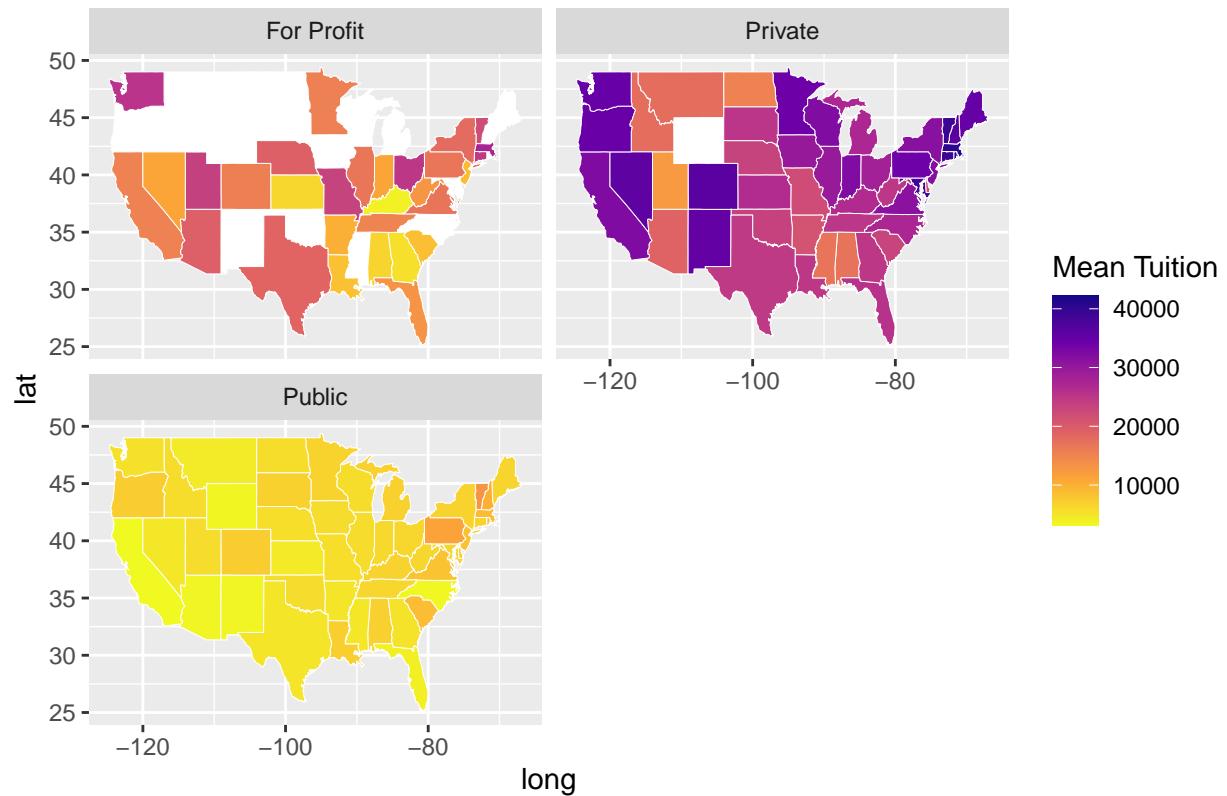


0.3.8 Comparing in/out-of state tuition



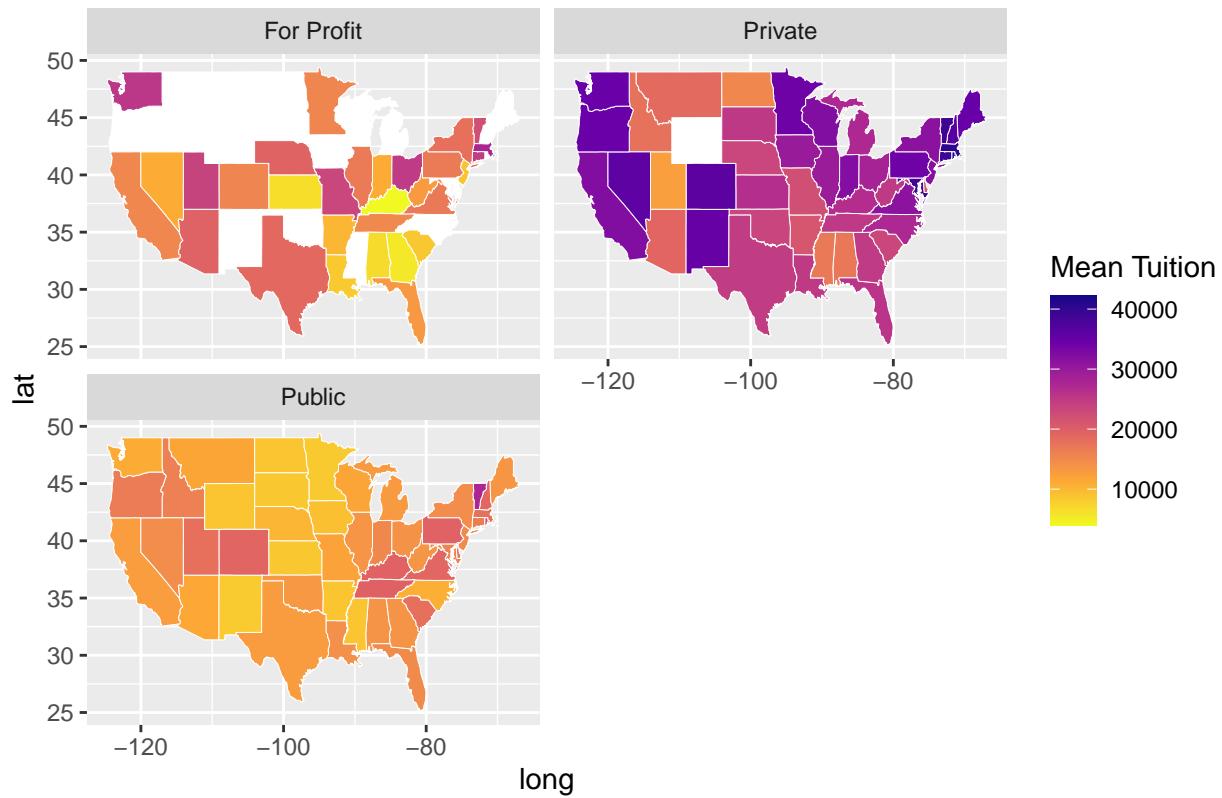
0.3.9 In-state tuition, different type of colleges; What is the relationship?

Mean in-state tuition of colleges in U.S. States

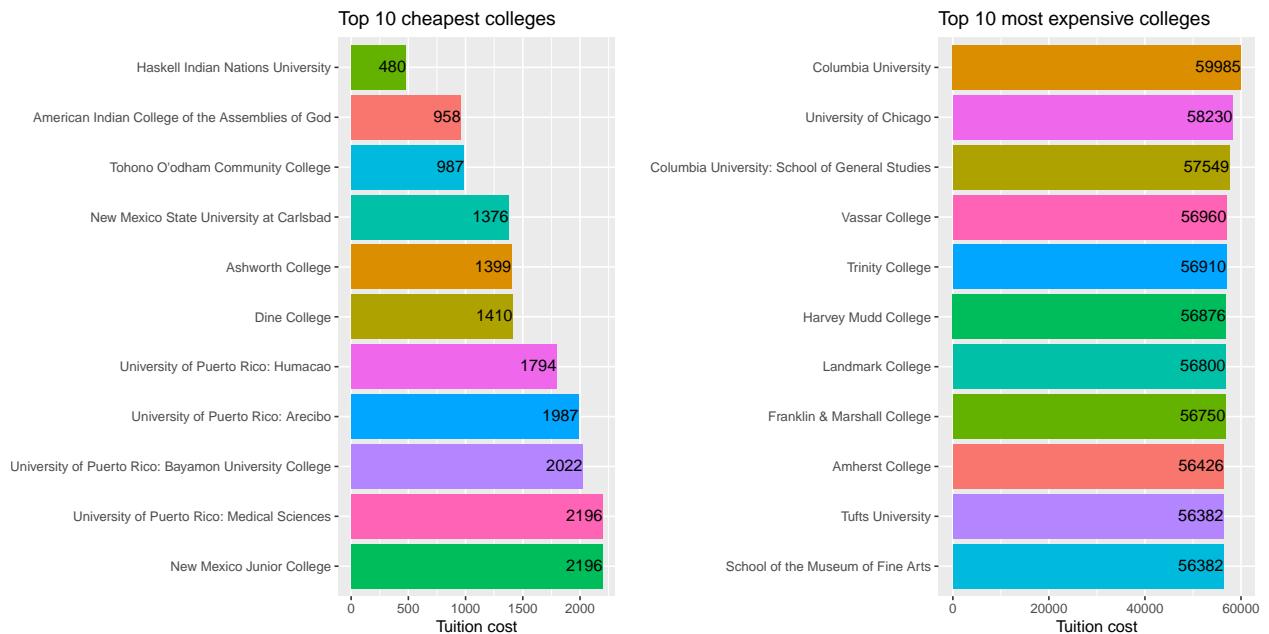


0.3.10 Out-of-state tuition, different type of colleges; What is the relationship?

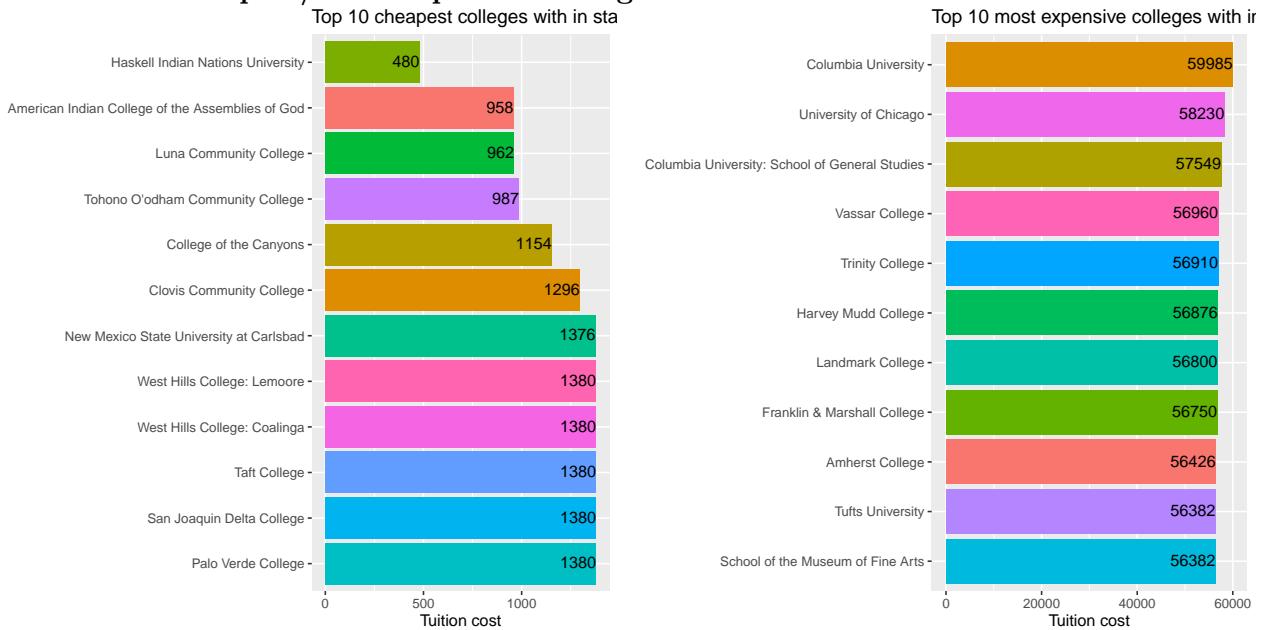
Mean out-of-state tuition of colleges in U.S. States



0.3.11 The cheapeast/most expensive colleges with out-of-state tuition



0.3.11.1 The cheapest/most expensive colleges with in-state tuition



0.4 The historical tuition dataset

0.4.1 270 observations and 4 variables

type	year	tuition_type	tuition_cost
All Institutions	1985-86	All Constant	10893
All Institutions	1985-86	4 Year Constant	12274
All Institutions	1985-86	2 Year Constant	7508
All Institutions	1985-86	All Current	4885
All Institutions	1985-86	4 Year Current	5504
All Institutions	1985-86	2 Year Current	3367

0.4.2 Data Manipulation

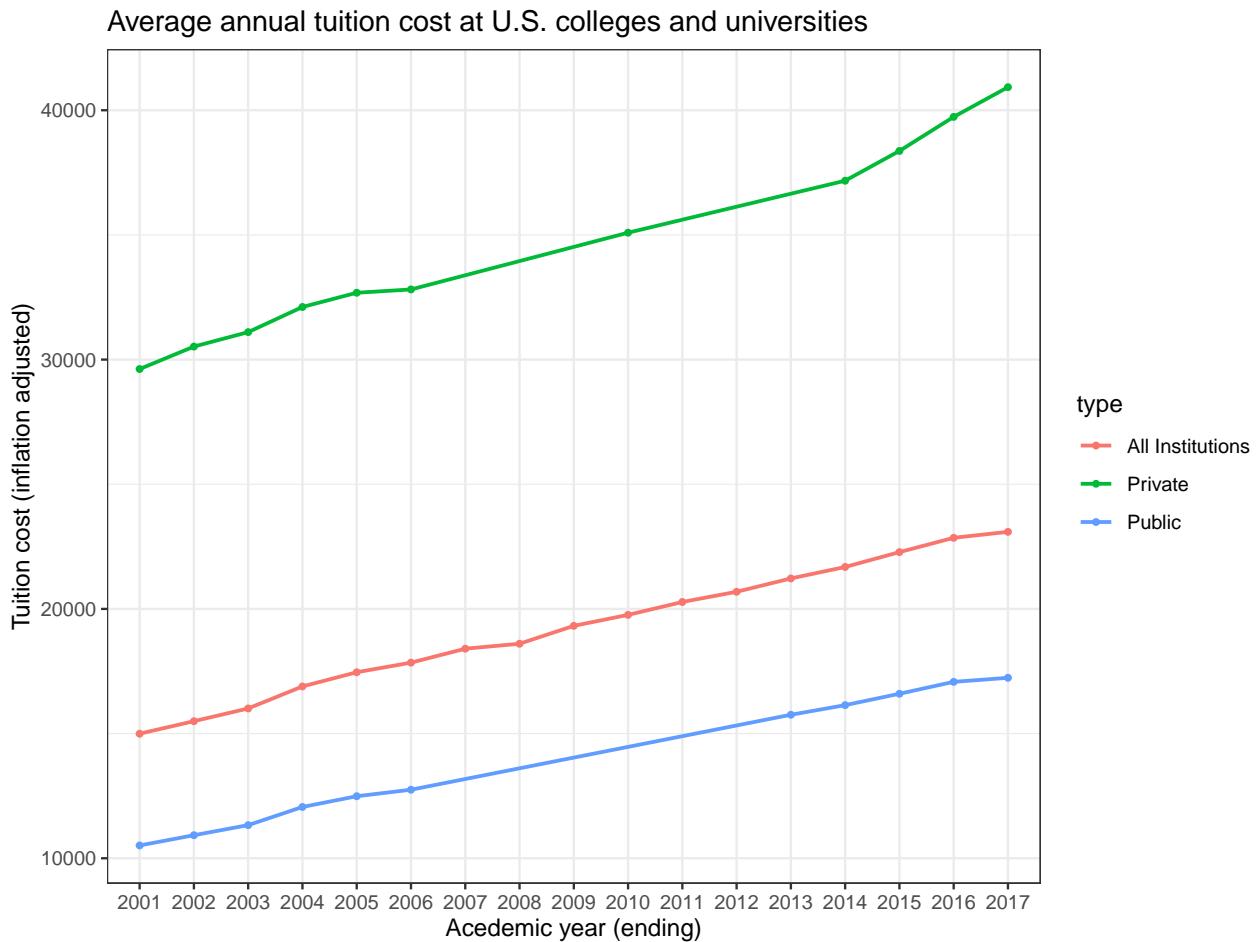
0.4.2.1 We observe that the data is available consistently from 2000 till 2017.

```
## [1] "1985-86" "1995-96" "2000-01" "2001-02" "2002-03" "2003-04" "2004-05"
## [8] "2005-06" "2006-07" "2007-08" "2008-09" "2009-10" "2010-11" "2011-12"
## [15] "2012-13" "2013-14" "2014-15" "2015-16" "2016-17"
```

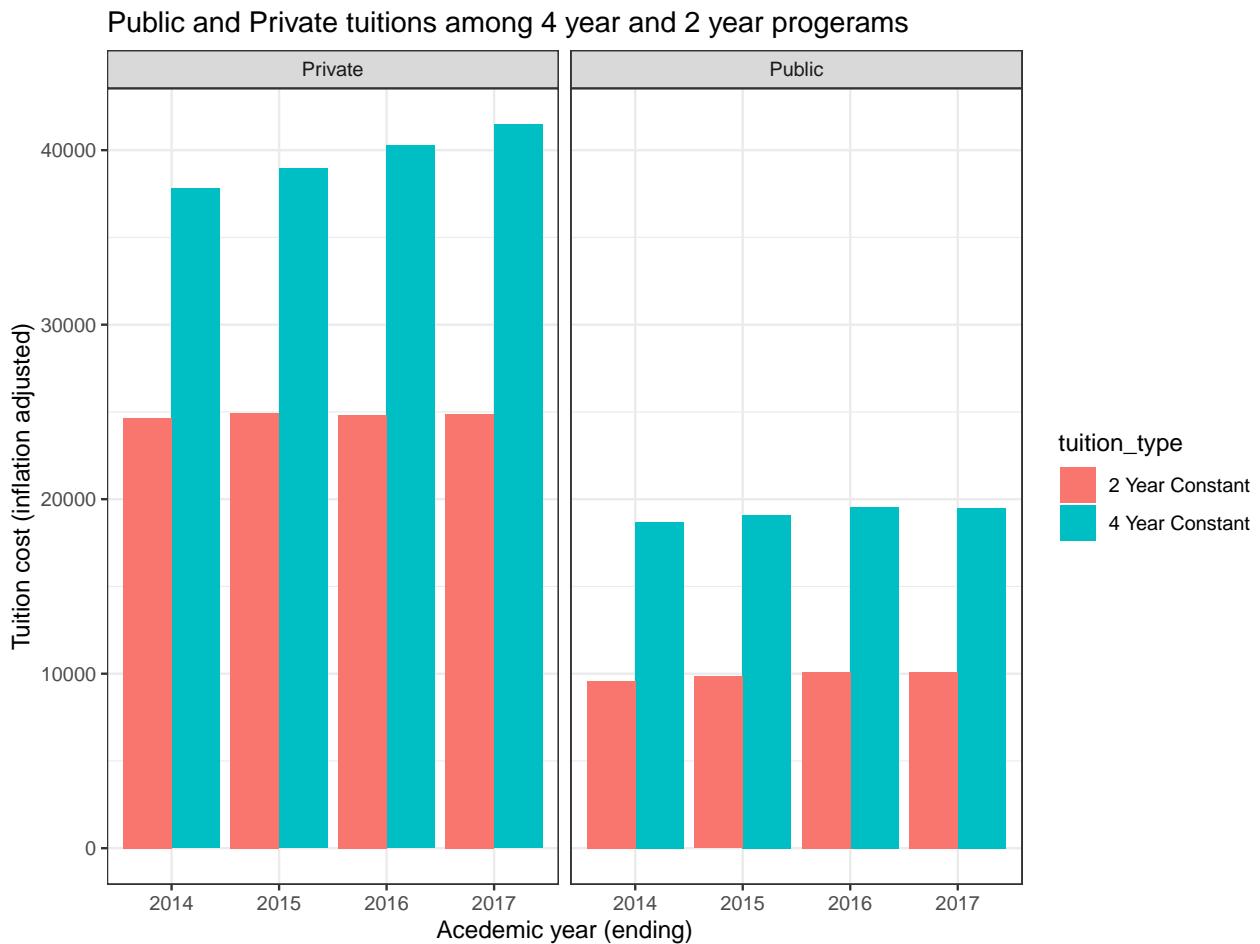
0.4.2.2 For convinience, we will consider the end of year.

```
## [1] 1986 1996 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013  
## [16] 2014 2015 2016 2017
```

0.4.3 Average tuition cost over time



0.4.4 Tuition comparison between 2 year and 4 year programs

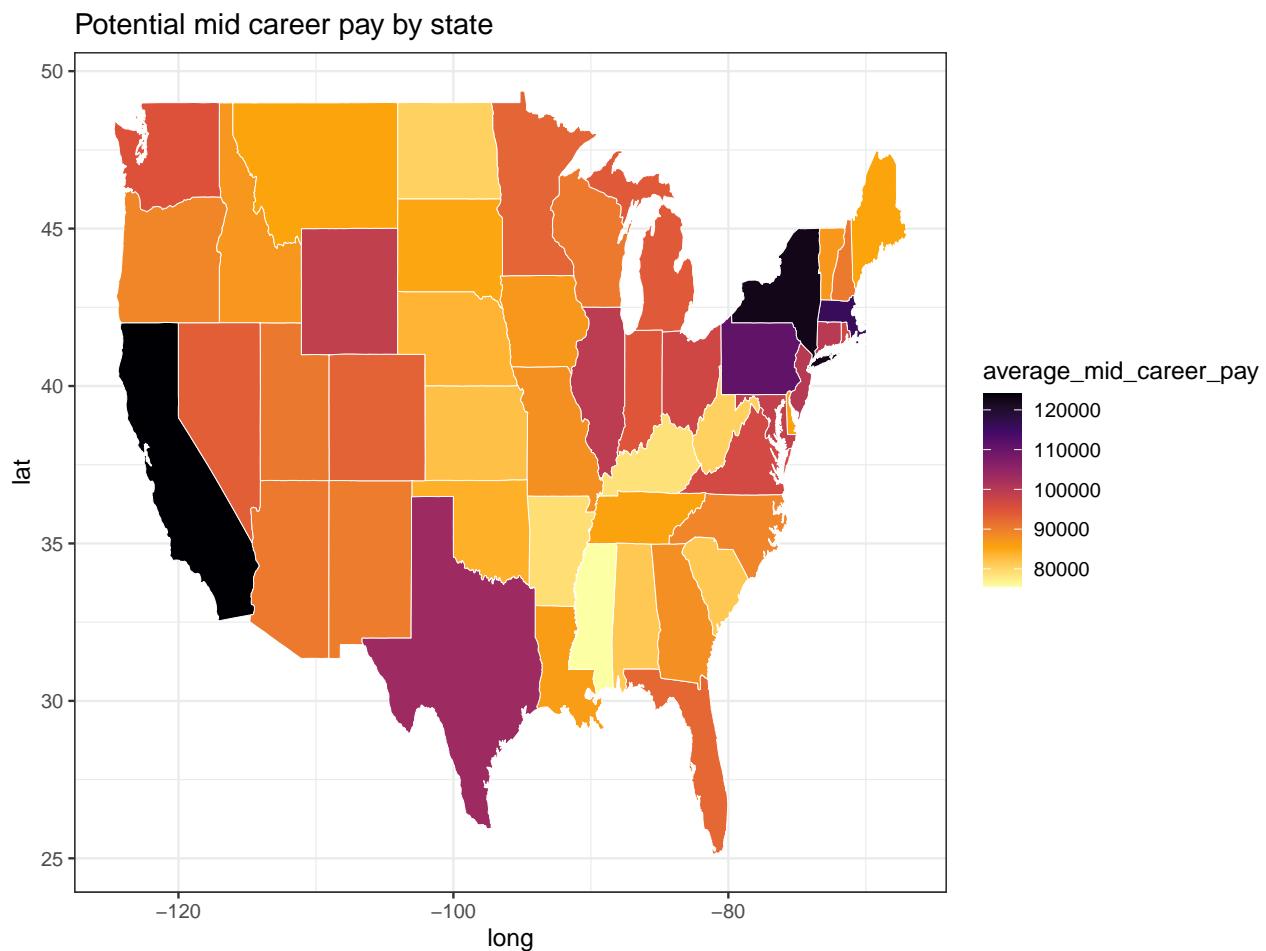


0.5 Salary potential dataset

0.5.1 935 observations and 6 variables including:

rank	name	state_name	early_career_pay	mid_career_pay	stem_percent
1	Auburn University	Alabama	54400	104500	33
2	University of Alabama in Huntsville	Alabama	57500	103900	40
3	The University of Alabama	Alabama	52300	97400	11
4	Tuskegee University	Alabama	54500	93500	33
5	Samford University	Alabama	48400	90500	11
6	Spring Hill College	Alabama	46600	89100	11

0.5.2 Which states have the highest/least potential salary?



0.5.3 Top 5 states

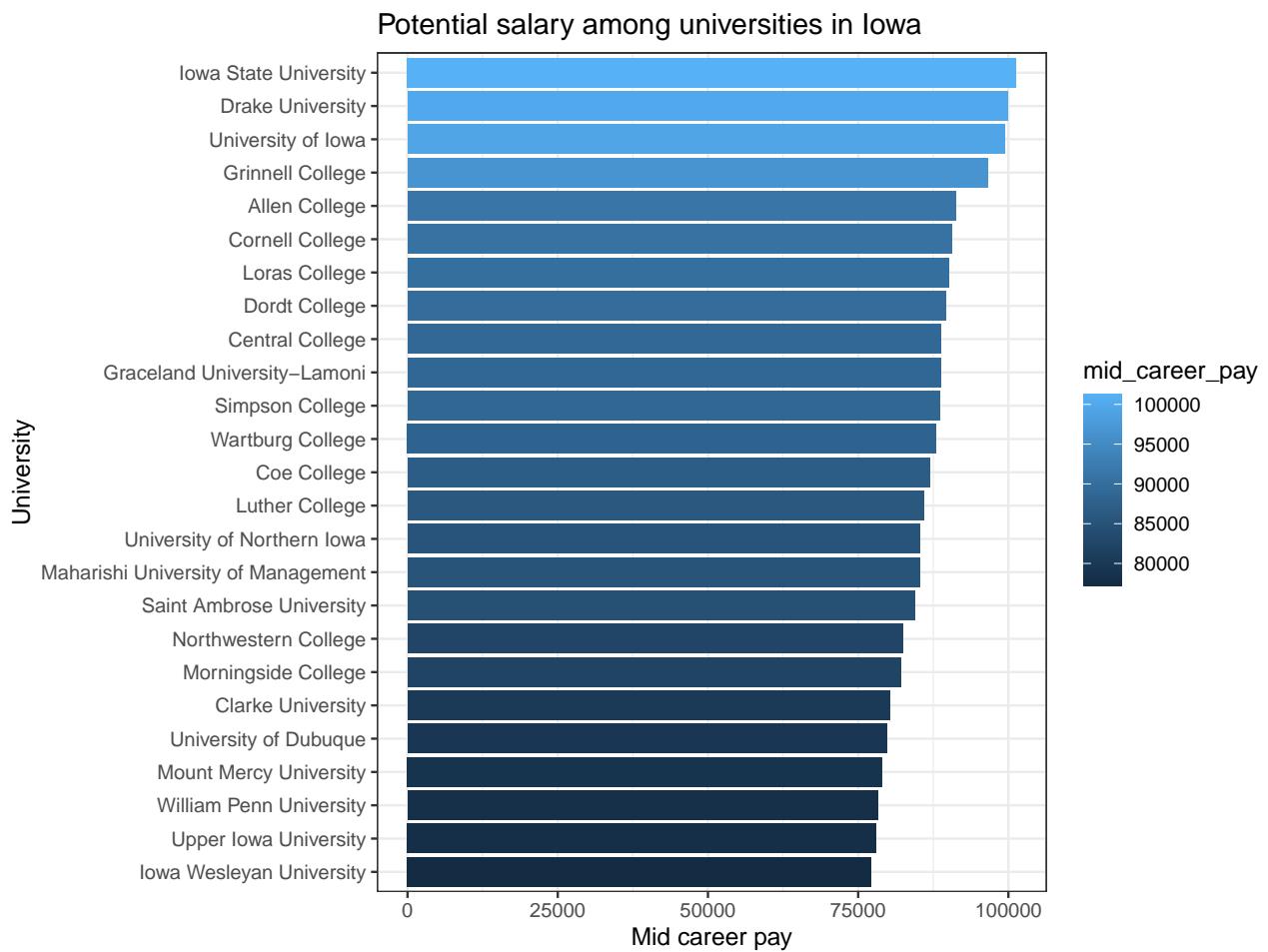
state_name	average_mid_career_pay
California	123976
New-York	122328
Massachusetts	115712
Pennsylvania	110884
Texas	103476

state_name	average_early_career_pay
California	67232
New-York	66688
Massachusetts	63100
Pennsylvania	60644
Texas	57468

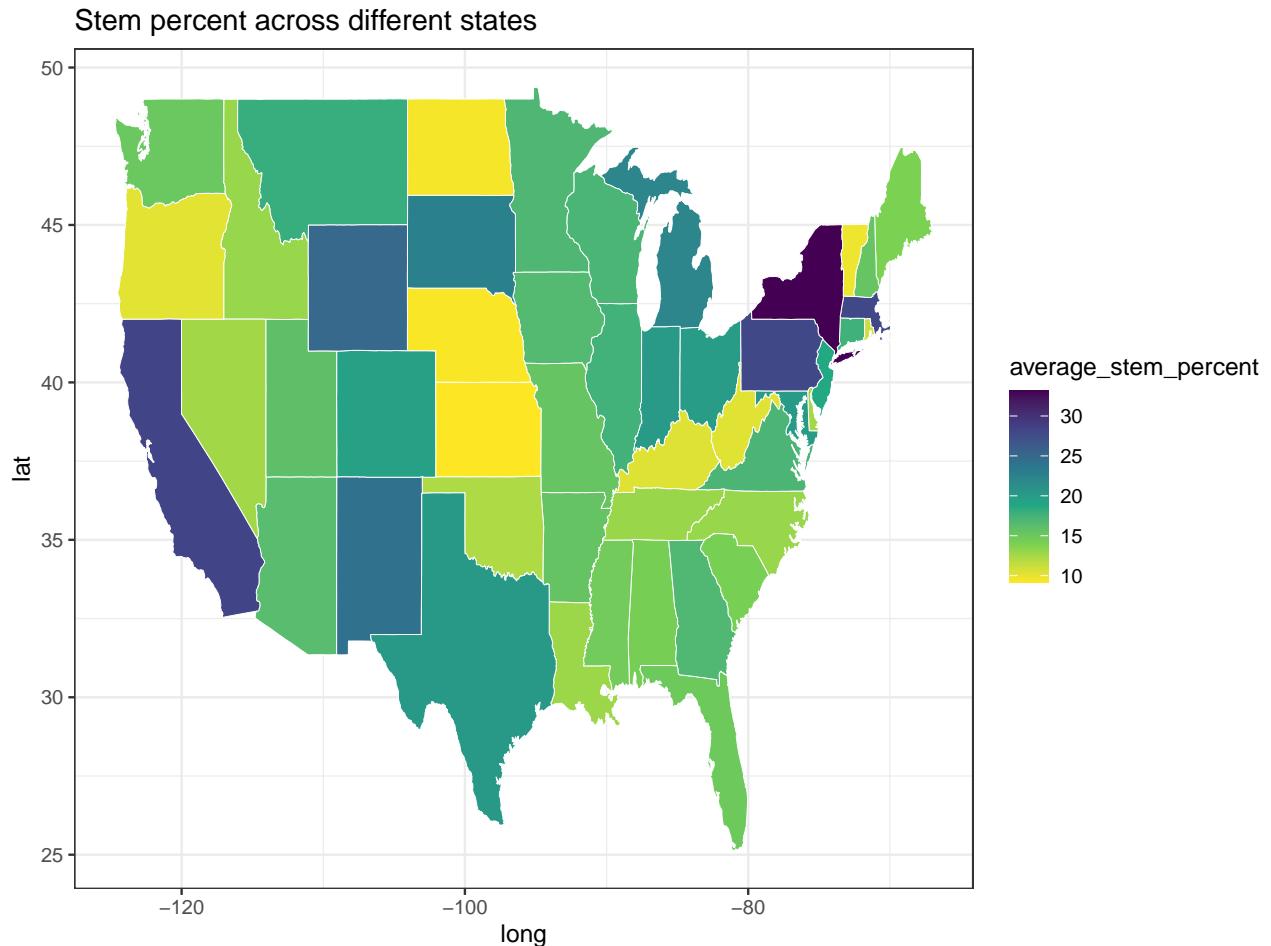
0.5.4 Let's take a closer look at Iowa

rank	name	state_name	early_career_pay	mid_career_pay	stem_perc
1	Iowa State University	Iowa	56100	101300	
2	Drake University	Iowa	52800	99900	
3	University of Iowa	Iowa	54100	99400	
4	Grinnell College	Iowa	53400	96500	
5	Allen College	Iowa	51600	91300	
6	Cornell College	Iowa	49600	90600	
7	Loras College	Iowa	48000	90100	
8	Dordt College	Iowa	51000	89600	
9	Central College	Iowa	49000	88800	
10	Graceland University-Lamoni	Iowa	48300	88700	
11	Simpson College	Iowa	49900	88600	
12	Wartburg College	Iowa	49300	88000	
13	Coe College	Iowa	47200	86900	
14	Luther College	Iowa	48200	85900	
15	University of Northern Iowa	Iowa	47100	85300	
16	Maharishi University of Management	Iowa	46800	85200	
17	Saint Ambrose University	Iowa	46900	84400	
18	Northwestern College	Iowa	44800	82400	
19	Morningside College	Iowa	44900	82100	
20	Clarke University	Iowa	44900	80200	
21	University of Dubuque	Iowa	44200	79700	
22	Mount Mercy University	Iowa	47200	79000	
23	William Penn University	Iowa	43900	78300	
24	Upper Iowa University	Iowa	44200	78000	
25	Iowa Wesleyan University	Iowa	42600	77200	

0.5.5 In Iowa, ISU has the highest potential salary



0.5.6 What is average stem percent across different states?



0.6 Conclusions

- The map of diversity across the US indicates that the US colleges are not equally diverse geographically.
 - There is relationship between different diversity groups, tuition and early career salary.
 - Average out-of-state tuition differs across the country while average in-state tuition remains almost the same.
 - East coast colleges are more expensive in terms of in-state and out-of-state tuition.
 - Massachusetts has the highest in-state tuition.
 - Private schools cost more than public schools.
 - Historical trend of tuition showed that tuition is increasing over time.

- Universities located in west/east coast have higher stem percent and also higher potential salary.