

“College tuition, diversity, and pay”

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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.

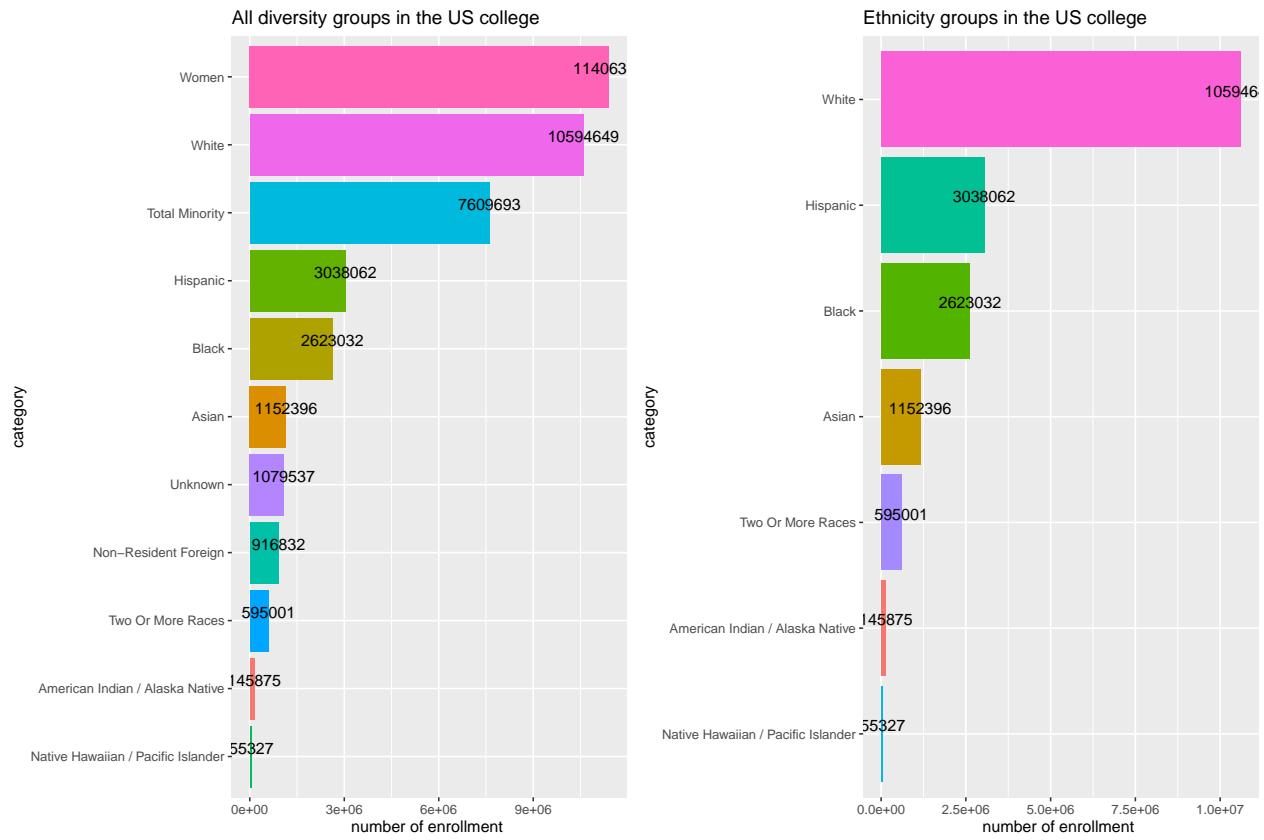
Diversity dataset

```
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, 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

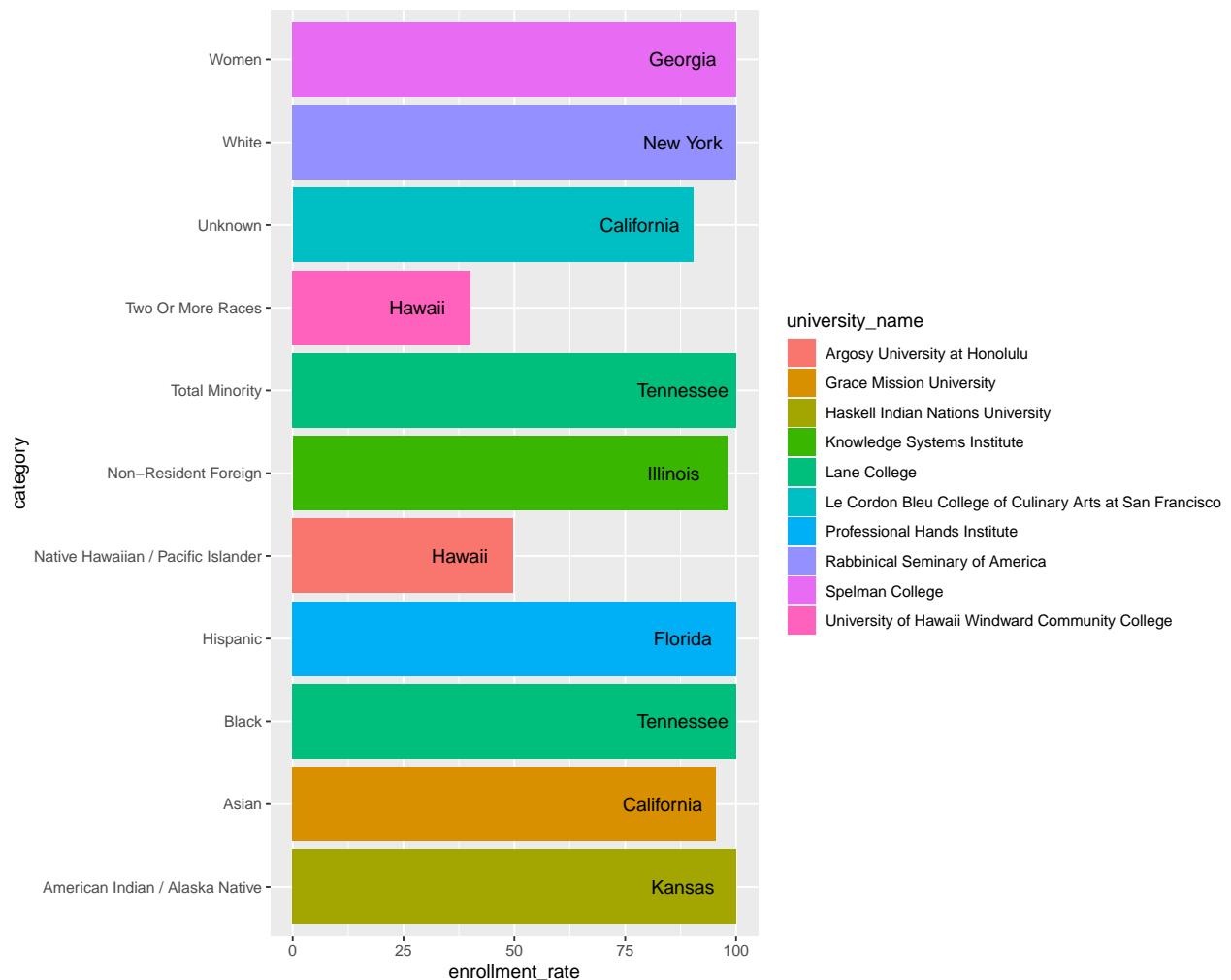
Bar chart of all diversity categories and ethnicity groups in the US college



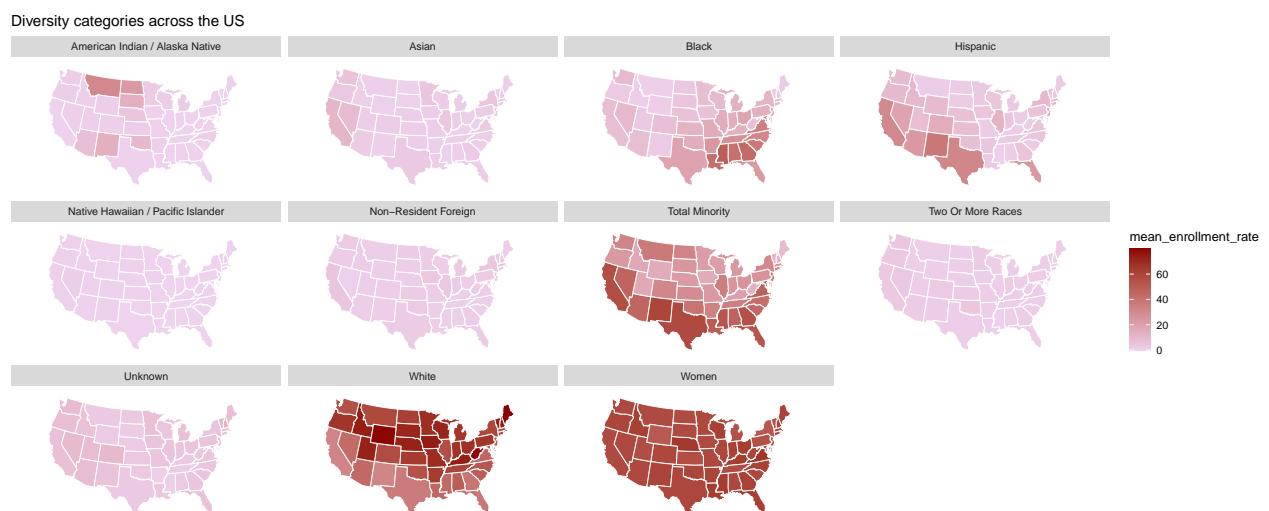
Finding the most diverse campus for each diversity category

category	university_name	state	enrollment
American Indian / Alaska Native	Haskell Indian Nations University	Kansas	100.0
Asian	Grace Mission University	California	95.4
Black	Lane College	Tennessee	100.0
Hispanic	Professional Hands Institute	Florida	100.0
Native Hawaiian / Pacific Islander	Argosy University at Honolulu	Hawaii	49.7
Non-Resident Foreign	Knowledge Systems Institute	Illinois	97.9
Total Minority	Lane College	Tennessee	100.0
Two Or More Races	University of Hawaii Windward Community College	Hawaii	40.1
Unknown	Le Cordon Bleu College of Culinary Arts at San Francisco	California	90.2
White	Rabbinical Seminary of America	New York	100.0
Women	Spelman College	Georgia	100.0

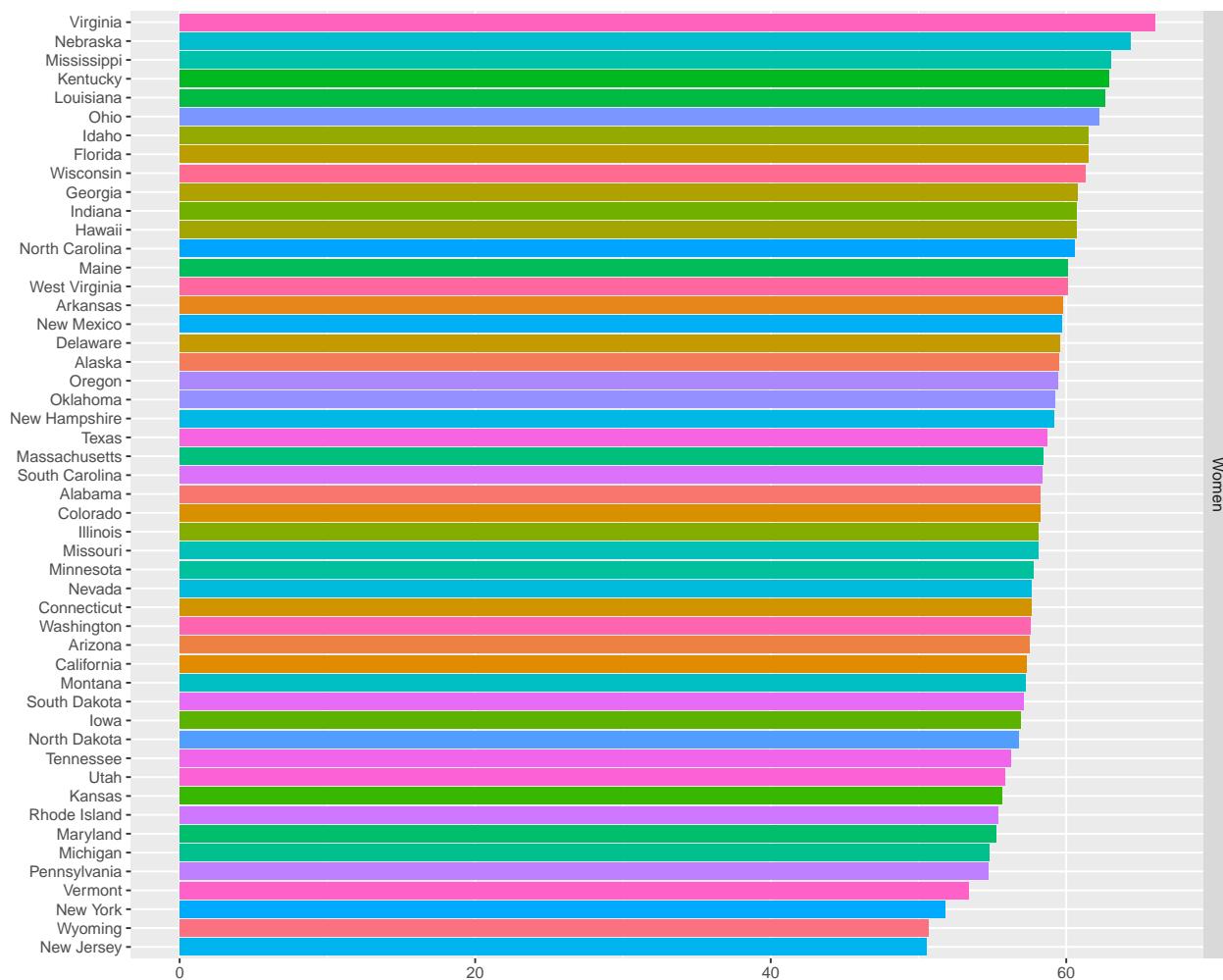
Finding the most diverse campus for each diversity category



Diversity map of the US for each diversity group



Women enrollment rate across the US



Tuition cost dataset

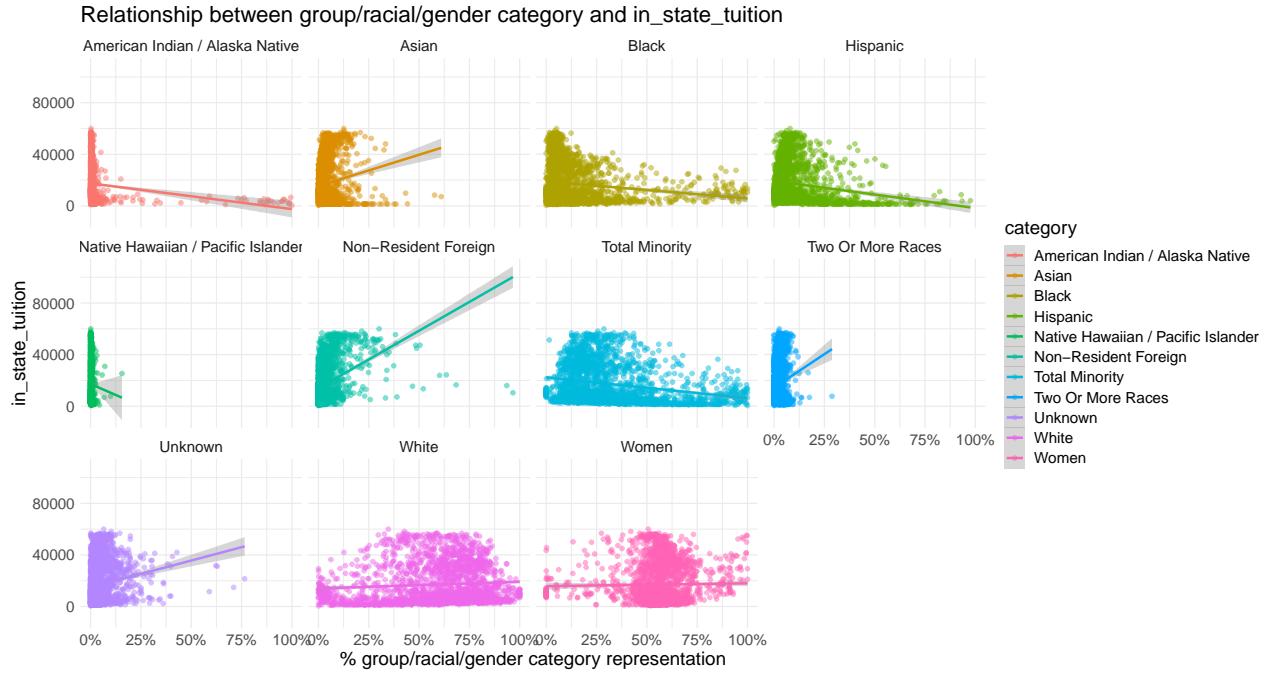
```
tuition_cost %>% glimpse()

## # 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...
```

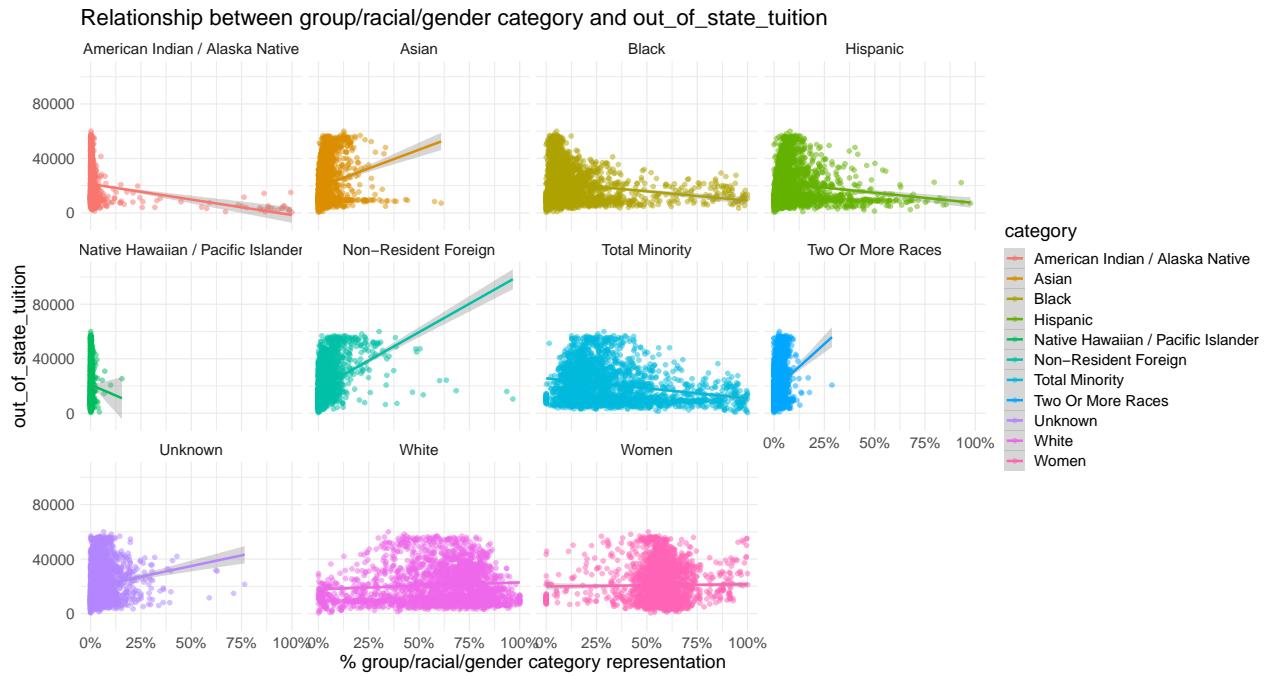
Merge tuition cost dataset and diversity dataset

- 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

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

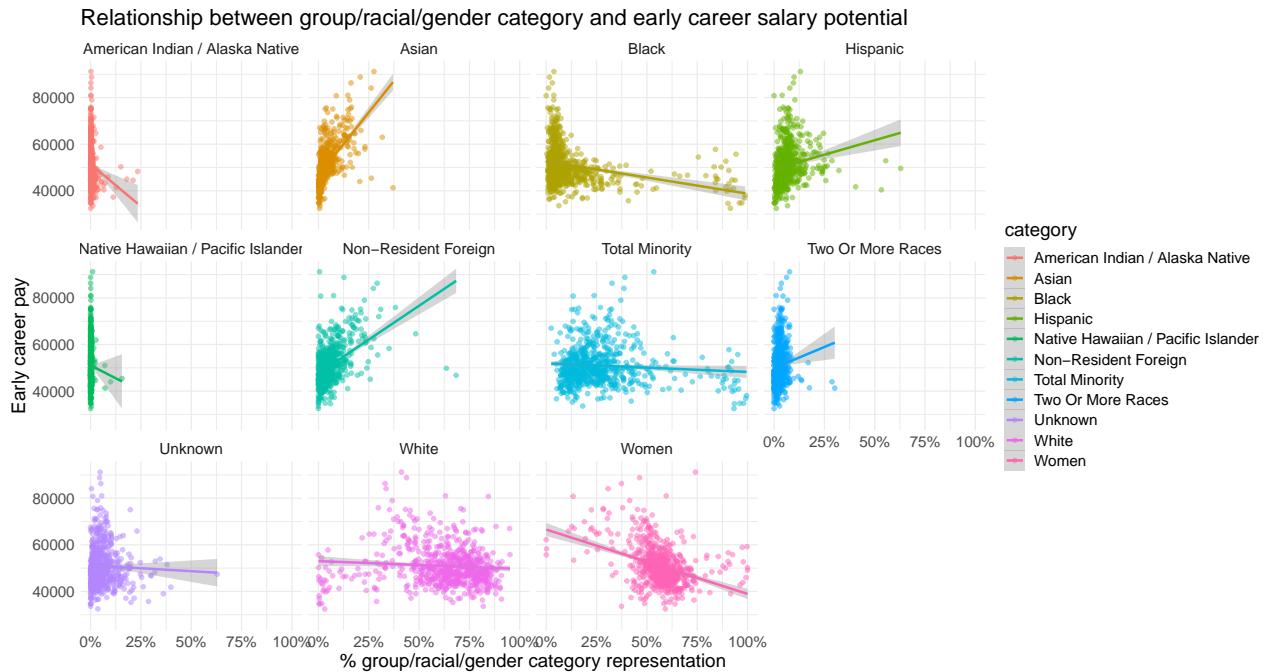


Relationship between enrollment rate and out-of-state tuition per each diversity group

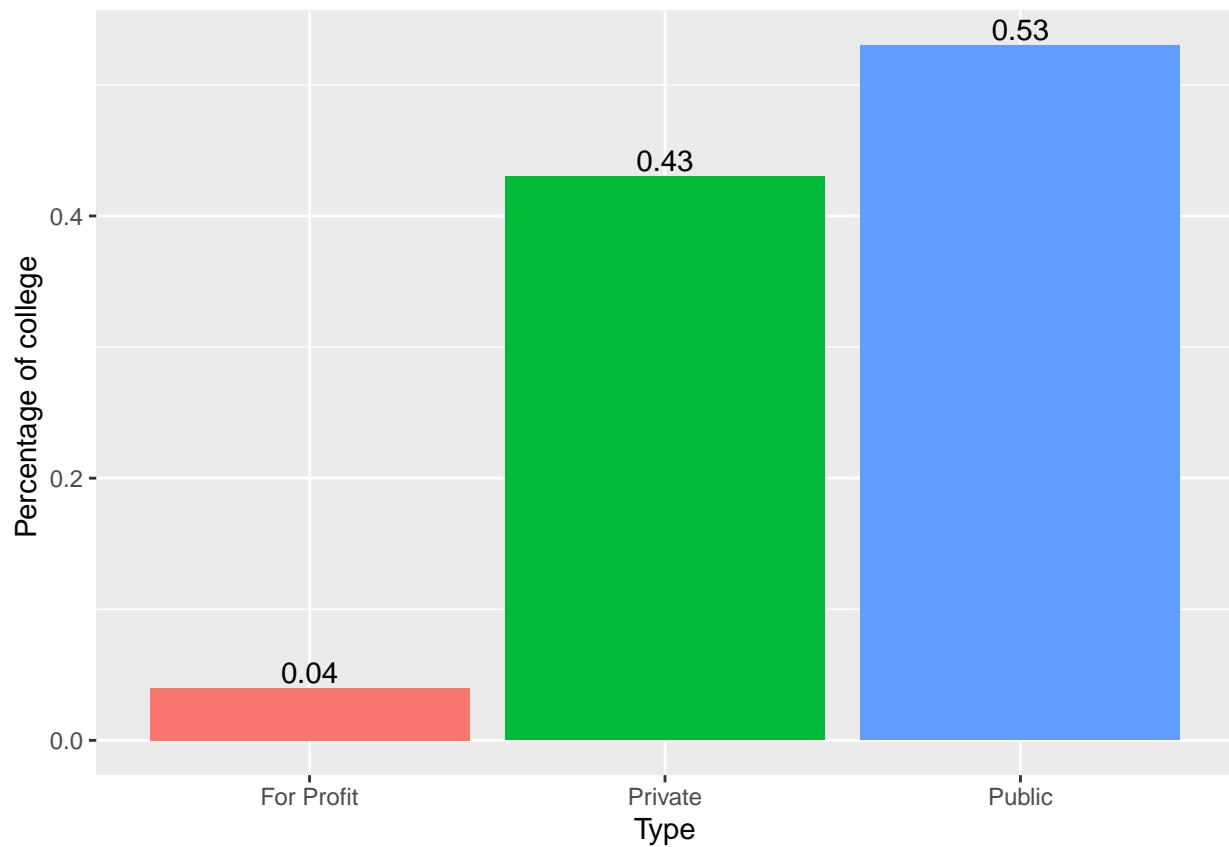


Relationship between diversity groups enrollment rate and early career salary

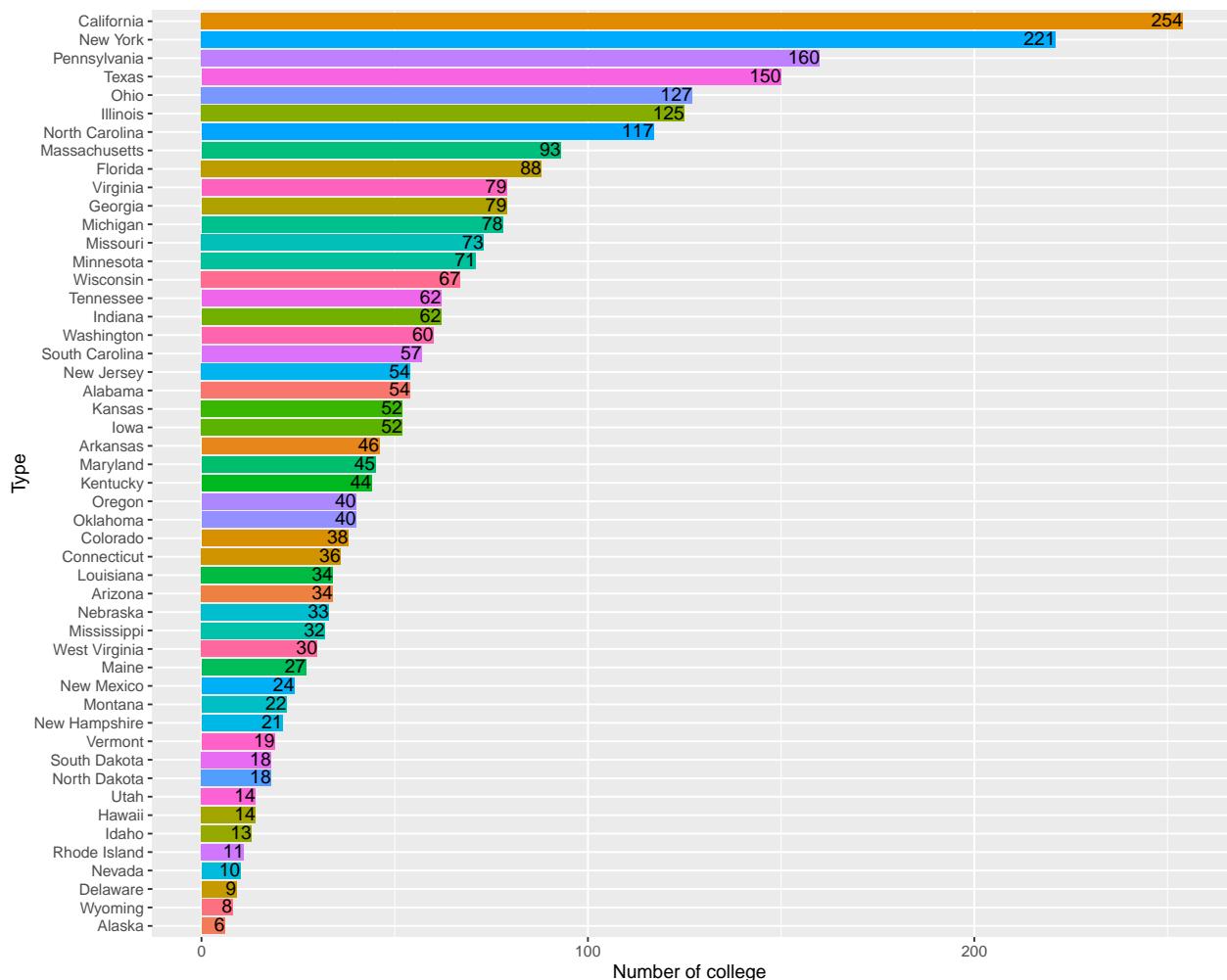
- we need to merge diversity dataset and salary dataset.



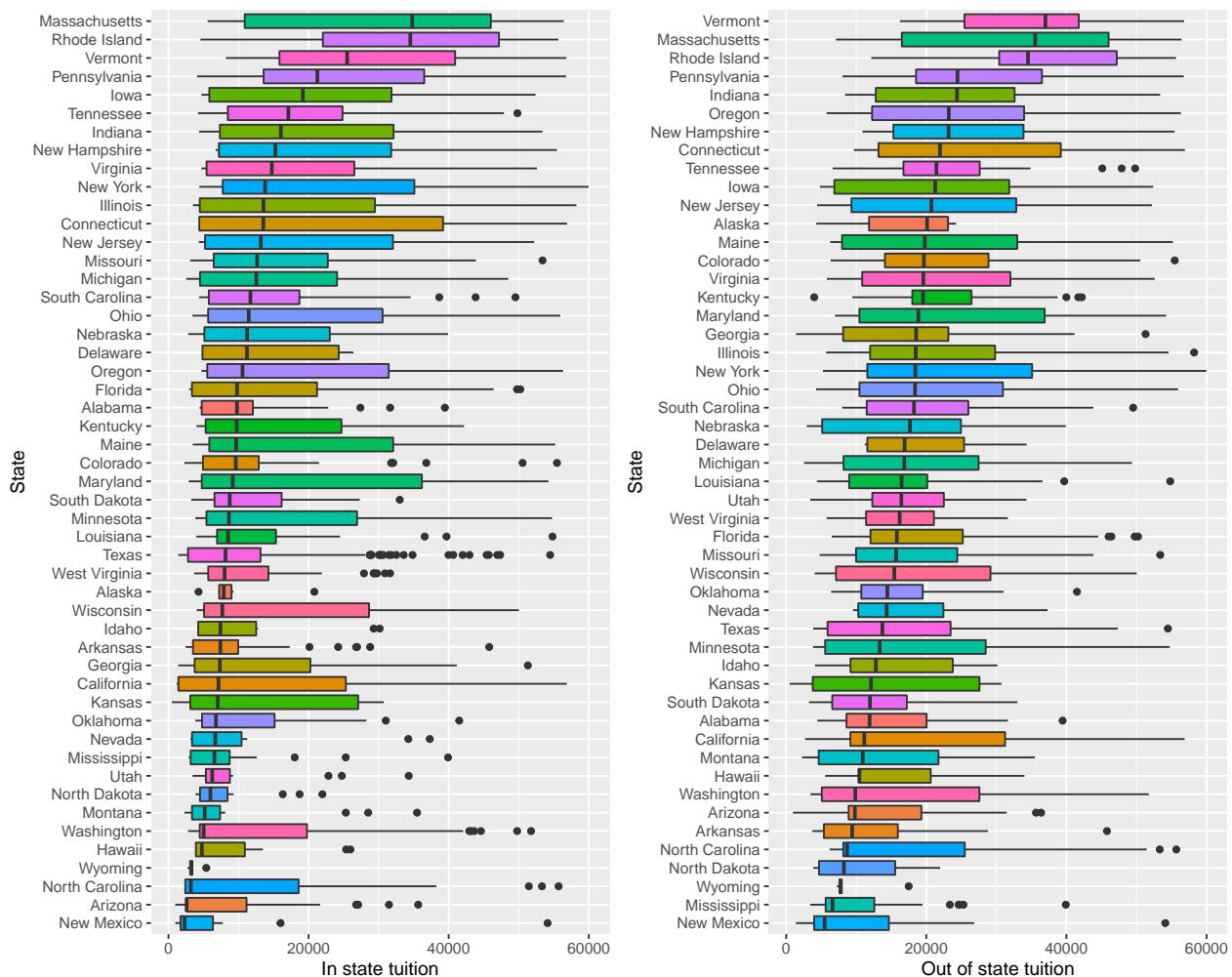
Different types of colleges in US



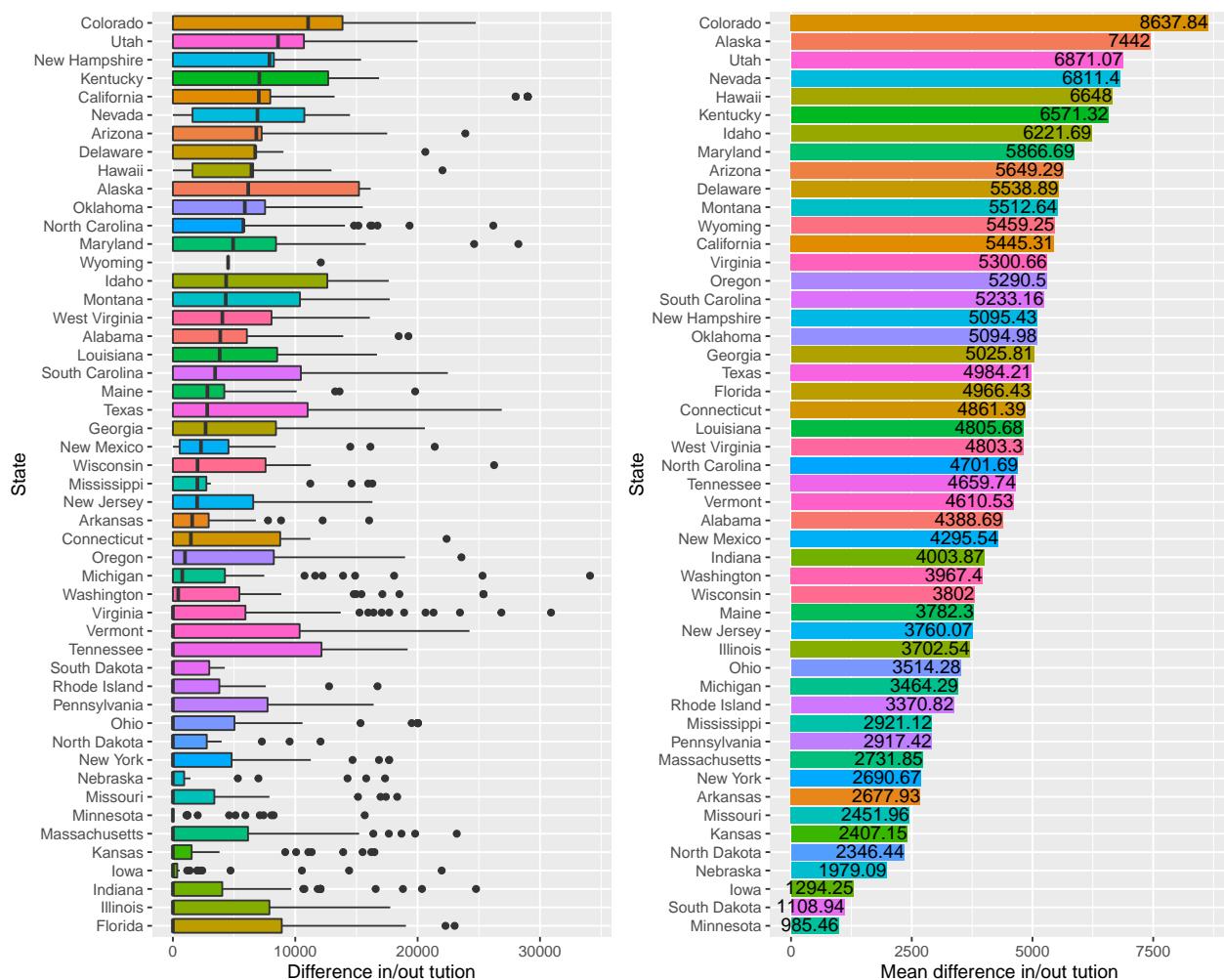
How many colleges are there in each state?



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

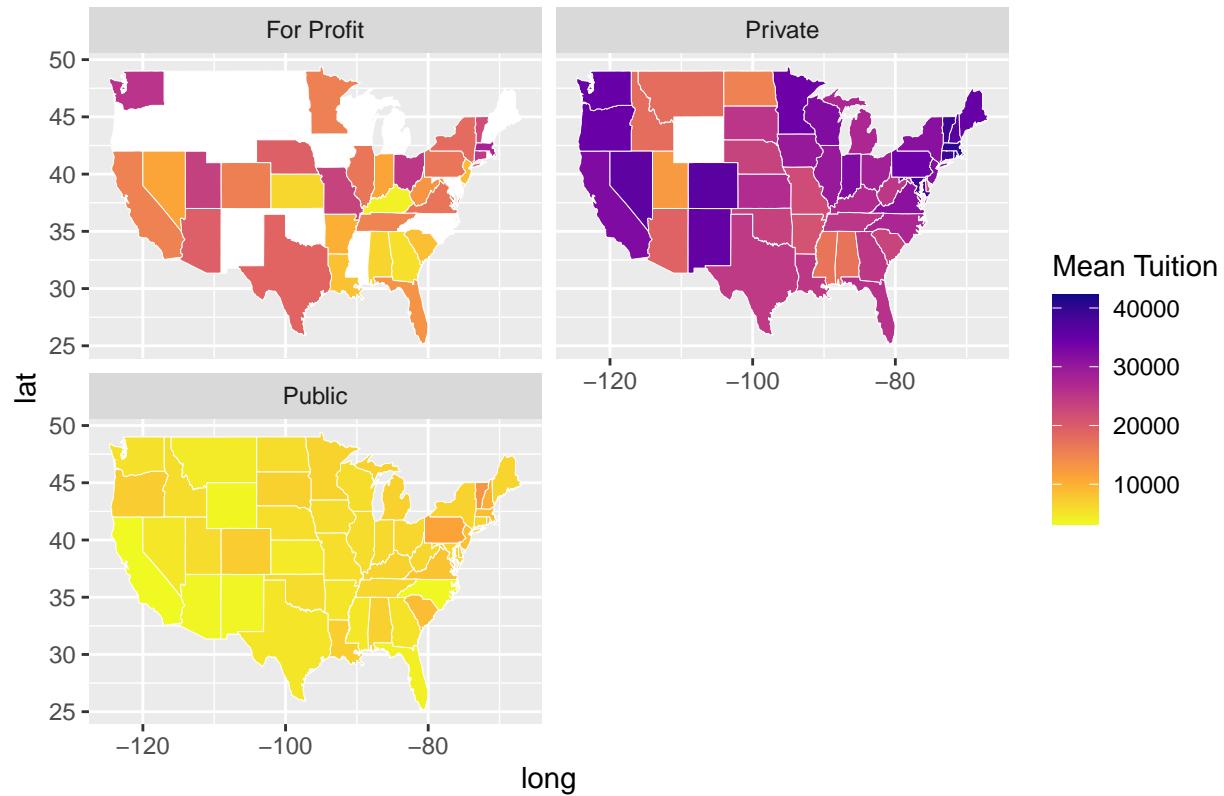


Comparing in/out-of state tuition



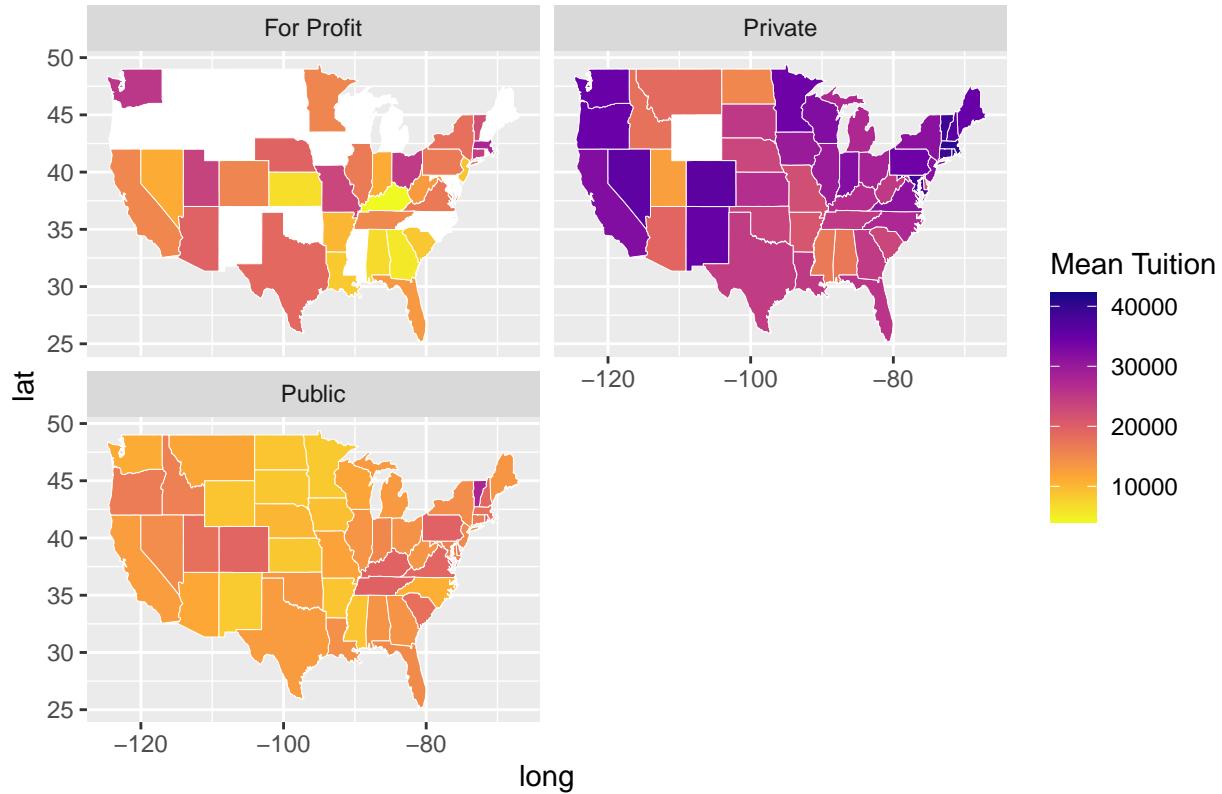
In-state tuition, different type of colleges; What is the relationship?

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

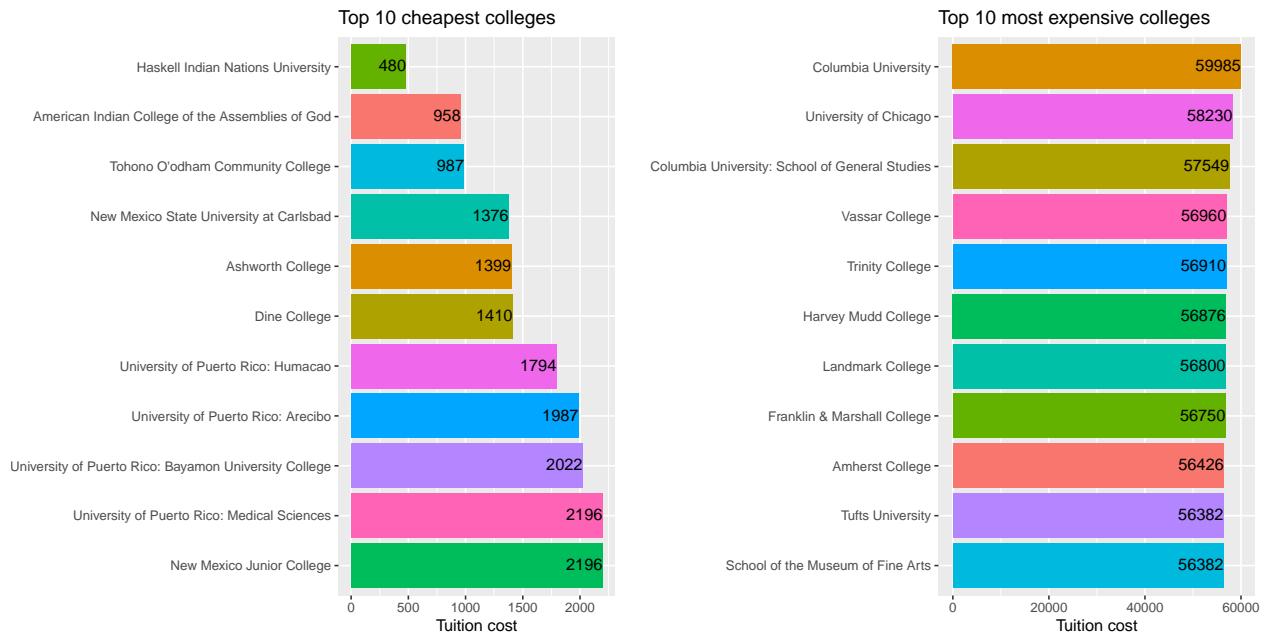


Out-of-state tuition, different type of colleges; What is the relationship?

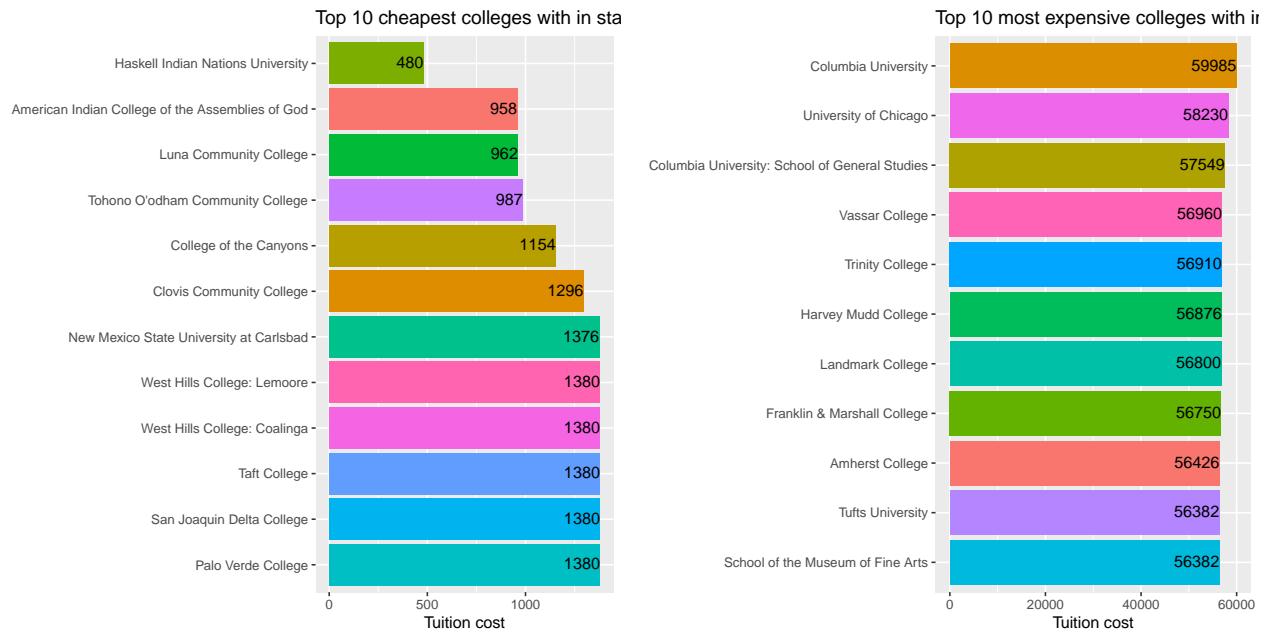
Mean out-of-state tuition of colleges in U.S. States



The cheapest/most expensive colleges with out-of-state tuition



The cheapest/most expensive colleges with in-state tuition



The historical tuition dataset

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

The historical tuition dataset

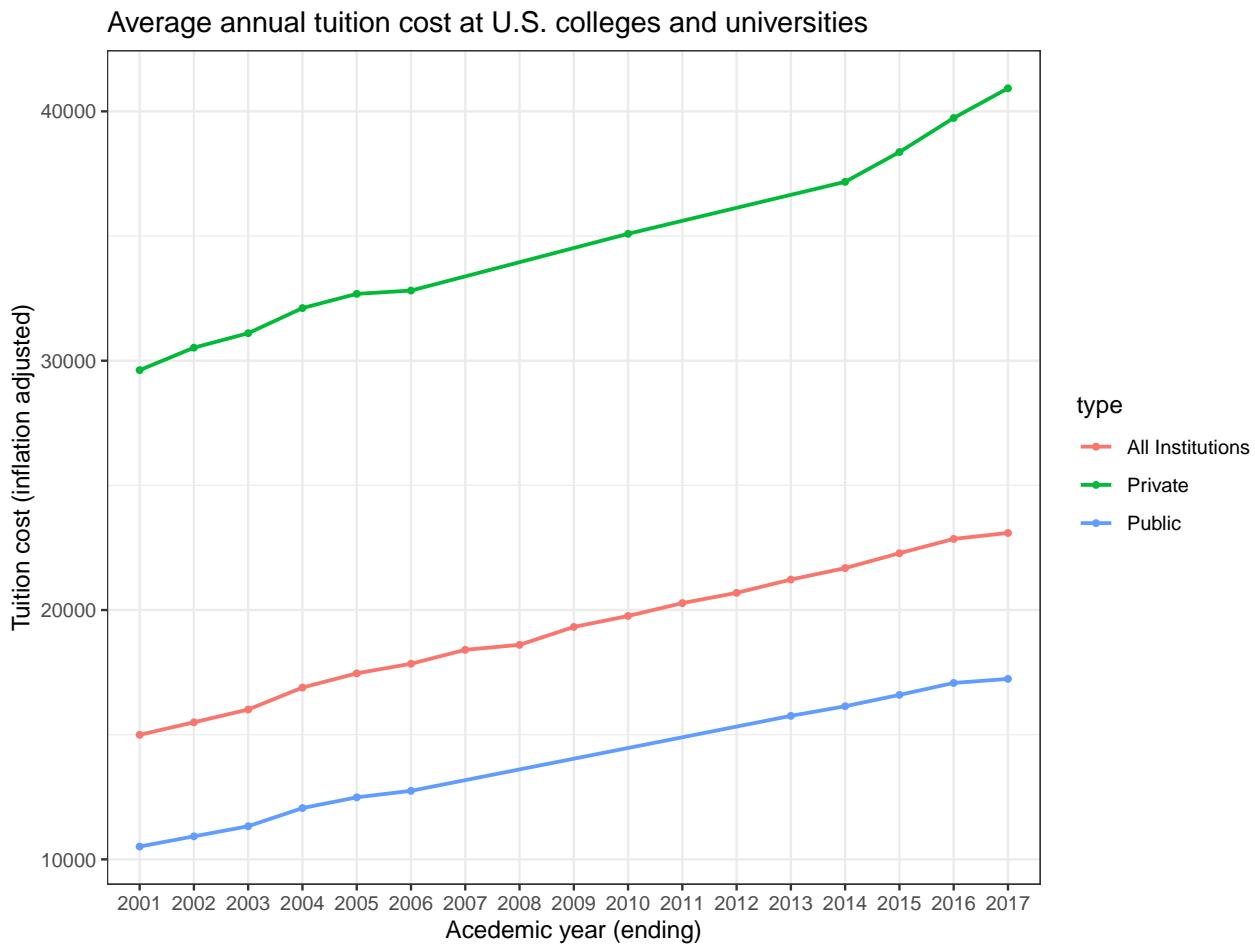
We observe that the data is available consistently from 2000 till 2017.

```
## [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"
```

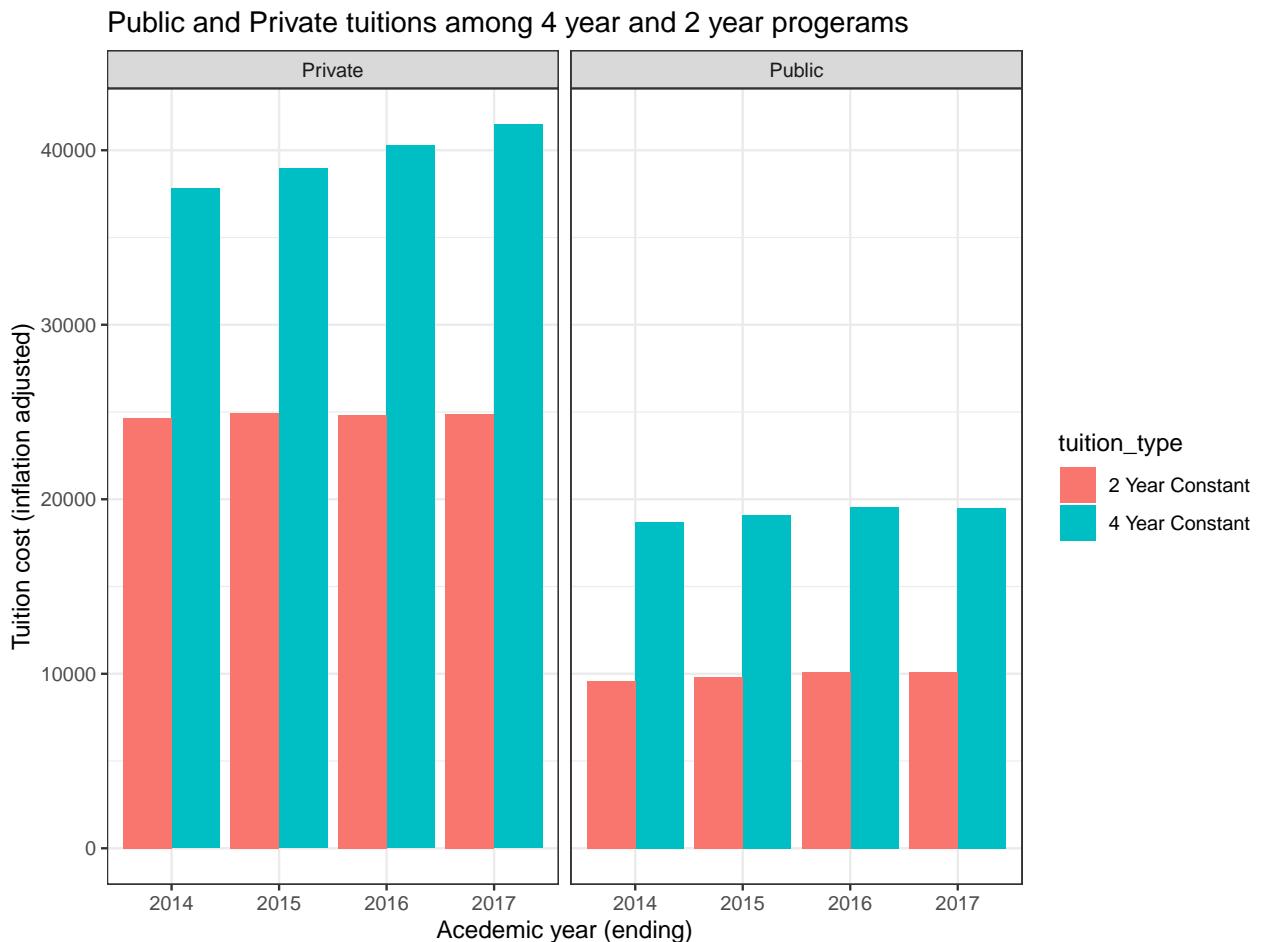
For convenience, we will consider the end of year.

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

Average tuition cost over time



Tuition comparison between 2 year and 4 year programs

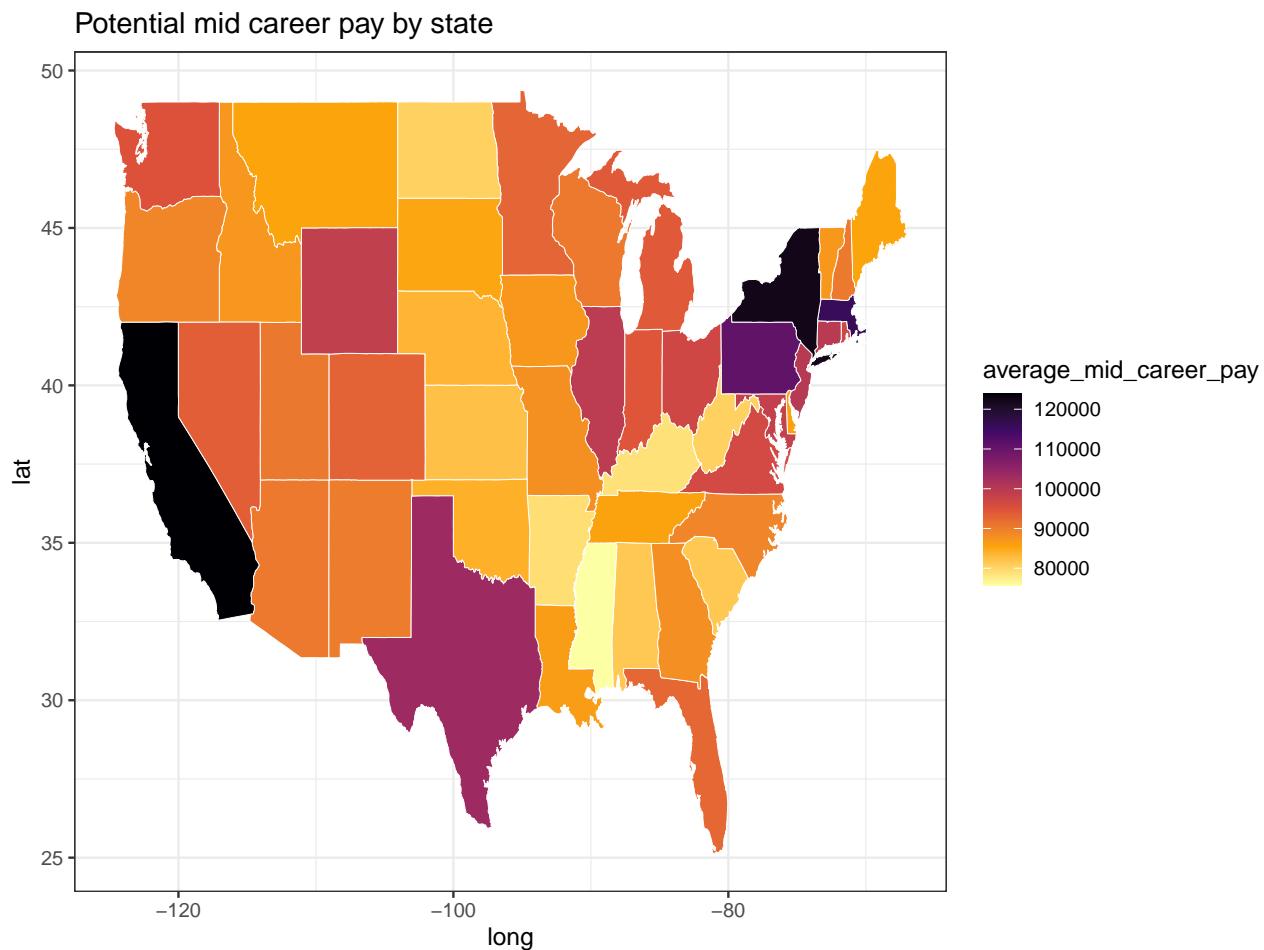


Salary potential dataset

935 observations and 6 variables including:

rank	name	state_name	early_career_pay	mid_career_pay	stem_percent
1	Auburn University	Alabama	54400	104500	31
2	University of Alabama in Huntsville	Alabama	57500	103900	45
3	The University of Alabama	Alabama	52300	97400	15
4	Tuskegee University	Alabama	54500	93500	30
5	Samford University	Alabama	48400	90500	3
6	Spring Hill College	Alabama	46600	89100	12

Which states have the highest/least potential salary?



Top 5 states

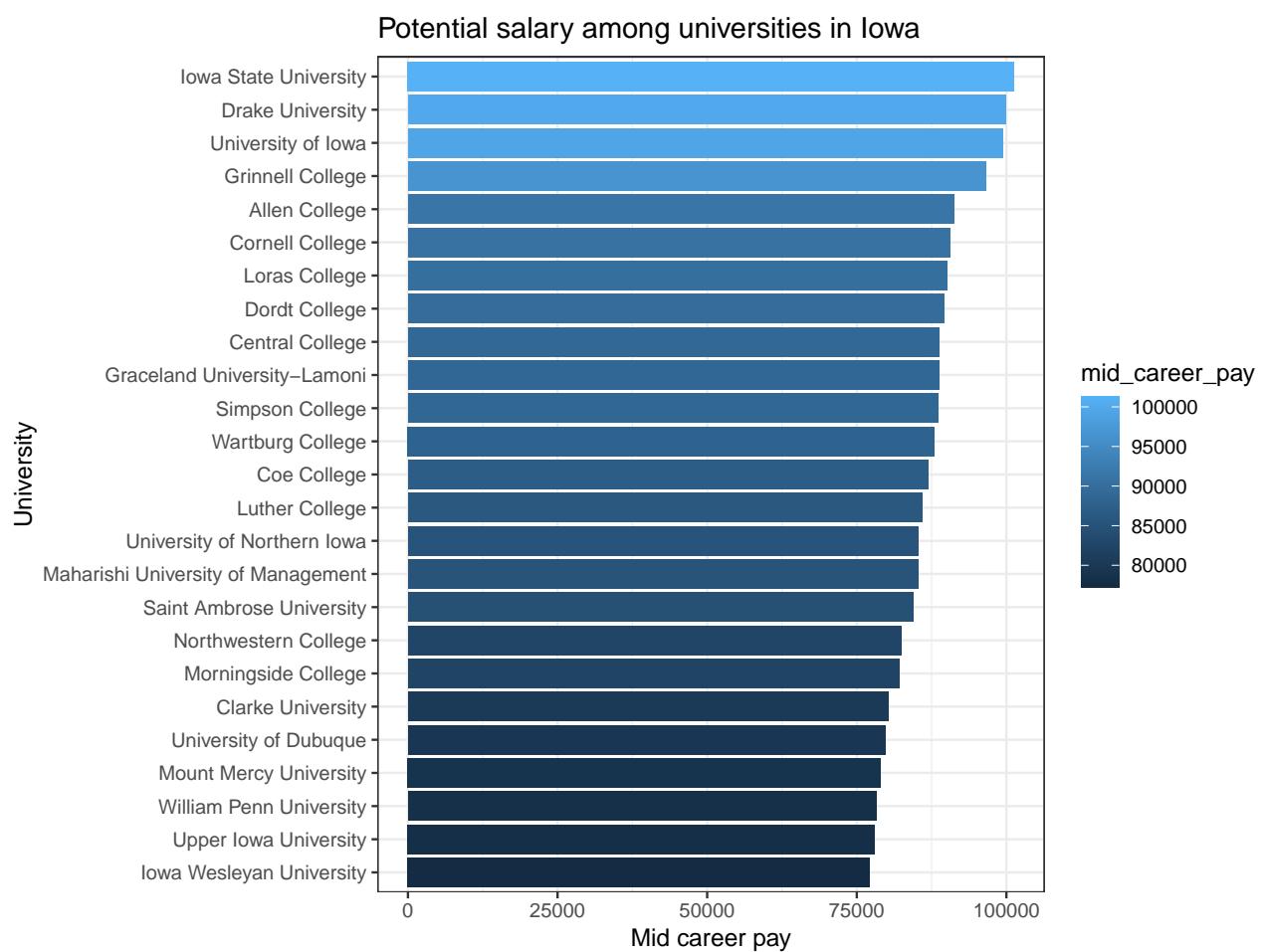
state_name	average_mid_career_pay
California	123976
New-York	122328
Massachusetts	115712
Pennsylvania	110884
Texas	103476

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

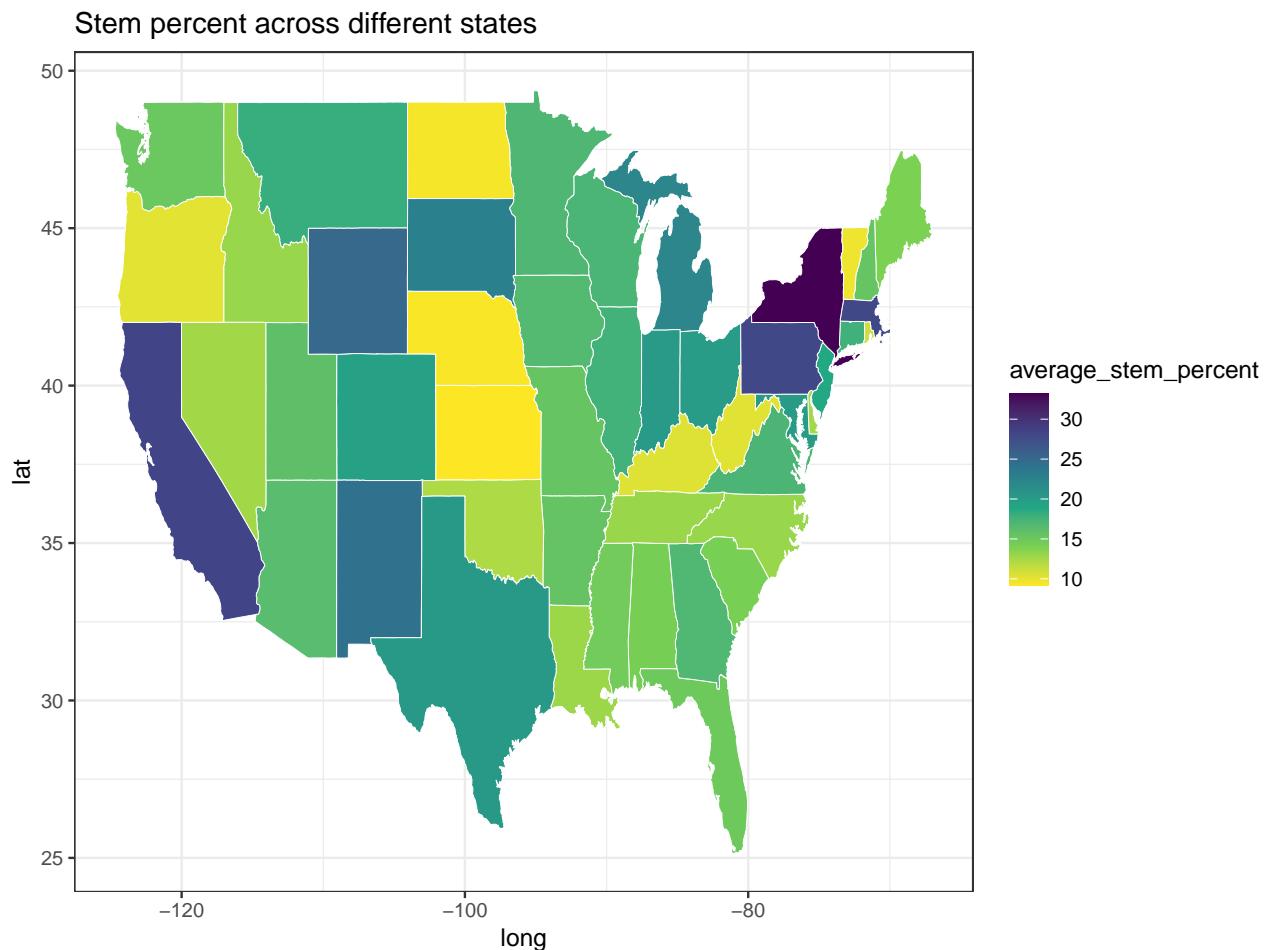
Let's take a closer look at Iowa

rank	name	state_name	early_career_pay	mid_career_pay	stem_percent
1	Iowa State University	Iowa	56100	101300	31
2	Drake University	Iowa	52800	99900	7
3	University of Iowa	Iowa	54100	99400	16
4	Grinnell College	Iowa	53400	96500	41
5	Allen College	Iowa	51600	91300	0
6	Cornell College	Iowa	49600	90600	22
7	Loras College	Iowa	48000	90100	14
8	Dordt College	Iowa	51000	89600	17
9	Central College	Iowa	49000	88800	36
10	Graceland University-Lamoni	Iowa	48300	88700	5
11	Simpson College	Iowa	49900	88600	17
12	Wartburg College	Iowa	49300	88000	34
13	Coe College	Iowa	47200	86900	24
14	Luther College	Iowa	48200	85900	21
15	University of Northern Iowa	Iowa	47100	85300	8
16	Maharishi University of Management	Iowa	46800	85200	65
17	Saint Ambrose University	Iowa	46900	84400	8
18	Northwestern College	Iowa	44800	82400	11
19	Morningside College	Iowa	44900	82100	6
20	Clarke University	Iowa	44900	80200	6
21	University of Dubuque	Iowa	44200	79700	7
22	Mount Mercy University	Iowa	47200	79000	4
23	William Penn University	Iowa	43900	78300	7
24	Upper Iowa University	Iowa	44200	78000	3
25	Iowa Wesleyan University	Iowa	42600	77200	8

In Iowa, ISU has the highest potential salary



What is average stem percent across different states?



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.