

# College Graduation Rates and Economic Inequality

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# Background



- National graduation average for full-time students at 4-year degree-granting institutions was **59 percent**.
- In 2016, graduation rates ranged from 1.3% to 100% for 4 year institutions
  - Context: Graduation is measured in 6 year time frame, e.g. students have 6 years to complete 4 year degree
  - Only 19% of students earn a degree in 4 years<sup>(1)</sup>
- Goal: What causes colleges to have higher graduation rates than others?

(1) <https://www.nytimes.com/2014/12/02/education/most-college-students-dont-earn-degree-in-4-years-study-finds.html>

# Data



- College Scorecard Data from the U.S. Department of Education.
- Hundreds of variables available
  - Selected most pertinent ones to graduation
- 5 Years of data: 2011-2016
  - Averaged together to control for outlier years
- Used data where graduation rates were available
- Dropped variables with more than 10% of data missing
- Imputed missing values

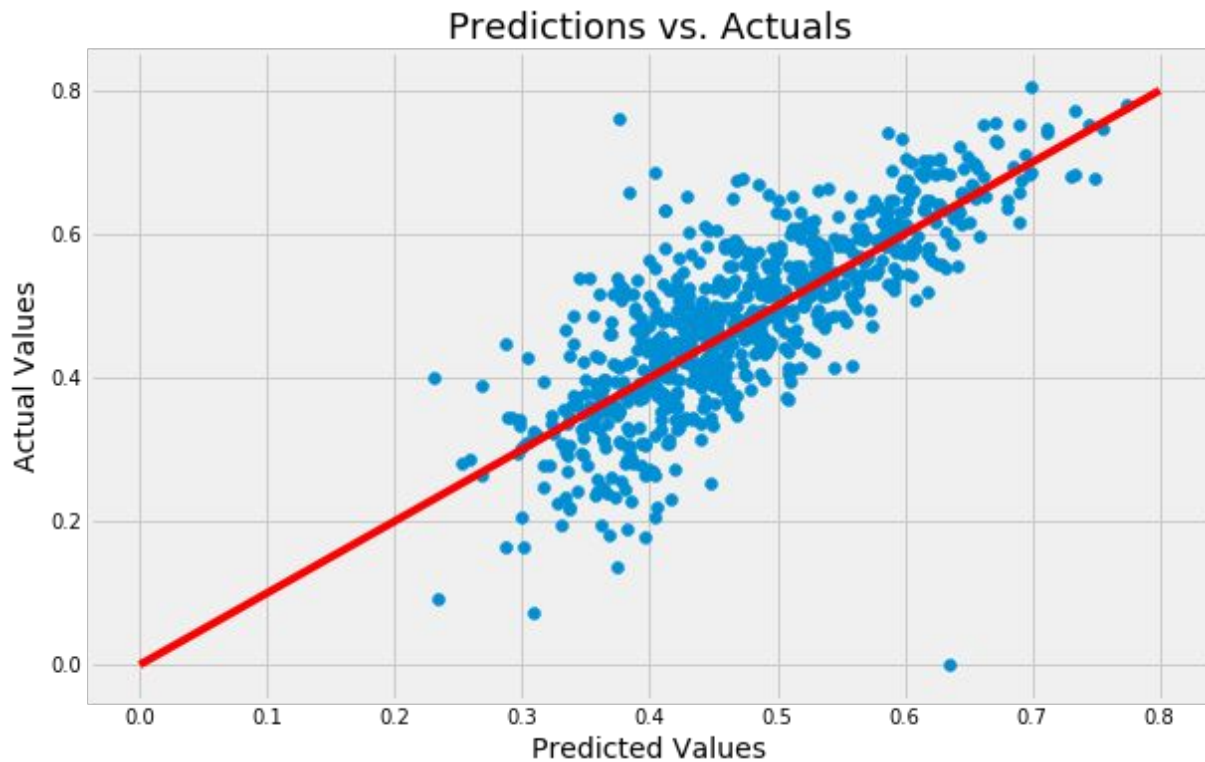
# Models



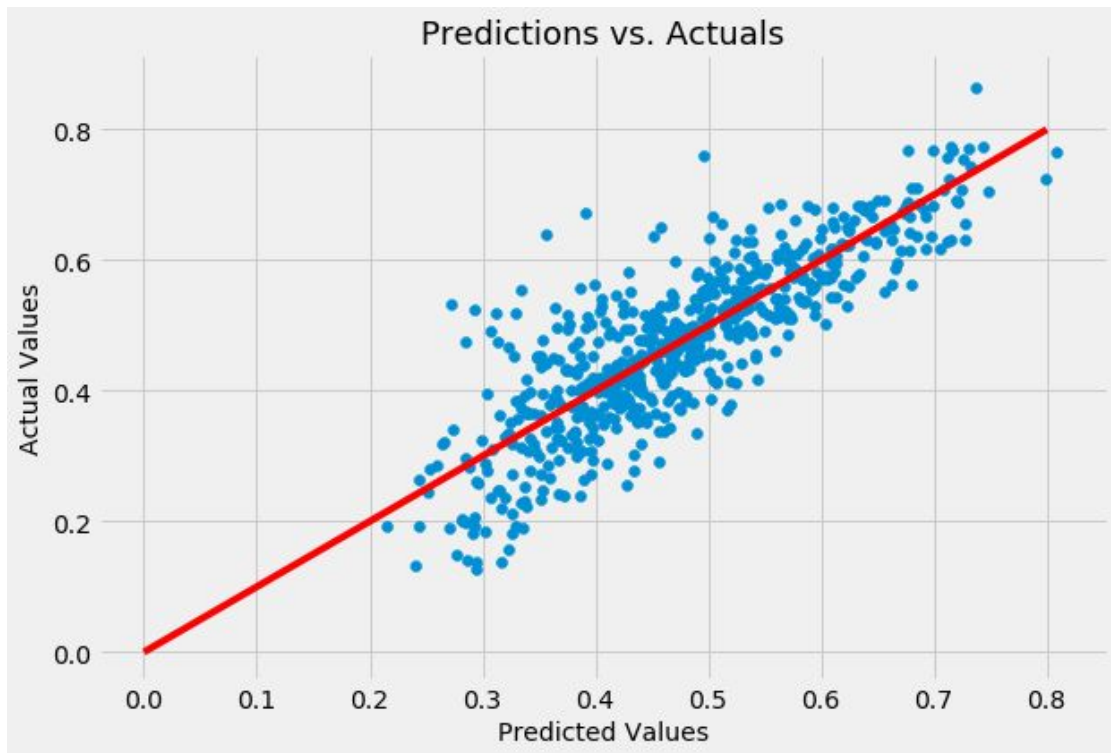
Two models used: Random Forest and Linear Regression

- Random Forest
  - Top 5 features explained vast majority of model performance
  - Best hyperparams
  - Cross validated  $R^2$  score: 60%
- Linear Regression
  - Top features all statistically significant with 95% confidence
  - Cross validated  $R^2$  score: 67%
- Final analysis incorporates strongest features from both models

# Random Forest Performance



# Linear Regression Performance



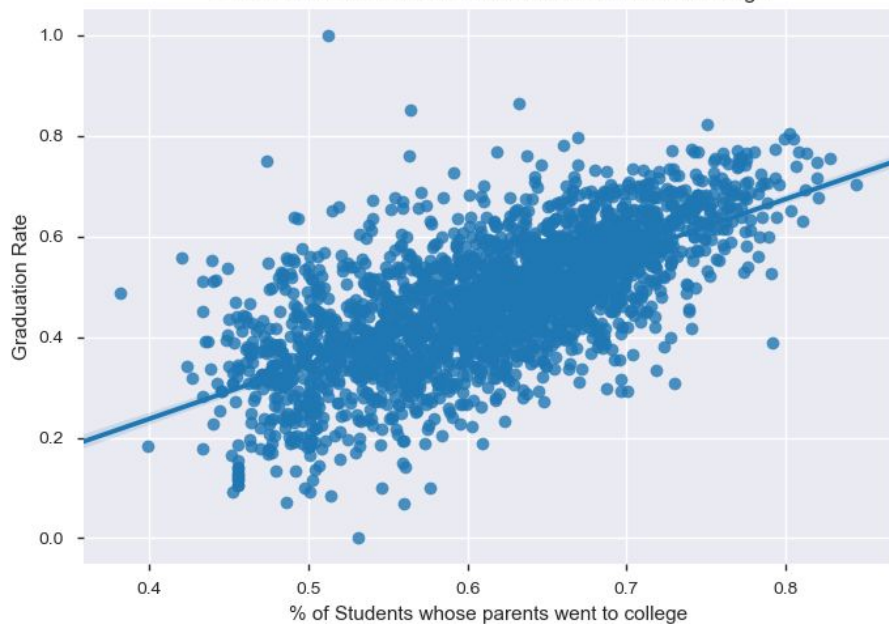
# Feature Importance

## – Top Features

### Between Models

- Number of students whose parents had higher than high school education (+)
- Number of students receiving a federal student loan (-)
- Tuition for out of state students (+)
- Median debt for students with family income \$75,001+ (+)
- Transfer rate for first-time, full-time students (-)

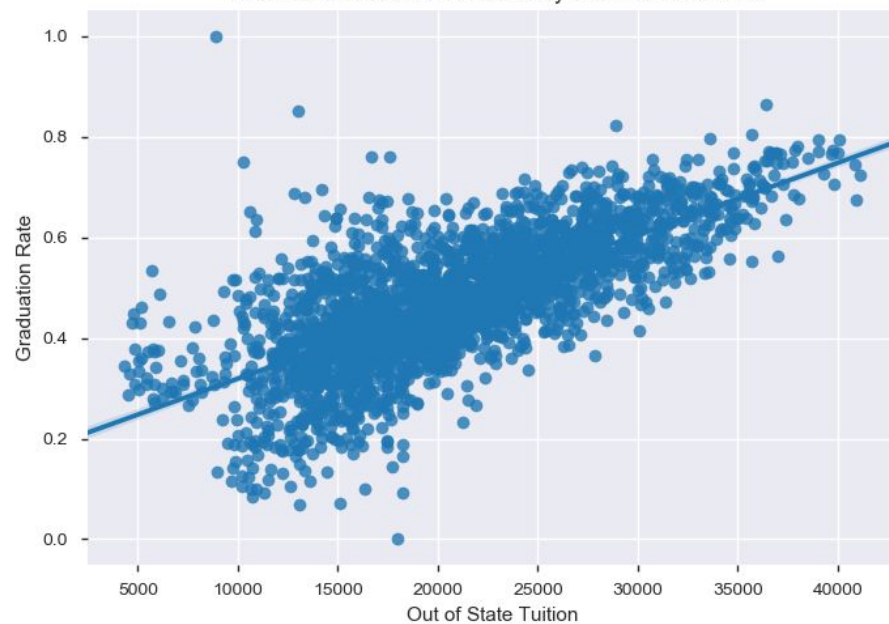
Rate of Grad. for Students whose Parents went to College



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Rate of Graduation for Students whose  
Parents Attended College

Rate of Grad. for Students that Pay Out of State Tuition

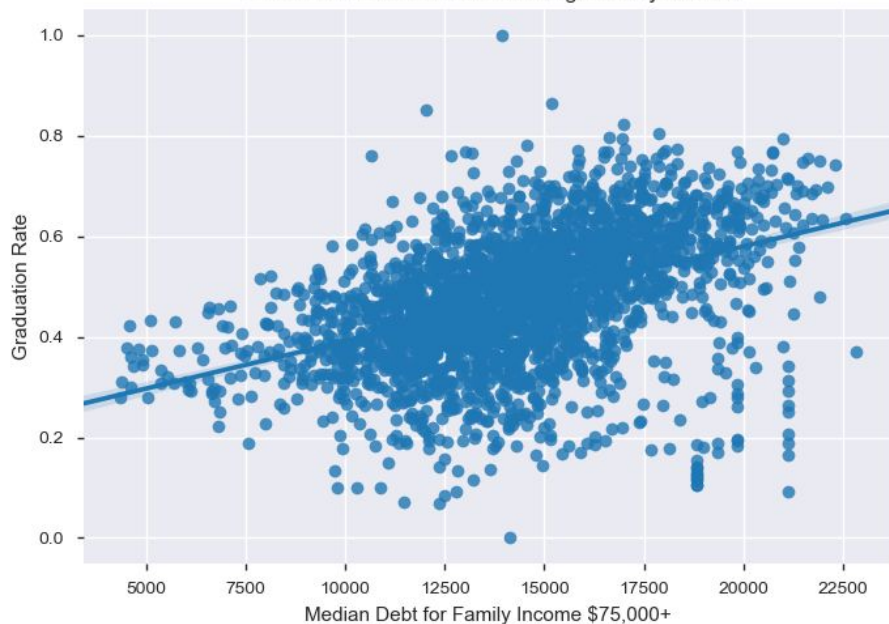


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Rate of Graduation for Students who Pay  
out of State Tuition



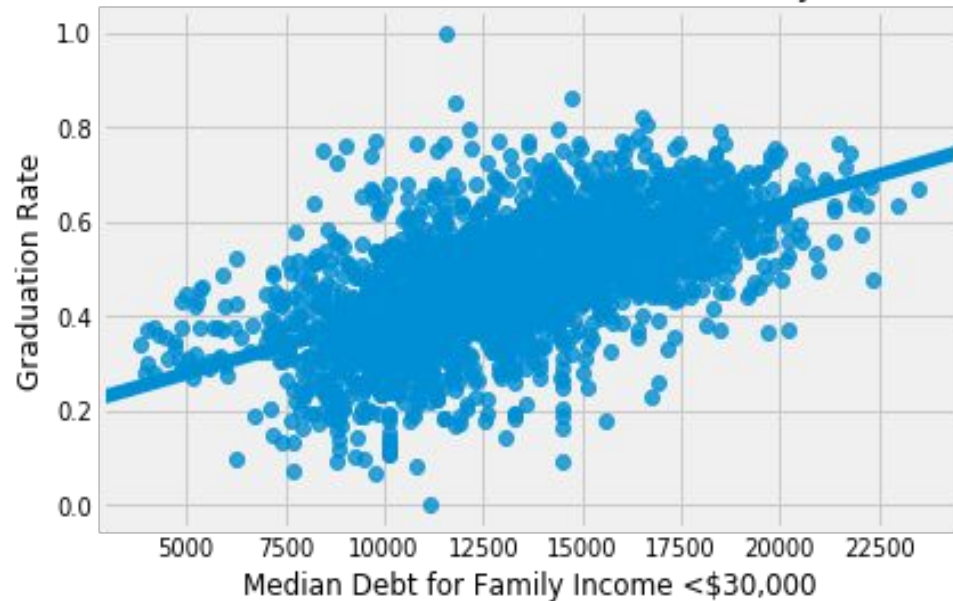
Rate of Grad. for Students with High Family Income



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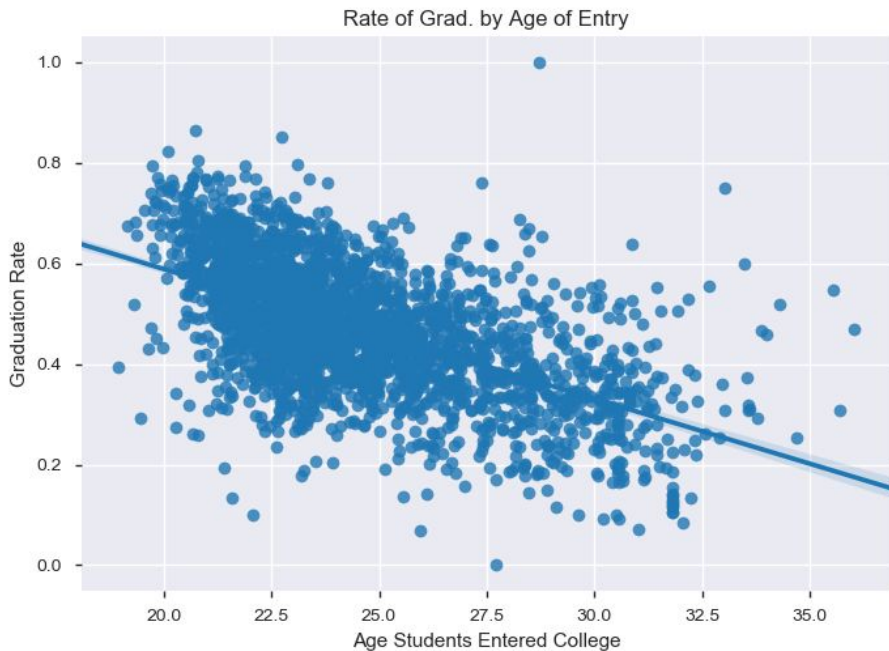
Median Debt Graduation for Students with  
Family Income >\$75,000

Rate of Grad. for Students with Low Family Income



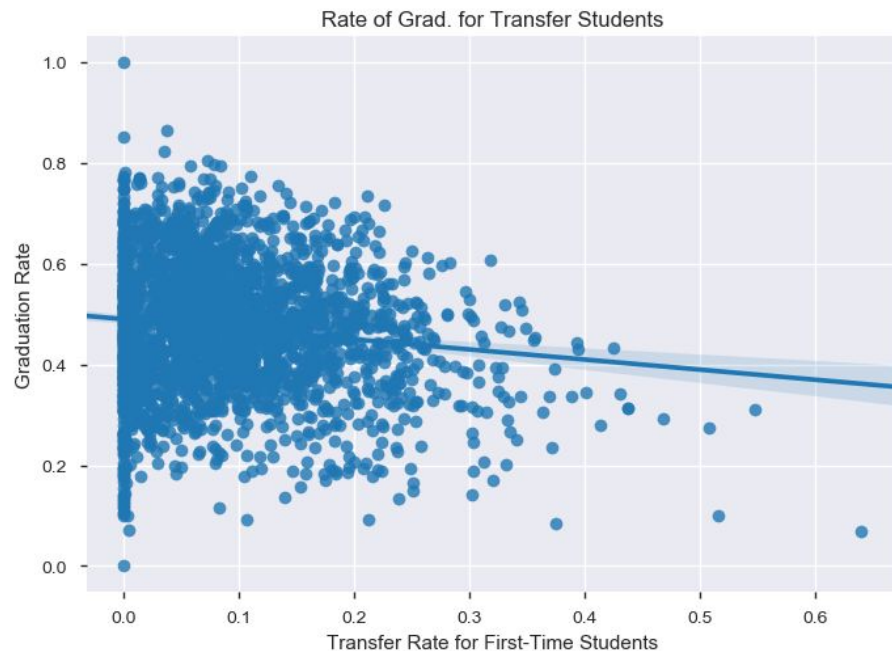
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Median Debt for Students with Family Income  
<\$30,000



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Rate of Graduation Based on Age of Entry



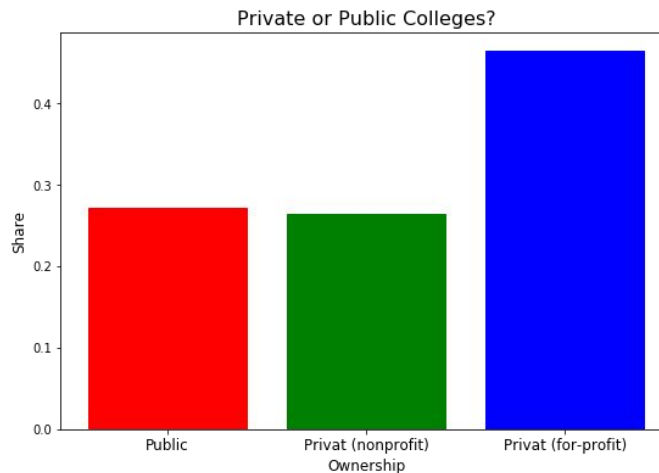
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Rate of Graduation vs. Student Transfers

# Conclusion

What causes colleges to have higher graduation rates than others?

- Higher educational background of the students parents.
- Higher tuitions.
- Fewer students transferring into the college.
- Less students receiving federal student loans.
- Higher debt for students with high family income.



# Recommendations

- Colleges that cater to higher economic classes have higher graduation rates across the board
- Schools need to re-orient their programs to be more inclusive of all income levels
- More research is necessary to determine what causes these differences and how to accommodate them

Questions?





**KEEP  
CALM  
AND  
GO  
BANANAS**