



Investigation of H-1B Visa Applications

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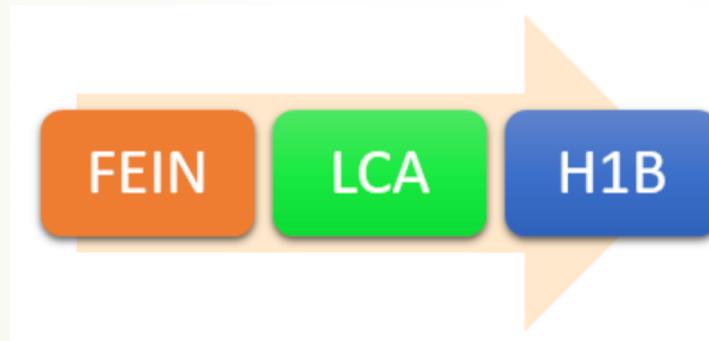


Outline

- ▶ Background
- ▶ Data
- ▶ Analysis
 - ▶ Questions being Investigated and Results
- ▶ Conclusion

Background

- ▶ What are H-1B Visas?
 - ▶ For qualified foreigners to work in specialty occupations in the U. S.



- ▶ Why do we care?

Data

- ▶ 3,002,458 H-1B Visa applications from 2011 to 2016
- ▶ 10 variables

	CASE_STATUS	EMPLOYER_NAME	SOC_NAME	JOB_TITLE	FULL_TIME_POSITION	PREVAILING_WAGE	YEAR	WORKSITE	lon	lat
1	CERTIFIED-WITHDRAWN	UNIVERSITY OF MICHIGAN	BIOCHEMISTS AND BIOPHYSICISTS	POSTDOCTORAL RESEARCH FELLOW	N	36067	2016	ANN ARBOR, MICHIGAN	-83.7430378	42.2808256
2	CERTIFIED-WITHDRAWN	GOODMAN NETWORKS, INC.	CHIEF EXECUTIVES	CHIEF OPERATING OFFICER	Y	242674	2016	PLANO, TEXAS	-96.6988856	33.0198431
3	CERTIFIED-WITHDRAWN	PORTS AMERICA GROUP, INC.	CHIEF EXECUTIVES	CHIEF PROCESS OFFICER	Y	193066	2016	JERSEY CITY, NEW JERSEY	-74.0776417	40.7281575
4	CERTIFIED-WITHDRAWN	GATES CORPORATION, A WHOLLY-OWNED SUBSIDIARY OF TOMKINS PLC	CHIEF EXECUTIVES	REGIONAL PRESIDEN, AMERICAS	Y	220314	2016	DENVER, COLORADO	-104.990251	39.7392358
5	WITHDRAWN	PEABODY INVESTMENTS CORP.	CHIEF EXECUTIVES	PRESIDENT MONGOLIA AND INDIA	Y	157518.4	2016	ST. LOUIS, MISSOURI	-90.1994042	38.6270025
6	CERTIFIED-WITHDRAWN	BURGER KING CORPORATION	CHIEF EXECUTIVES	EXECUTIVE V P, GLOBAL DEVELOPMENT AND PRESIDENT, LATIN AMERI	Y	225000	2016	MIAMI, FLORIDA	-80.1917902	25.7616798
7	CERTIFIED-WITHDRAWN	BT AND MK ENERGY AND COMMODITIES	CHIEF EXECUTIVES	CHIEF OPERATING OFFICER	Y	91021	2016	HOUSTON, TEXAS	-95.3698028	29.7604267
8	CERTIFIED-WITHDRAWN	GLOBO MOBILE TECHNOLOGIES, INC.	CHIEF EXECUTIVES	CHIEF OPERATIONS OFFICER	Y	150000	2016	SAN JOSE, CALIFORNIA	-121.8863286	37.3382082
9	CERTIFIED-WITHDRAWN	ESI COMPANIES INC.	CHIEF EXECUTIVES	PRESIDENT	Y	127546	2016	MEMPHIS, TEXAS	NA	NA
10	WITHDRAWN	LESSARD INTERNATIONAL LLC	CHIEF EXECUTIVES	PRESIDENT	Y	154648	2016	VIENNA, VIRGINIA	-77.2652604	38.9012225

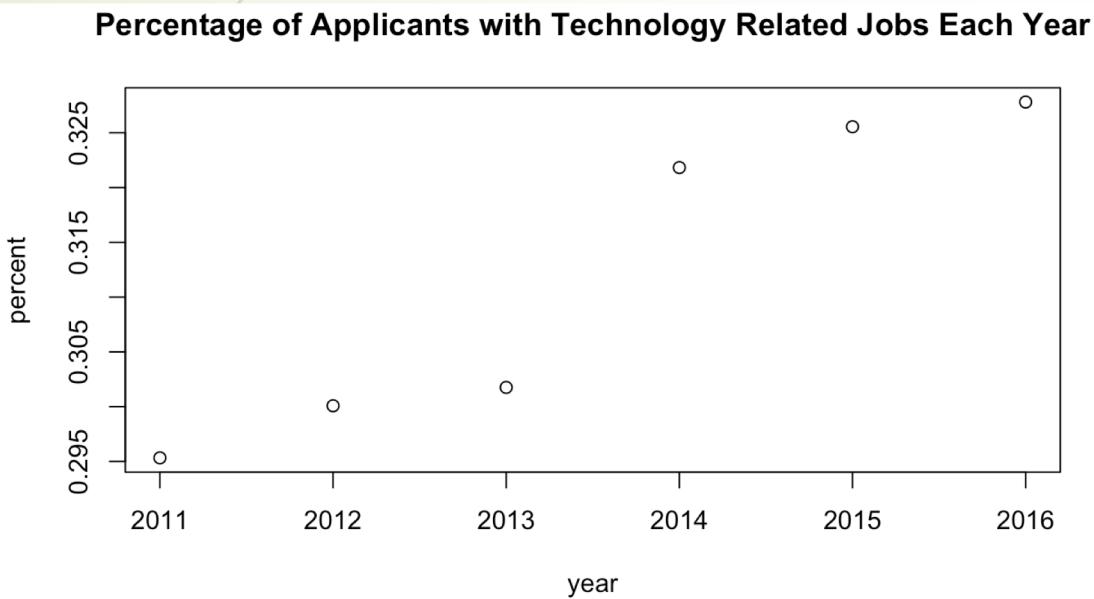
Analysis

- ▶ Questions:
 - ▶ Is the proportion of applicants with technology related jobs increasing over the years?
 - ▶ What is the trend for the proportion of certified applications over the years?
 - ▶ What is the trend for the average annual wages over the years for all applications? For only certified applications?
 - ▶ What is the trend for the proportion of denied applications over the years?

Question 1

Is the proportion of applicants with technology related jobs increasing over the years?

► Z test for two population proportions at level 0.05



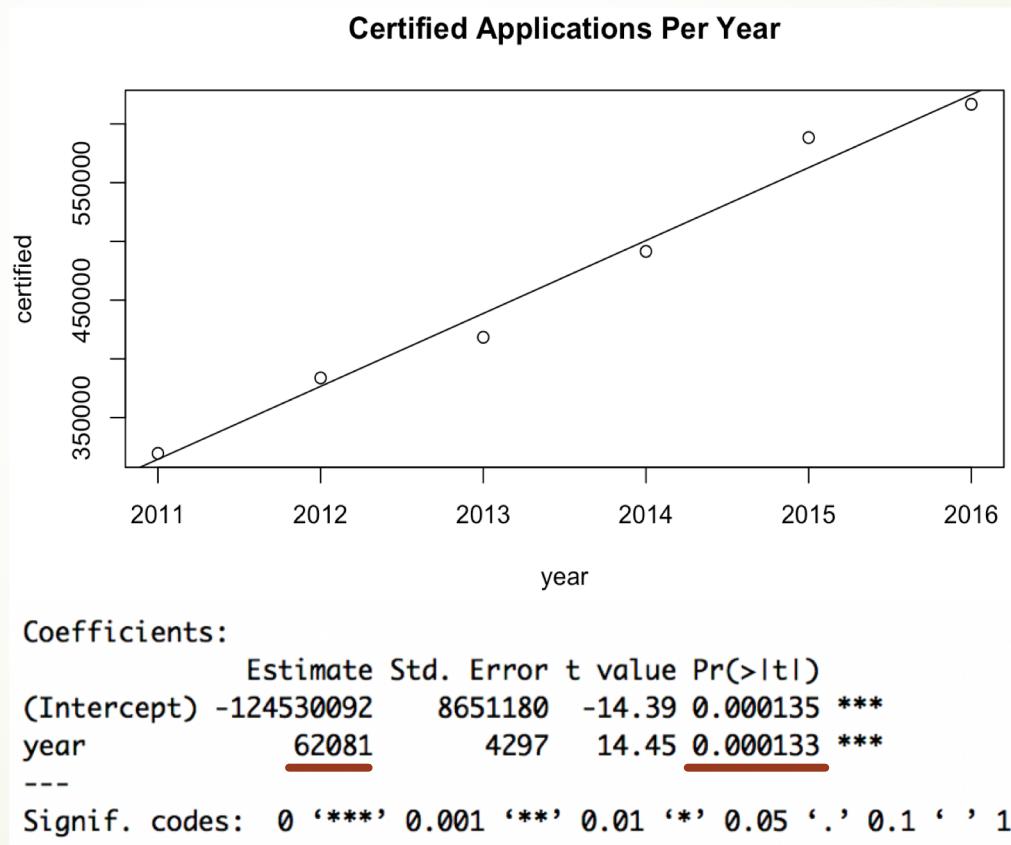
```
2-sample test for equality of proportions with continuity correction  
data: c(103990, 212348) out of c(352118, 647796)  
X-squared = 1112.1, df = 1, p-value < 2.2e-16  
alternative hypothesis: less
```

► Yes, the proportion of technology related jobs in 2016 is higher than 2011

Question 2

What is the trend for the proportion of certified applications over the years?

- Linear regression model



Question 2 Count.

- ▶ Z test for two population proportions at level 0.05

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2-sample test for equality of proportions with continuity correction
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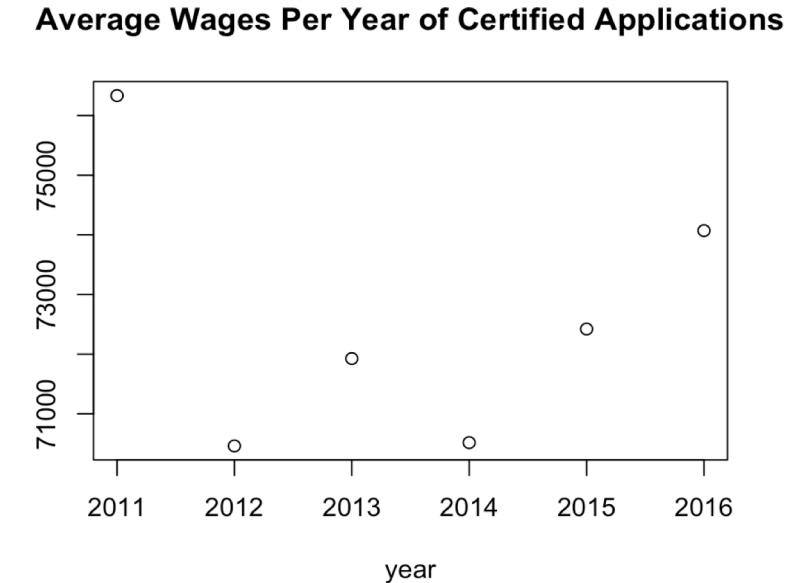
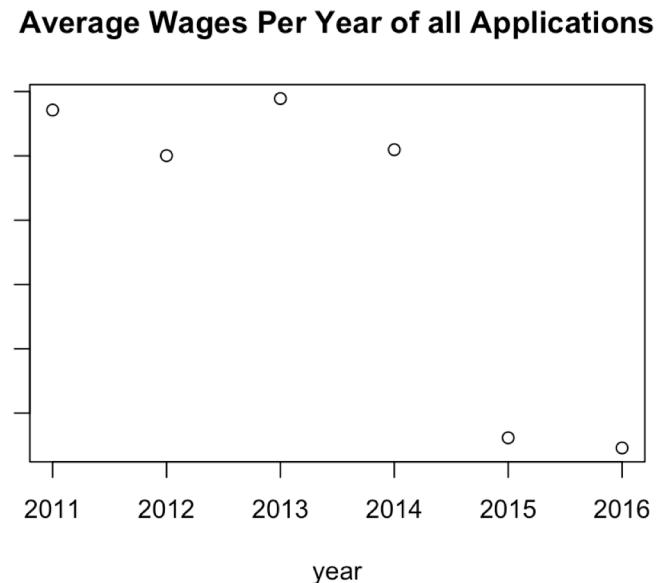
```
data: c(c_1, c_6) out of c(nrow(data_1), nrow(data_6))
X-squared = 13391, df = 1, p-value < 2.2e-16
alternative hypothesis: less
```

- ▶ The general trend for the number of certified applications per year is increasing

Question 3

What is the trend for the average annual wages over the years for all applications? For only certified applications?

► Overview



Question 3 Count.

- ▶ Two-sample t test for approved applications wage means in 2011 and 2016 at level 0.05

```
Welch Two Sample t-test

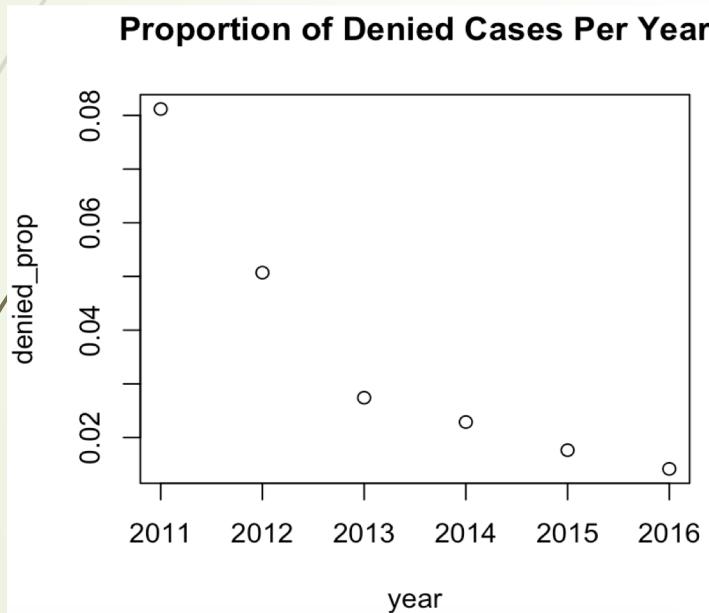
data: c1$PREVAILING_WAGE and c6$PREVAILING_WAGE
t = 0.56383, df = 311500, p-value = 0.5729
alternative hypothesis: true difference in means is not equal to 0
```

- ▶ Average wages for all applicants decreased significantly in 2015, but the average wages for certified applications remained the same over the six years

Question 4

What is the trend for the proportion of denied applications over the years?

- Z test for two population proportions at level 0.05



```
2-sample test for equality of proportions with continuity correction  
data: c(d_1, d_6) out of c(nrow(data_1), nrow(data_6))  
X-squared = 28334, df = 1, p-value < 2.2e-16  
alternative hypothesis: greater
```

- The rate of denial is decreasing over the years



Conclusion

- ▶ The proportion of people with technology related jobs applying for the visa is increasing
- ▶ The number of certified applications is increasing by about 62081 each year
- ▶ The rate of approval for the application is increasing, while rate of denial is decreasing
- ▶ Average wages for certified applications remain the same from 2011 to 2016 at around \$73,000 per year
- ▶ However, this means that the lottery is more and more competitive!

References

- ▶ “H-1B Specialty Occupations, DOD Cooperative Research and Development Project Workers, and Fashion Models.” USCIS, U.S. Citizenship and Immigration Services, 4 Mar. 2017, www.uscis.gov/working-united-states/temporary-workers/h-1b-specialty-occupations-dod-cooperative-research-and-development-project-workers-and-fashion-models.
- ▶ Naribole, Sharan. “H-1B Visa Petitions 2011-2016.” Kaggle, Kaggle, 28 Feb. 2017, www.kaggle.com/nsharan/h-1b-visa.
- ▶ “U.S. GDP 1990-2017.” Statista, Statista, Jan. 2018, www.statista.com/statistics/188105/annual-gdp-of-the-united-states-since-1990/.



Questions?



Some R Code

- ▶ Filtering technology related jobs

```
toMatch = c('programmer', 'software', 'computer', 'database')
toNotMatch = c('sales', 'marketing')
tech_jobs_temp = filter(data_6, grepl(paste(toMatch,collapse='|'), JOB_TITLE))
tech_jobs = filter(tech_jobs_temp, !grepl(paste(toNotMatch,collapse='|'), JOB_TITLE))
```

Why is Linear Regression Appropriate for Question 2?

- ▶ Check assumptions – response variable has to have a normal distribution and equal variances – normal plot

