

H-1B Visa Applications

Devon Allies

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1 Introduction

1.1 Overview of the H-1B Program

The H-1B is a non-immigrant visa program in the United States that allows employers to employ foreign workers. The program is aimed towards professionals with a “theoretical and practical applications of a body of highly specialized knowledge” This program allows companies in the United States to hire foreign professionals with specific skills and expertise across various industries and locations.

1.2 Dataset Description

The H-1B Employer Data Hub is a database that launched in April of 2019 by the USCIS. This database provides transparency into the H-1B visa program

2 Data Preperation

2.1 Data Importing & Cleaning

Initial Data Exploration

```
## [1] "Fiscal.Year"           "Employer..Petitioner..Name"
## [3] "Tax.ID"                "Industry..NAICS..Code"
## [5] "Petitioner.City"       "Petitioner.State"
## [7] "Petitioner.Zip.Code"   "Initial.Approval"
## [9] "Initial.Denial"        "Continuing.Approval"
## [11] "Continuing.Denial"

## Fiscal.Year  Employer..Petitioner..Name  Tax.ID  Industry..NAICS..Code
## Min. :2020    Length:293617           Min. : 0    Length:293617
## 1st Qu.:2021   Class :character          1st Qu.:2414 Class :character
## Median :2022   Mode  :character          Median :4931 Mode  :character
## Mean :2022                    Mean :4948
## 3rd Qu.:2023                    3rd Qu.:7463
## Max. :2024                    Max. :9999
##                               NA's :3730
## Petitioner.City  Petitioner.State  Petitioner.Zip.Code  Initial.Approval
## Length:293617    Length:293617      Min. : 603          Min. : 0.000
## Class :character Class :character     1st Qu.:18940        1st Qu.: 0.000
## Mode :character  Mode :character     Median :48188        Median : 1.000
##                               Mean :49912          Mean : 1.895
##                               3rd Qu.:83898        3rd Qu.: 1.000
##                               Max. :99901          Max. :977.000
##                               NA's :29
## Initial.Denial  Continuing.Approval  Continuing.Denial
## Min. : 0.0000    Min. : 0.000          Min. : 0.000
## 1st Qu.: 0.0000   1st Qu.: 0.000        1st Qu.: 0.000
## Median : 0.0000   Median : 1.000        Median : 0.000
## Mean : 0.1039     Mean : 3.649          Mean : 0.143
## 3rd Qu.: 0.0000   3rd Qu.: 2.000        3rd Qu.: 0.000
## Max. :398.0000    Max. :995.000         Max. :947.000
##
```

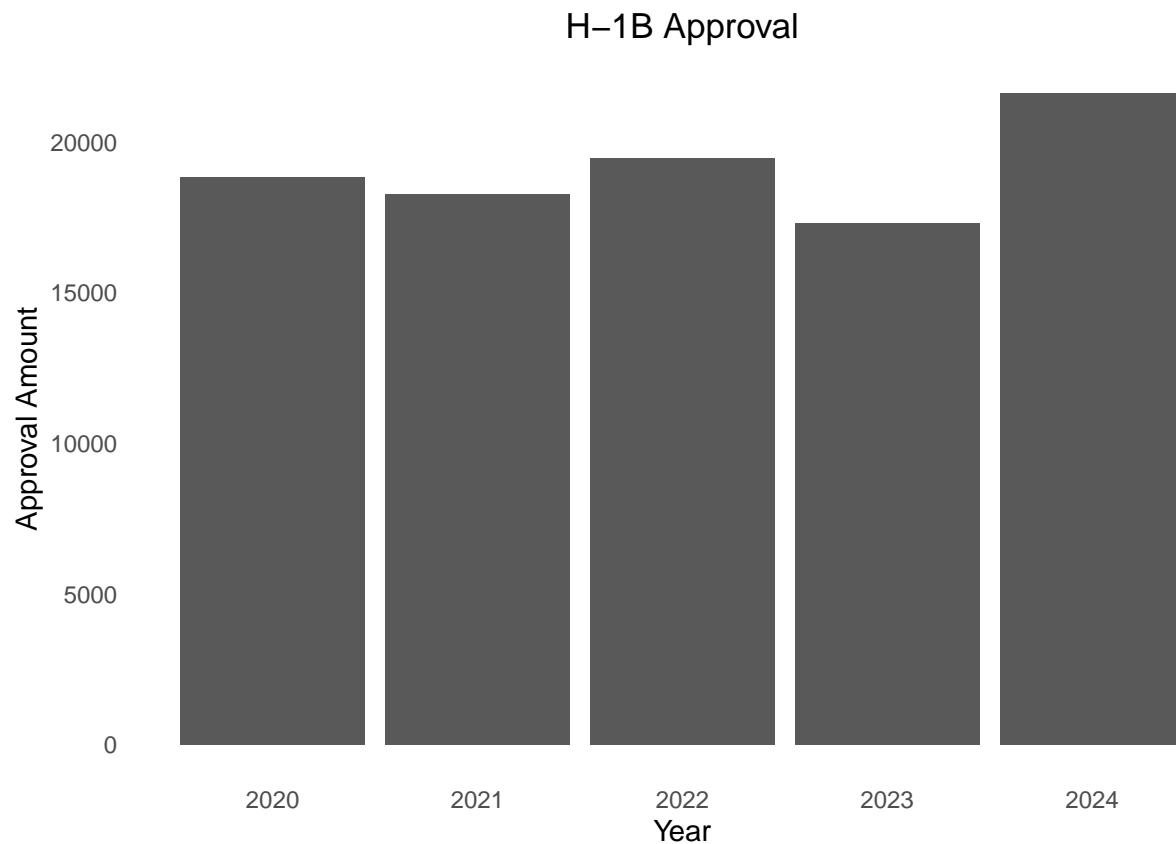
```
## Rows: 293,617
## Columns: 11
## $ Fiscal.Year          <int> 2024, 2024, 2024, 2024, 2024, 2024, 2024, 2~
## $ Employer..Petitioner..Name <chr> "", "", "1 800 FLOWERS COM INC", "1 HOTEL K~
## $ Tax.ID               <int> 3581, 4245, 7311, 5669, 7999, 6496, 3805, 1~
## $ Industry..NAICS..Code <chr> "54 - Professional, Scientific, and Technic~
## $ Petitioner.City      <chr> "LAFAYETTE", "DAVIE", "JERICH0", "MIAMI", "~
## $ Petitioner.State     <chr> "CA", "FL", "NY", "FL", "OR", "SC", "CA", "~
## $ Petitioner.Zip.Code  <int> 94549, 33328, 11753, 33133, 97367, 29708, 9~
## $ Initial.Approval     <dbl> 0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1, 0, 1, 0, 1~
## $ Initial.Denial       <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0~
## $ Continuing.Approval  <dbl> 1, 0, 5, 1, 0, 1, 0, 1, 3, 1, 0, 1, 0, 1, 0~
## $ Continuing.Denial    <dbl> 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0~
```

3 Analysis

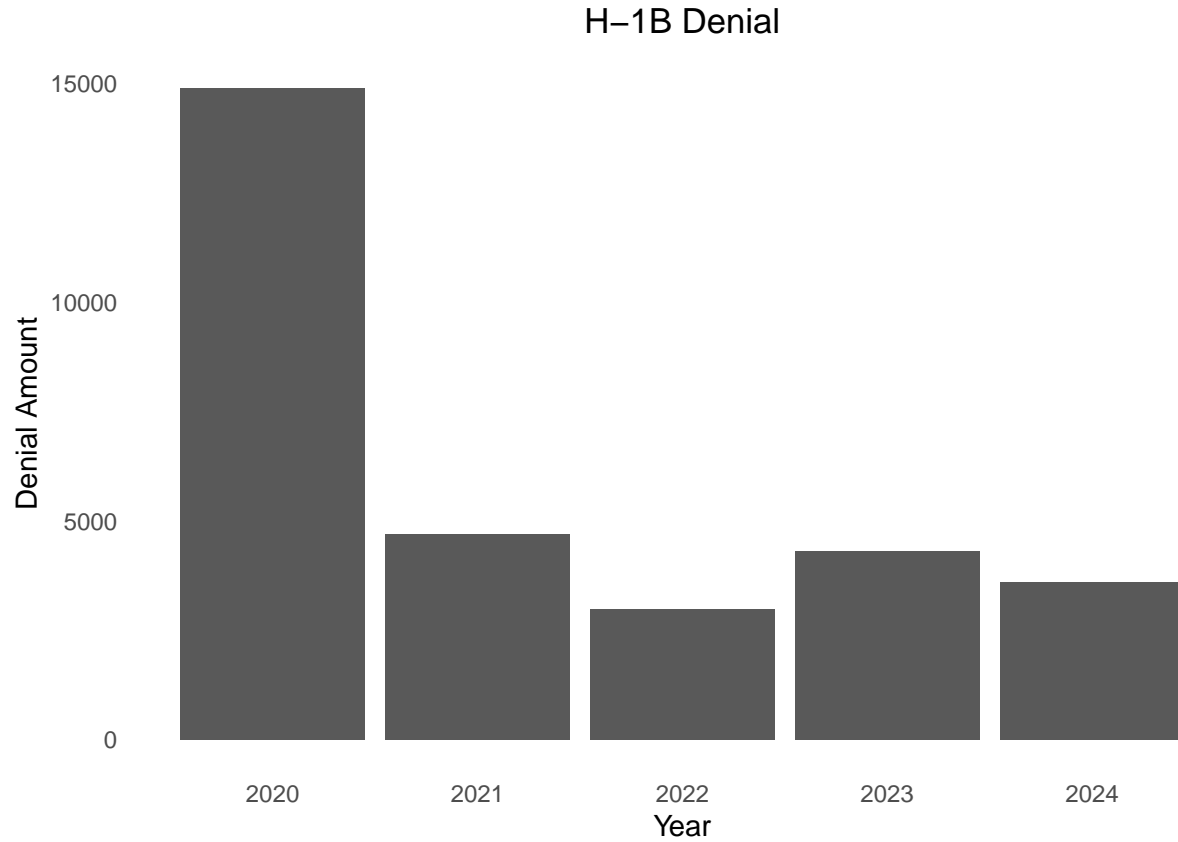
3.1 Trends

The analysis of H-1B applications for the fiscal years, 2020 - 2024, reveals some patterns:

3.1.1 Approval Rates



3.1.2 Denial Rates



3.1.3 Approval & Denial Rates

Table 1: Table 1: Summary Statistics for H-1B Visa Program

Fiscal.Year	approval	denial	total_applications	approvalRate	denialRate
2020	18841	14911	33752	56	44
2021	18280	4690	22970	80	20
2022	19468	2988	22456	87	13
2023	17314	4309	21623	80	20
2024	21636	3611	25247	86	14

3.1.4 Hypothesis testing

```
##
## Pearson's Chi-squared test
##
## data:  table
## X-squared = 10538, df = 4, p-value < 2.2e-16
```

Overall, the approval rates have increased while denials have decreased. The trend suggest a shift in H-1B visa processing policies and practices over the 5 year period, with a clear move towards higher approval rates and fewer denials.

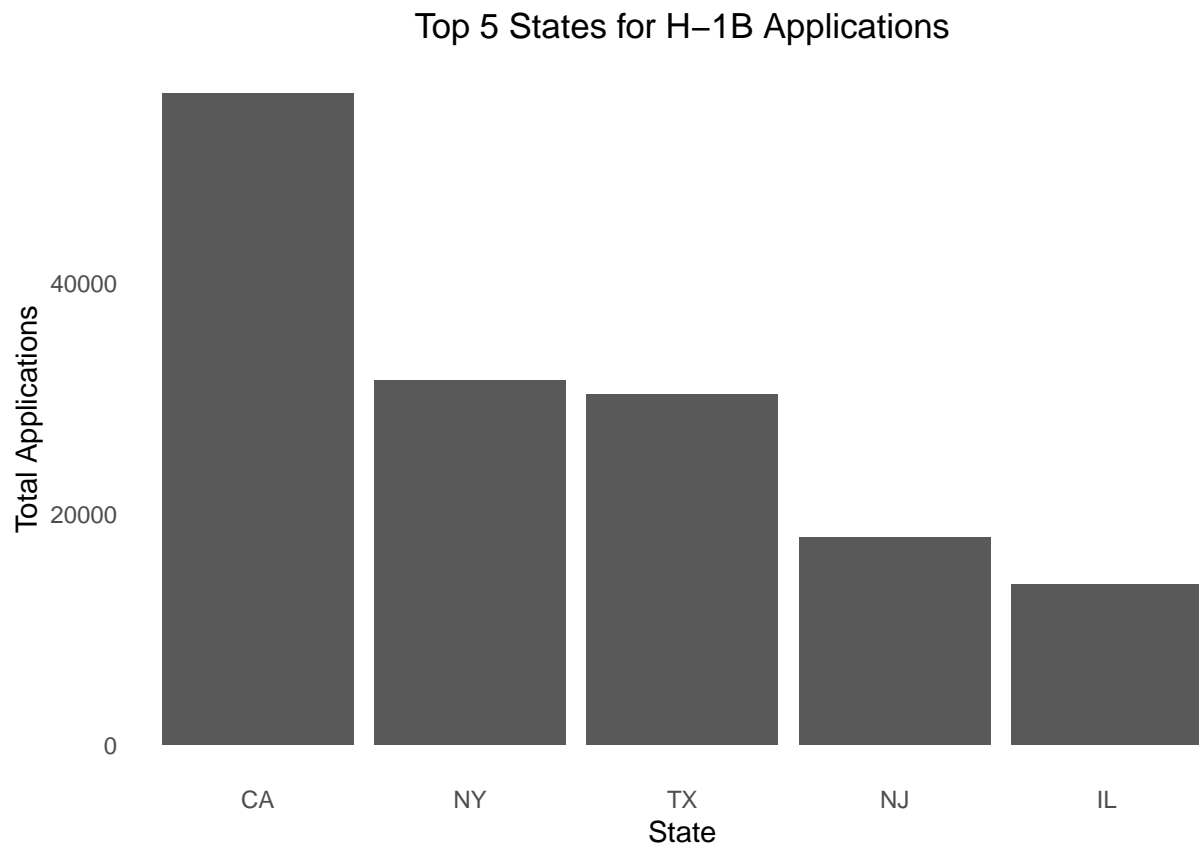
The chi-square test helps to determine if the observed changes in approval and denial rates are statically significant or merely random chance. This is crucial because:

- it validates the trends
- provides evidence to support the claims about the changes

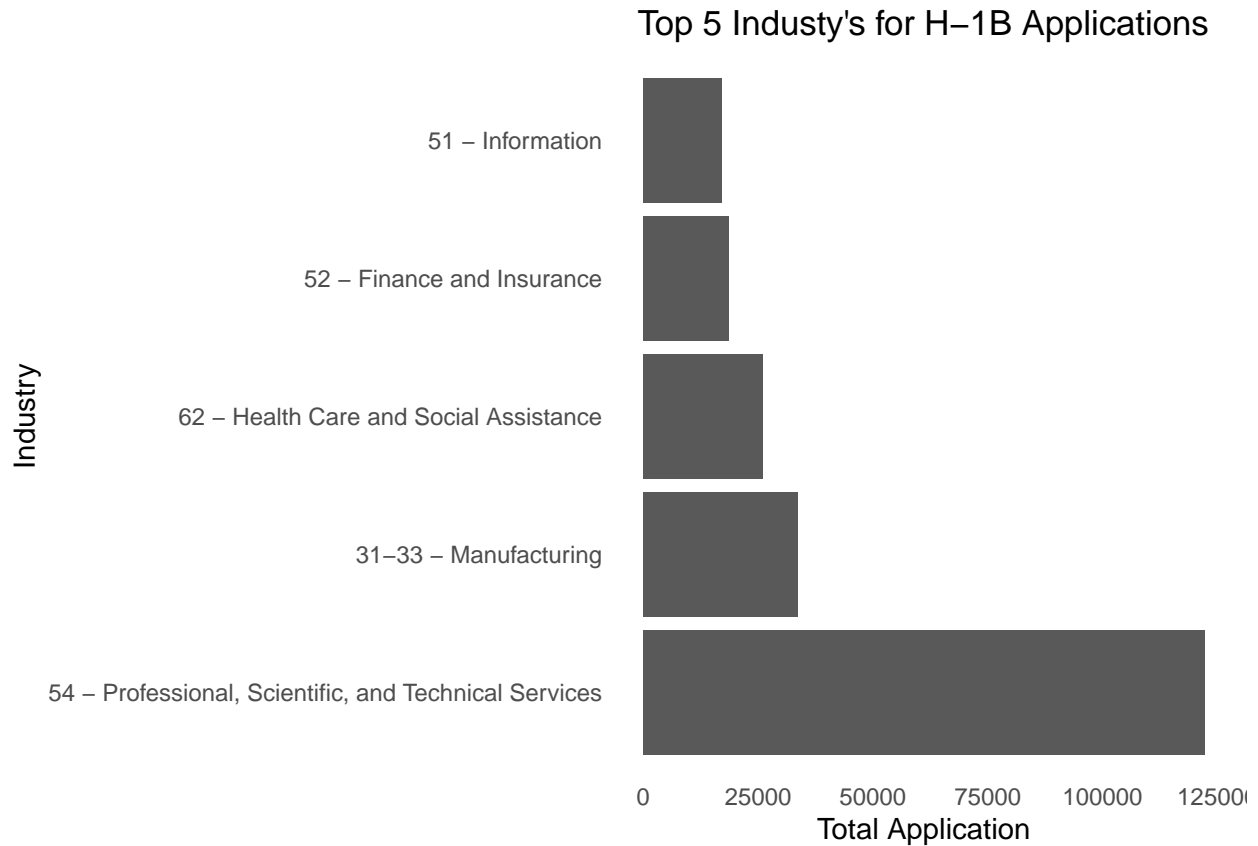
The p-value, $<2.2e-16$, suggests that the approval and denial rate is not due too random chance.

3.2 Distribution

3.2.1 Distribution per State (Top 5 State)



3.2.2 Distribution per Industry (Top 5 Industries)



4 Conclusion

The approval rates have been increasing over the last 5 years with the denials decreasing, indicating that more and more foreign workers are getting access to the United States. The denial rate during the 2020 fiscal year could be due to the COVID-19 pandemic, which caused major disruptions in the visa processing.

The statistical evidence strengthens the conclusion that there has been a substantial shift in the H-1B processing, with a clear trend towards higher approval rates and lower denial rates.