

How Does Covid-19 Impact the Future Plans of Graduated College Students in China?

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ABSTRACT

The Covid-19 has dramatically influenced society world widely. This work explored its influence on the future plans of graduated college students in China. This work extracted data of different employment plans of graduated college students from 20 universities in China, using statistical techniques and Python libraries, analysed the data and visualized the results. This shows the impact of Covid-19 on the college students' employment directly and vividly.

Keywords: Covid-19, College student employment, Python Library, Data Visualization, Statistic analysis

1. INTRODUCTION

Started at the end of the year 2019, the Covid-19 has dramatically influenced human society world widely. The virus is extremely dangerous due to its vital symptoms and transmissibility. From the end of the year 2019 to now, August 29, 2021, the number of Covid cases worldwide has reached 217 million, with about 4.5 million of deaths [1]. This caused a huge cost to the resources of all the worlds, including human power resources, medical resources, transportation resources, and these costs by suspending manufacturing. According to the United Nations [2], the pandemic has already cost 2 trillion dollars to the world economy in the last year, which is a huge cost to the whole world economy, and it is approximately ten percent of the GDP of America. What's more, the pandemic also had a huge impact on people's life, it led to an unprecedented challenge to public health, food systems and the world of work. Millions of enterprises face an existential threat, also has been affecting the entire food system and has laid bare its fragility. It also leads to employment and labour issues, in particular workers' health and safety [3]. The Covid-19 impacts various groups of people in the world, workers, merchants, and specially the students. College students are in their golden period of studying and considering employment, their further plans may be dramatically impacted by the pandemic. Since the pandemic had such a dramatic impact on the world work system and transportation system, this work discusses

what influences does the pandemic have on the future work plans of graduated college students in China by the methods of computer codes generated statistical diagrams that makes the data visualized. The work will collect 21 colleges' data of graduated students' work status, including Tsinghua University, Beijing University and Shanghai university, and other famous and symbolic colleges in China. After that, the data will be analysed, including analysing the number of students who go abroad, the employment status of graduating students, and the differences of tendencies of employments between the undergrad student, graduated student, and the doctoral students. This work will generate the data visual diagrams via our own codes, clarify the results and comparisons, and generate a set of clear, reliable statistical diagrams on the after-graduate student employment status in China. With the visualization of data and the broad statistical information, how the Covid-19 pandemic has impacted the future of graduated college students in China will be concluded.

2. METHOD

2.1 Backgrounds and Data

In this experiment, data of different employment plans of graduated college students from 20 universities in China are extracted. These data come from the employment quality reports of the universities in China, which are published on their official website. Taking the University of Science and Technology of China as an

example, divide the graduates into three categories: undergraduates, masters and doctoral students. And subdivide each category into four categories of their employee plans: domestic further study after graduation, going abroad after graduation, get employment after graduation, and non-employment after graduation.

The development environment used for this experiment is the Virtual Studio Code released by Microsoft, which is a development environment that integrates multiple programming languages, which facilitates the realization of different project requirements. The programming language used is Python. Python, as the most popular language in recent years, has a huge resource library, allowing programmers to bid farewell to the era of "slash and burn", which facilitated the efficiency of writing codes and increased the acceptances of people joining the world of programming. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms and can be freely distributed [4]. In Python, Different functions can be realized by calling different resource libraries for different needs. And these resources are all open sources. In recent years, this programming language has shown excellent results in the realization of machine learning and other major projects.

First, call the resource library that will be used in this project. To achieve the goal of visualizing datas, use the commonly used third-party library in Python -- matplotlib that provides data drawing functions, and its sub-library pyplot is mainly used to realize the generalization of various data display graphs. The Matplotlib library is composed of a series of organized and subordinate objects, which is extremely complicated for basic drawing operations, therefore, it provides a pyplot font library, which encapsulates the object construction process required for drawing in a function and provides a more friendly interface for users. It fortunately takes far less than a thousand words of code to create a production-quality graphic [5]. What's more, use the Xlrd library to read Excel files that obtain our extracted data. The library can take the data as input to realize the goal of generating graphs of statistical data.

2.2 Python Codes

The following takes the University of Science and Technology of China as an example to briefly introduce the main methods of data visualization. As shown in Figure 1, Matplotlib and Xlrd libraries are used, and also the Numpy library that can perform array operations.

```
import xlrd
import matplotlib.pyplot as plt
import numpy as np
```

Figure 1 Imported libraries

Taking the data extraction of doctoral students in 2020 as an example, first use Xlrd to read the data, and store the data needed in a table as shown in Figure 2, which is expressed in the form of a dictionary. The keys

of this dictionary are serial numbers from 0 to 19, and the value of each key corresponds to a list of four different destinations for each university:

```
data=xlrd.open_workbook(filename=r'C:\\Users\\user\\Desktop\\data.xls')
table=data.sheets()[2]
ta={}
for i in range(19):
    ta[i]=table.row_values(2+i,9,13)
```

Figure 2 Inserting Table

As shown in Figure 3, Classifying the data, the x-axis label is the name of each university, and creates four

empty lists to store the proportions of different employment plans.

```
x_data=["USTC","ZJU","THU","FDU","SDU","TCU","HNU","CUFE","ECNU","CSU","TJU","SCUT","GZU","SH
Go_abroad=[]
Study_higher=[]
Employed=[]
Unemployed=[]
```

Figure 3 Creating Labels

As shown in Figure 4, After defining the corresponding label, use a loop statement to store the

corresponding data, and build four arrays.

```
for i in range(19):
    Go_abroad.append(ta[i][0])
    Study_higher.append(ta[i][1])
    Employed.append(ta[i][2])
    Unemployed.append(ta[i][3])
GA=np.array(Go_abroad)
SH=np.array(Study_higher)
E=np.array(Employed)
UE=np.array(Unemployed)
```

Figure 4 Editing Labels

As shown in Figure 5, the code starts to draw the histograms, it would specify the length and width of the

canvas for better comparisons, the xy axis label and the width of the column.

```
x_range=np.arange(19)
plt.figure(figsize=(30,10))
plt.xlabel("College Name")
plt.ylabel("Rate")
plt.bar(x=x_range-0.3, height=GA, width=0.15)
plt.bar(x=x_range-0.15, height=SH, width=0.15)
plt.bar(x=x_range, height=E, width=0.15, tick_label=x_data)
plt.bar(x=x_range+0.15, height=UE, width=0.15)
```

Figure 5 Visualizing Data

3.RESULT

The final product is as follows:

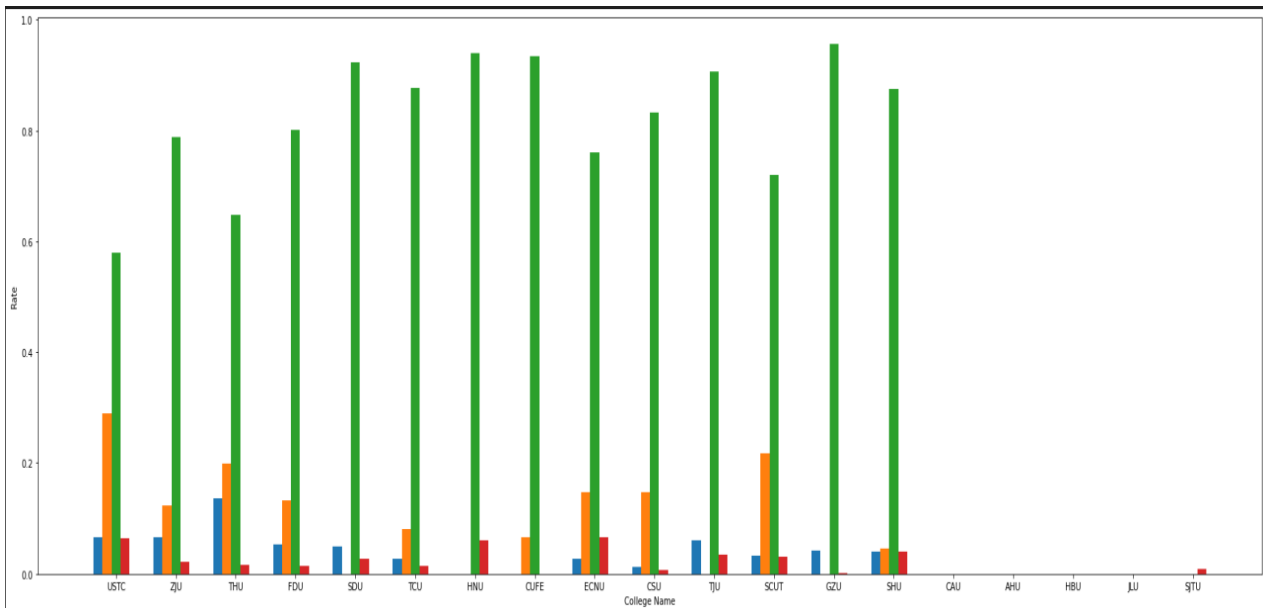


Figure 6 Result Example

Shown in Figure 6, From left to right are the data of each school. In each school, from left to right, are the proportions of going abroad, domestic further study after graduation, employed, and unemployed. Using the

diagrams, people can visually observe the distribution of the data.

In the figure made, for each school, the data counted from left to right are "going abroad", "domestic

advancement", "employed" and "unemployed", where "unemployed" refers to the excluding the first three All conditions except this. From the histogram, people can

clearly see the changes in employment. Below are the final diagrams made:

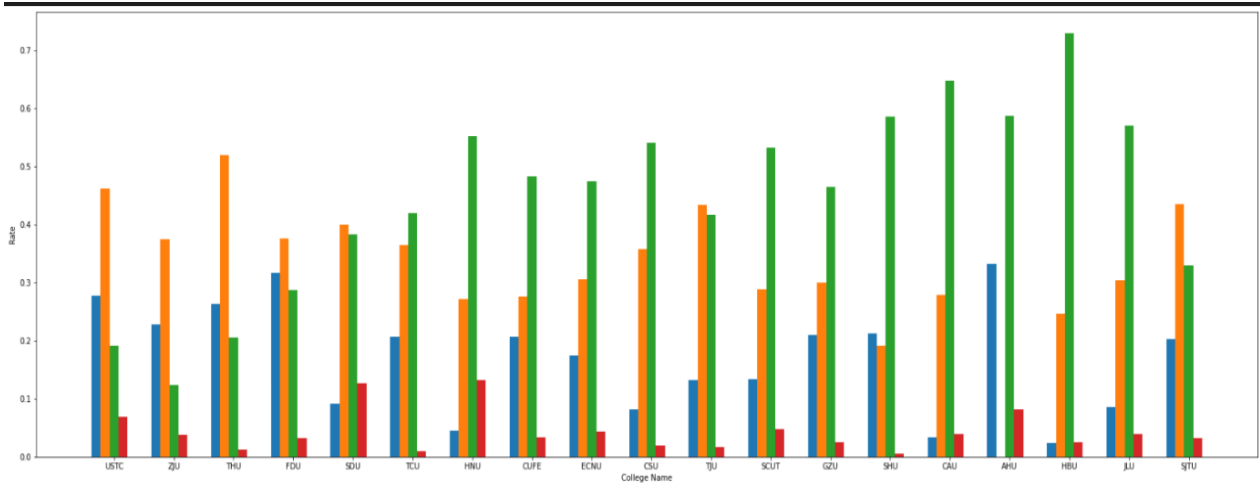


Figure 7 Graduating of 2018

Figure 7 shows the employment situation of graduating students in 2018.

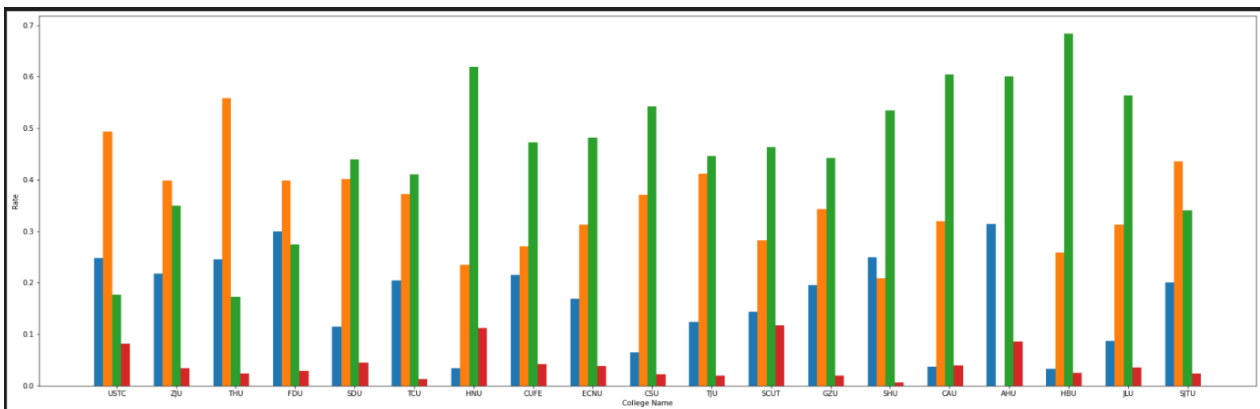


Figure 8 Graduating of 2019

Figure 8 shows the employment situation of graduating students in 2019.

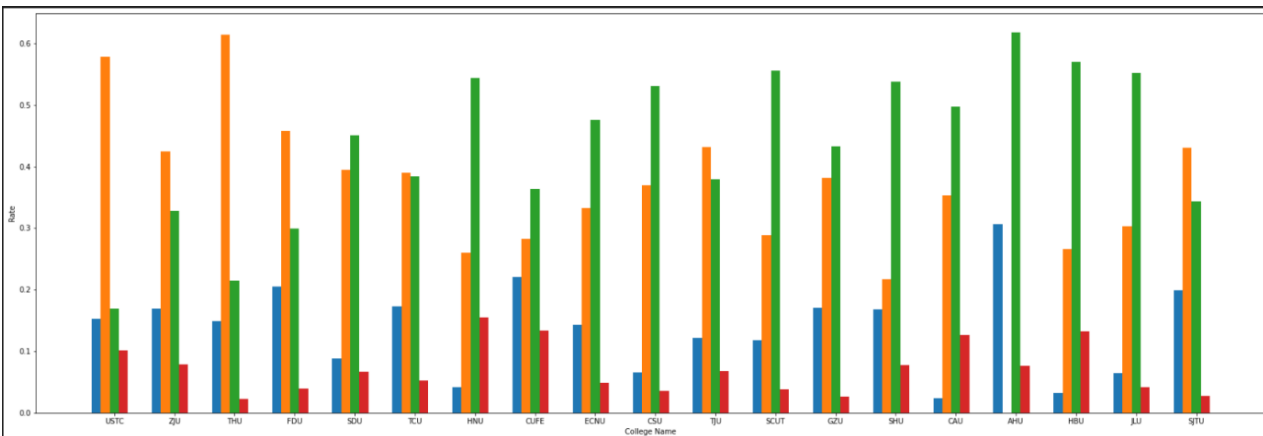


Figure 9 Graduating of 2020

Figure 9 shows the employment situation of graduating students in 2020.

Note: Anhui University (AHU) combines the rate of enrolment domestic and abroad into one statistics, and it is putted in the "Going Abroad"

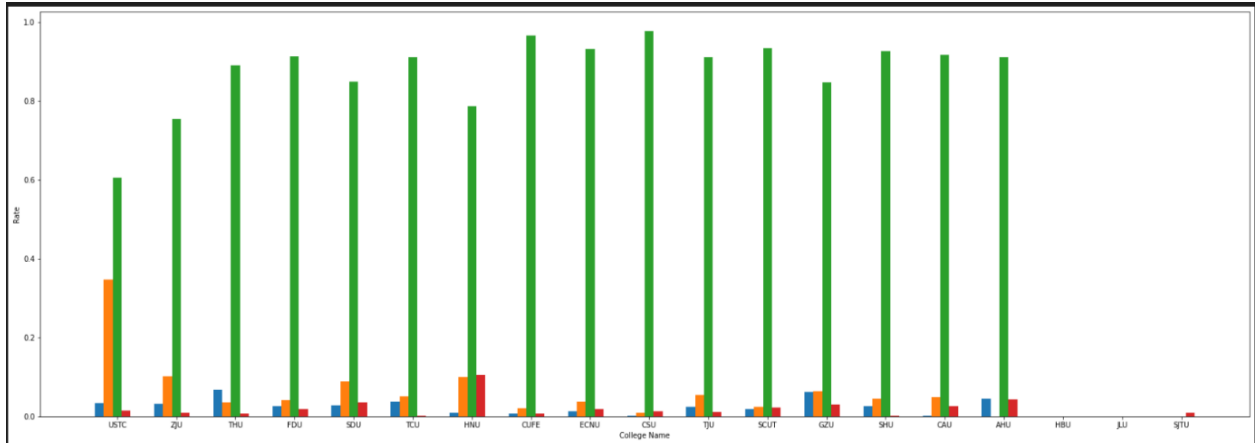


Figure 10 Masters of 2018

Figure 10 shows the employment situation of master students in 2018.

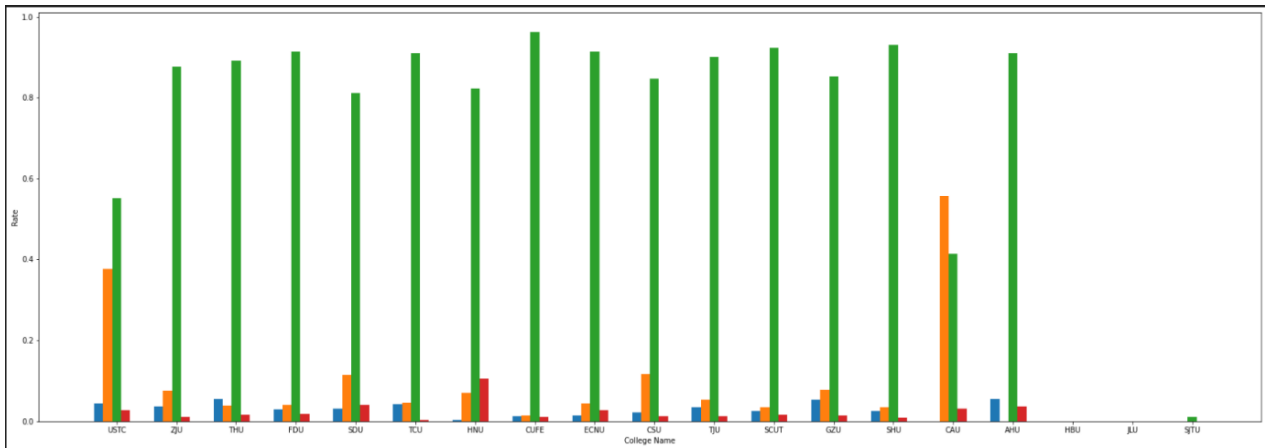


Figure 11 Masters of 2019

Figure 11 shows the employment situation of master students in 2019.

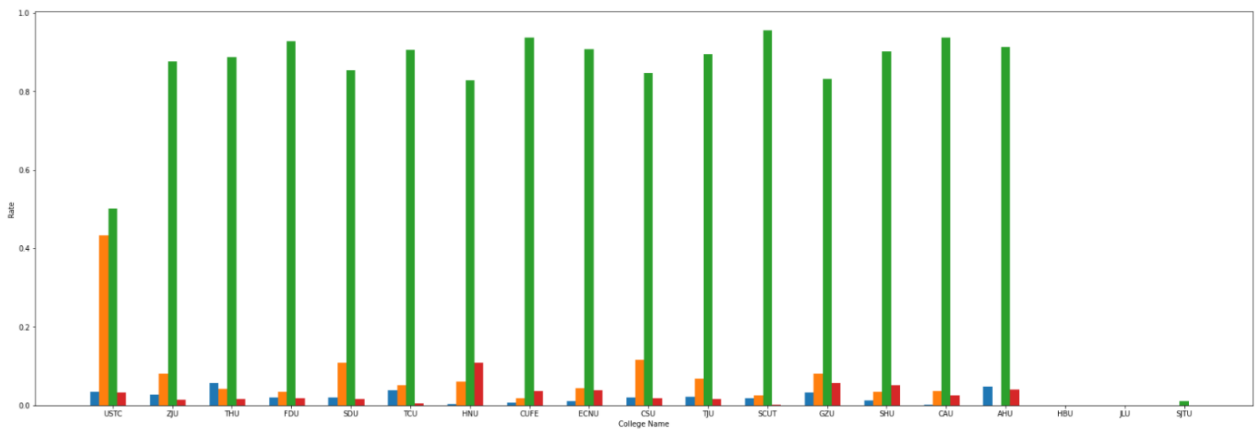


Figure 12 Masters of 2020

Figure 12 shows the employment situation of master students in 2020.

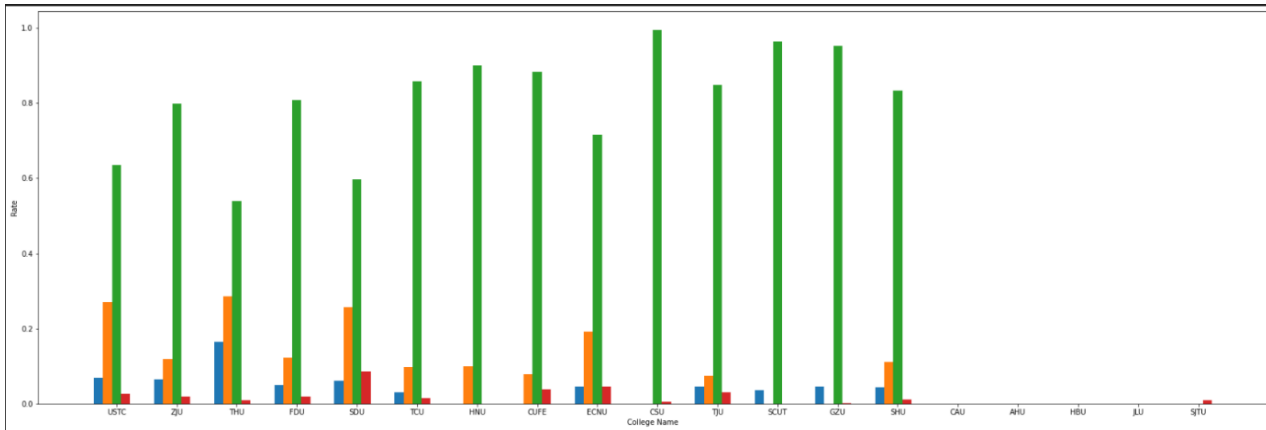


Figure 13 Doctoral of 2018

Figure 13 shows the employment situation of doctoral students in 2018.

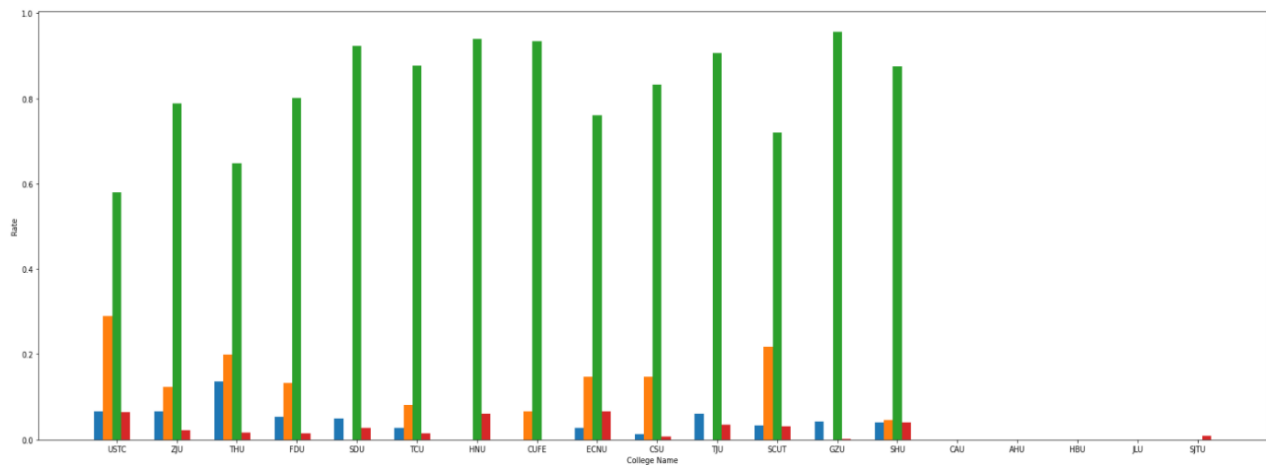


Figure 14 Doctoral of 2019

Figure 14 shows the employment situation of doctoral students in 2019.

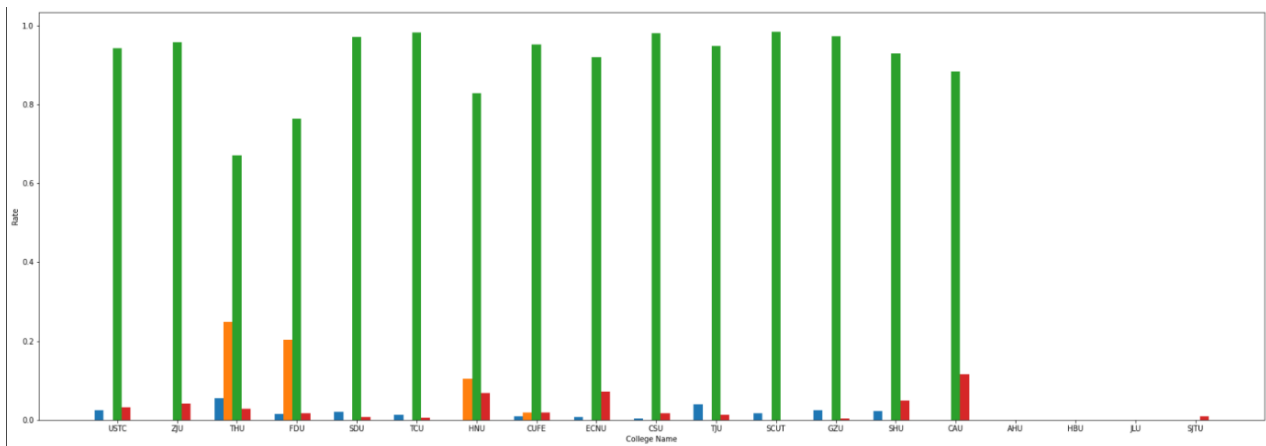


Figure 15 Doctoral of 2020

Figure 15 shows the employment situation of doctoral students in 2020.

Note: The statistics of Anhui University (AHU) and Chang'an University (CAU) combine the statistics of master students and doctoral students, and Anhui

University (AHU) combines domestic and foreign enrolment rates into one statistics; Hebei University (HBU), Jilin University (JLU) And Shanghai Jiaotong University (SJTU) have not released the employment destination of masters, and Hebei University (HBU) only has the overall employment rate.

4. CONCLUSION

From the diagrams made, this work observed some phenomena and trends of graduating student's employment plans. First of all, most obviously, the rate of going abroad is decreasing every year, probably because of the prevalence of Covid-19 throughout the world.

U.S. schools saw a 72% decrease in new international student enrolment in 2020 compared to 2019. New international students include those who were not enrolled in a program of study at a U.S. school during the previous calendar year [6]. As a comparison, the rate of 'domestic further studying' is increasing, because many students are choosing to study in their own country because of the pandemic. Secondly, the rate of 'not employed' is also increasing, especially in the graduating students. The Hardship of employment increased world widely. According to the research done by the Centre on Budget and Policy Priorities [7], Hardship rates fell especially fast after the enactment of the American Rescue Plan on March 11, which included \$1,400 payments for most Americans as well as other assistance to struggling households. Thirdly, compared with undergraduates, masters and doctoral students are more inclined to choose employment when they graduate. Our assumption is that because of the hardship of going abroad because of the pandemic, the Master Students and Doctoral students are probably not considering going abroad to get further education. Lastly, the same assumption still works for the graduating students, most of the graduating student choose to get employment after graduating, according to our assumption, some of them may give up considering going abroad for their Master diplomas, and because of the hardship of get employment, they choose to get employed so that they can get stand income. In conclusion, the pandemic does have a dramatic impact on the graduating college students' further career plans, the plans of both employment and educational careers.

In general, the main purpose of the work is to analyse how a social event impacts other social events, using data visualization, which can make it easy for the users to observe the impacts of events and differences between years. The pattern of the codes can also be used for future use, analysing different statistical data and visualizing them to optimize observation.

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