Jeff Williams

MA342

Final Project Report

Purpose

With this project, I set out to answer the following questions:

I.   Which degree programs in Kansas have the highest return on investment, considering median wage and job placement rate?

II.   How do the median wages and placement rates of each university compare?

III.   Does university choice matter when it comes to salary for similar degrees?

Data Collection

All of the data I used during my analysis is from https://ksdegreestats.org/program_search.jsp. This site has a table that contains all of the offered degree programs from all state and municipal universities, as well as all programs from community colleges and technical schools. Contained in the table are links to detailed breakdowns of each program, if available. Below is an example of the data you can find from this source.

Annual Cost of Degree			Wage Information	
Cost Category			% of Program Graduates Employed in the Region	**71%**
Resident Tuition	$10,765			
Fees	$145		**Median Earnings of Program Graduates in Region**	
Room and Board	$10,846		Upon Entry	$54,506
Books and Supplies	$1,357		After 5 years	$84,293
Total Annual Cost (estimated)	$23,113			
Estimated Total Cost Over: 5 ▾ Years	$141,108		**Or Choose your Own Earnings:**	$ 54506
More »			More »	

To collect the data for this project, I compiled a list of links from the table mentioned above, and wrote a webscraping script to visit each link and collect the data I needed for analysis. The data is then cleaned and stored into a row in a dataframe. If no data is available for a given program, then the Institution and Program ID are still stored in the dataframe, but all the other information is set to NA. I then exported the dataframe as a .csv file, titled "courses.csv', to use for analysis.

Data Set

The data set I'm using for analysis consists of two tables. The first, courses, contains data about each degree program. The variables in this data set are inst_id and program_id, which are taken from the link and used as a composite primary key for joining tables. Also included are the string variables, DegreeTitle and Award, and numerical variables RequiredHours, AnnualTuition,
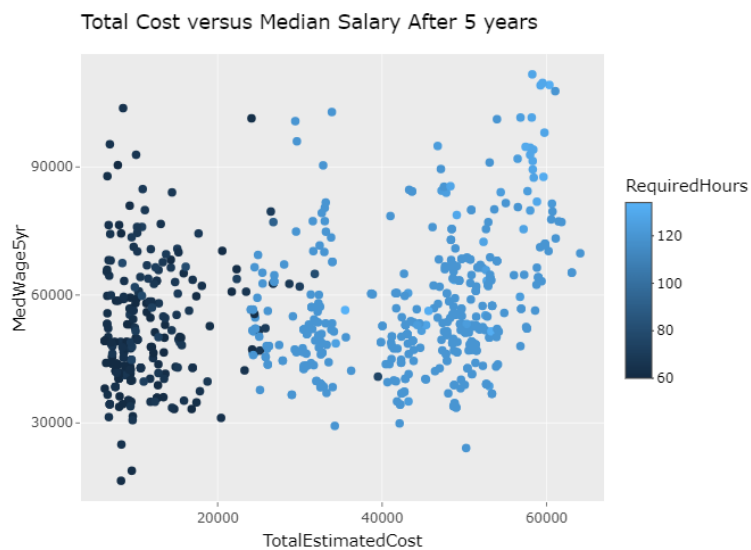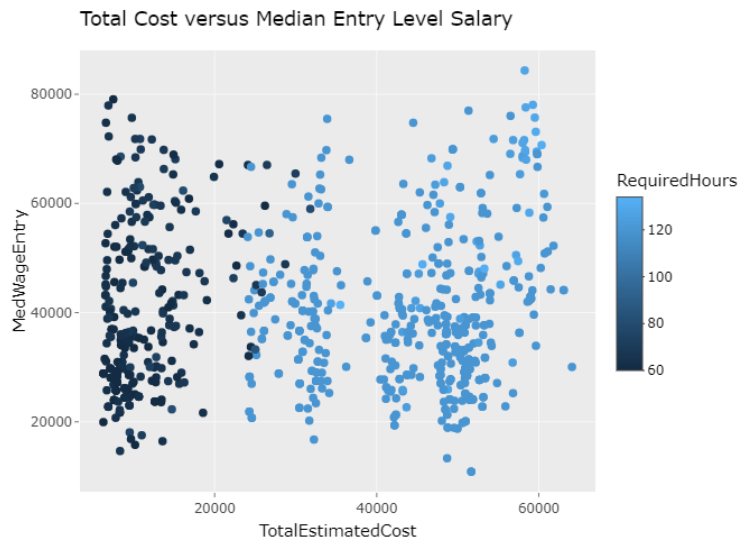
AnnualFees, Placement, MedWageEntry, and MedWage5yr. In addition, I added computed variables, TotalEstimatedCost, Med5yrValue, and MedEntryValue.
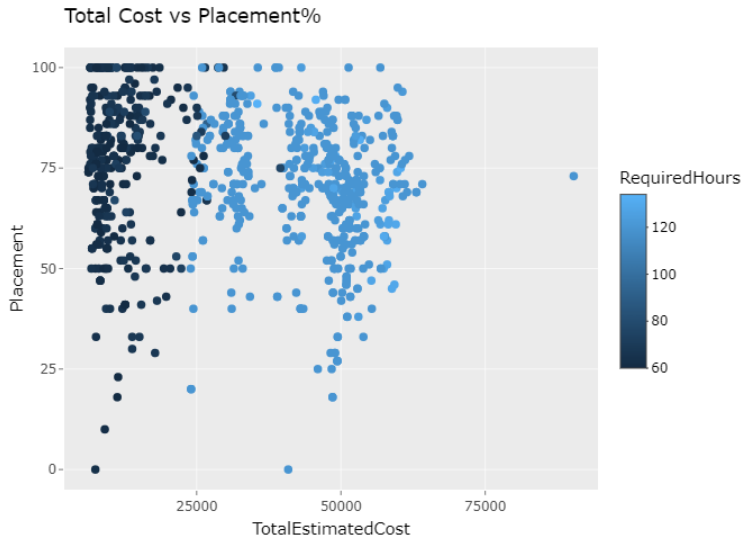
I manually created a second table, institutions, which contains the inst_id, institution name, and institution type. Having this table allows me to join it with courses to get additional information out of the data.

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Analysis

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To answer question I. "Which degree programs in Kansas have the highest return on investment, considering median wage and job placement rate?", I developed three charts comparing total cost of the degree to median wage on entry, median wage after 5 years, and job placement percentage.

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Note: all 4 of the following plots are interactive, and show additional information about each degree (Degree Name and Institution)

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Total Cost versus Median Entry Level Salary

Total Cost versus Median Salary After 5 years

Total Cost vs Placement%

Analysis (continued)

We can draw a number of conclusions from these three plots.

1. For entry level positions, median salary is very comparable between bachelor's versus associate's degree recipients.
2. After five years, salaries of those with a bachelor's degree tend to be similar to associate's around the middle, but the potential for earning is much higher with a bachelor's degree.
3. Job placement for those with two-year degrees tends to actually be a bit higher than those with bachelor's degrees.

With these points in mind, it's important to note that many fields require a bachelor's degree, therefore it's important to try and find the best value degree for four-year degrees. Below is a chart showing only degrees with 120 or more required hours.

Total Cost versus Median Salary After 5 years (Bachelors Degrees)
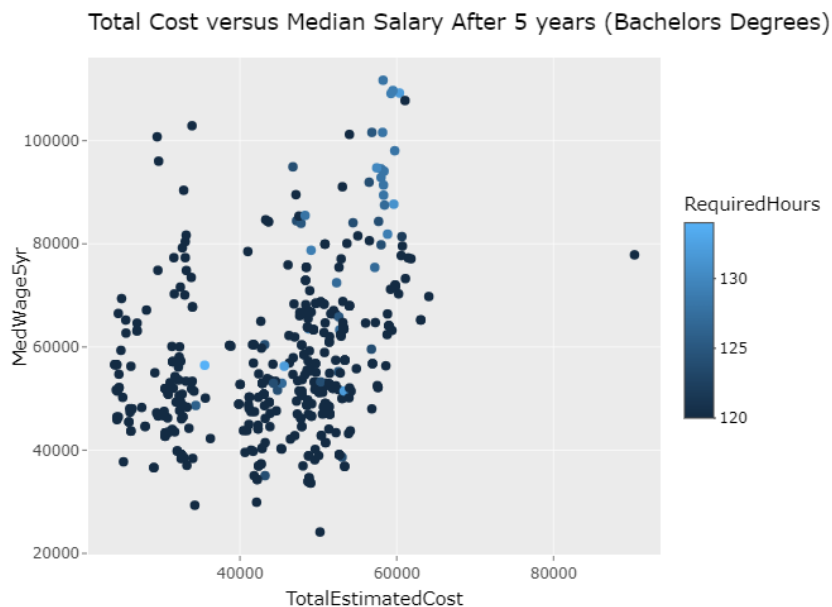
Analysis (continued)

For question II., "How do the median wages and placement rates of each university compare?", I created the following boxplots.
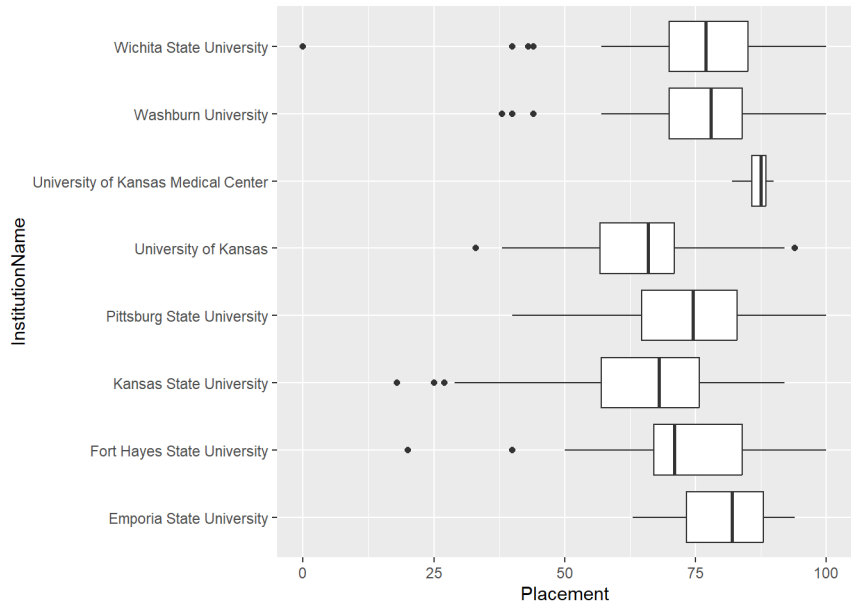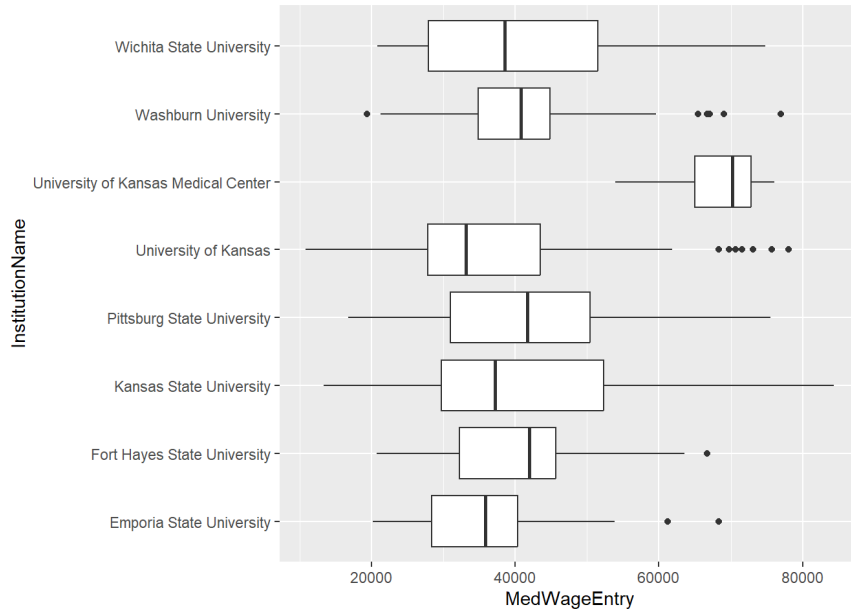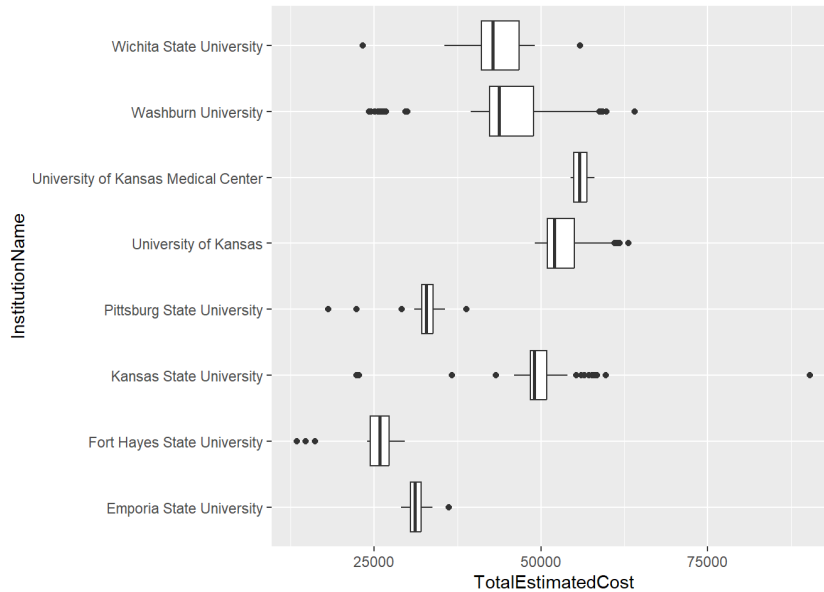
As you can see from the above charts, the median entry wage for all institutions was close to $40,000, and the median placement rate with close to 75%, although there are a few standouts for each category. Surprisingly, the cheaper universities have generally better placement rates and median wages. With these facts in mind, we're unable to draw a concrete conclusion regarding the correlation between cost vs salary and placement rate.

The last question "Does university choice matter when it comes to salary for similar degrees?" requires some more in-depth analysis. Again, I plotted University versus salary, though this time only degrees related to engineering. Below is this plot.
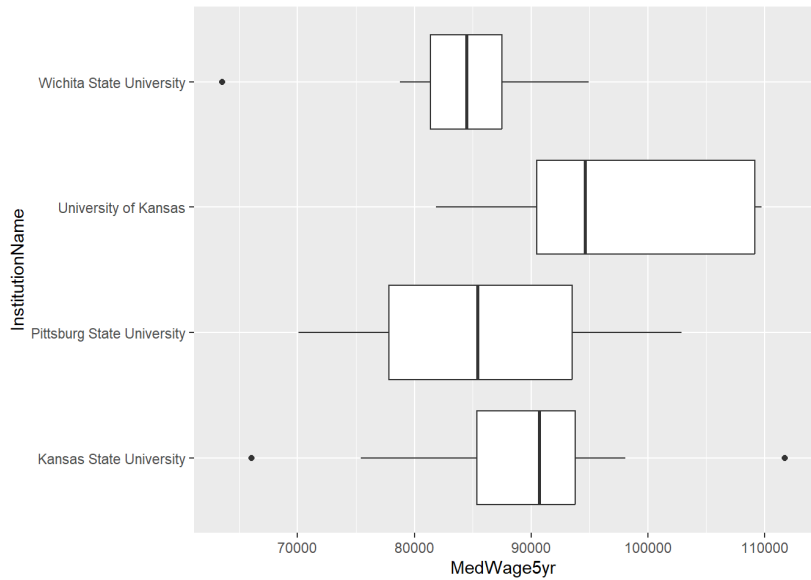
This chart shows us something interesting. Within the engineering field, the larger university graduates seem to have an advantage in long term salary. This is in contrast to the previous plots, which gives a different outcome when considering all program types.

Conclusions

Using the analysis above, I believe we were able to offer answers to questions 1 and 3, as outlined in the proposal. The charts related to question 2 might not have been able to concretely answer the question, but it does offer some valuable insights.

Q: Which degree programs in Kansas have the highest return on investment, considering median wage and job placement rate?"

A: The data overwhelmingly suggests that two-year technical degrees offer the highest value when compared to four-year degrees. Many of these programs offer wages and placement similar to four-year degrees, but at around half of the required hours and a third of the cost.

Q: How do the median wages and placement rates of each university compare?

A: We found that across all offered programs, median wage and placement rates are similar among all state and municipal universities, even though some are substantially cheaper.

Q: Does university choice matter when it comes to salary for similar degrees?

A: With the boxplot showing wage information among engineering fields, we see that KU and KSU have significantly higher median wage compared to Pittsburg and WSU. This is in contrast to the previous plots that don't show much difference across all fields of study.