

STAA57 Final Project Report

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Introduction

Data

DATA ANALYSIS

6. UNEMPLOYMENT RATE COMPARISON BETWEEN EDUCATION LEVELS IN THE LABOUR FORCE SURVEY

Considering that we wanted to focus on time-to-amortize-degree as a criterion for being “worth-it”, It is obvious that one of the greatest affectors of this is employment or equivalently unemployment. Therefore we suggest Unemployment as a secondary criterion for being “worth-it”, we define the criterion as follows: “The Degree level (BSc, MSC, High school, College) that shows lowest level of unemployment rate is the most worth-it and would contribute to a faster amortization of degree cost”.

The First part of our analysis will focus on graphically presenting unemployment rate among individuals in 6 levels of education as defined in the lfs dataset.

The Second part will run a tukey analysis to statistically prove and answer “is there a significant, unemployment rate difference among the levels of education”

Read Labour force survey, 2018, based to 2011 census population

Levels of Education

2: Gr 11 to 13, graduate 3: Some post secondary 4: Post secondary certificate or diploma 5: University: bachelors degree 6: University: graduate degree

```
## [1] 0.06187401

## # A tibble: 5 x 3
##   educ  UNEMPLrate diff_from_TorontoAggregate
##   <fct>      <dbl>          <dbl>
## 1 6      0.0477      -0.0141
## 2 4      0.0518      -0.0100
## 3 5      0.0563      -0.00561
## 4 2      0.0758       0.0139
## 5 3      0.0821       0.0202
```

In the above comparison with the Toronto unemployment rate, we see unemployment rate for “graduate degree”, “Post secondary certificate/diploma” and “bachelors degree” are below the Toronto unemployment rate, and “Gr 11 to 13, graduate” and “Some post secondary” are above it. This shows that any post secondary education is worth-it in comparison to not having a post secondary education. =====This explanation is long so can be dropped if needed===== But when focusing on “is university worth it”, we found a surprising result just considering the values, the unemployment rate for individuals with a bachelors degree is higher ever so much than one with a non-bachelors Post secondary certificate/diploma. So just based off of this result a Post secondary certificate/diploma is more worth it to that of a bachelors degree, this is even more affirmed by the fact that a Post secondary certificate/diploma cost less than a University bachelors degree meaning that the combined influence of lower cost education plus lower unemployment rate makes

University not worth-it, in at least this comparison. This result can be easily verified for the employment rate as well[see appendix]

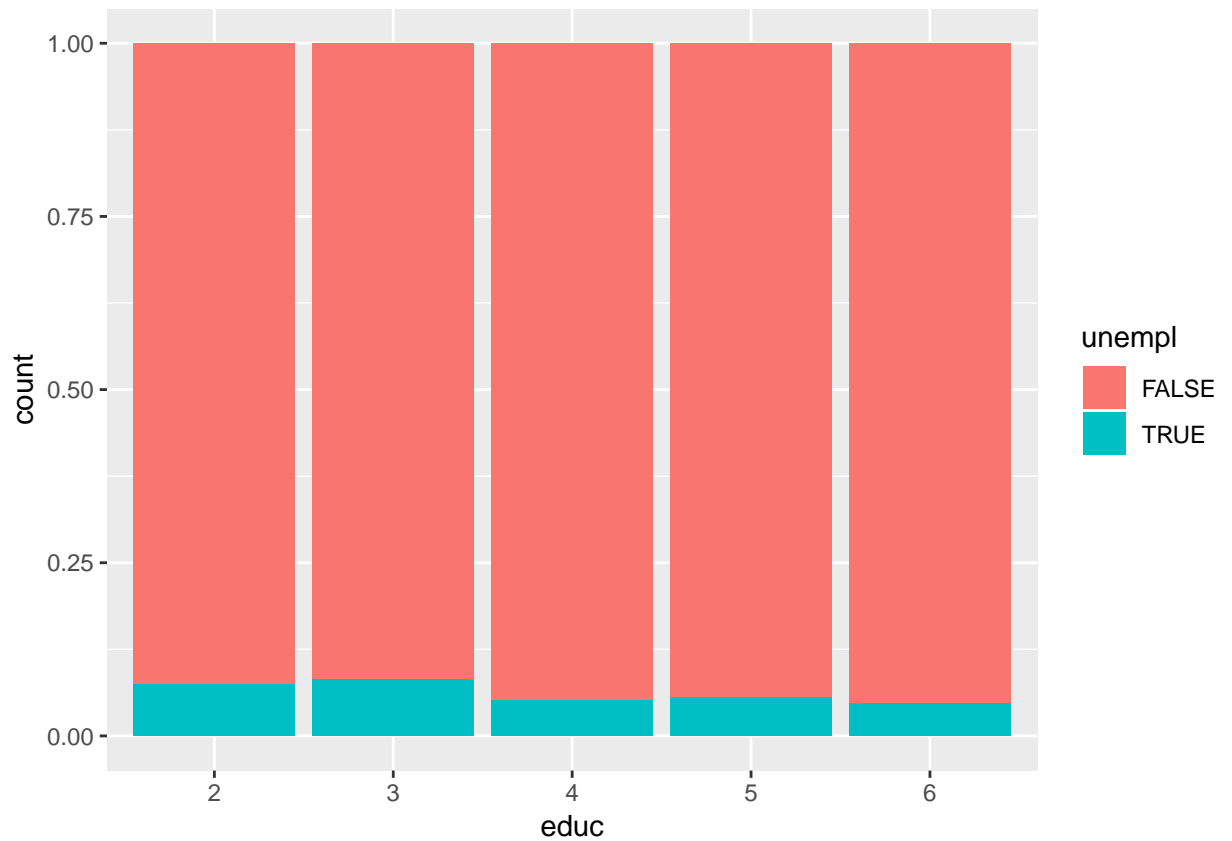
But the redeeming result comes from the fact that having a University graduate degree puts an individual in the category with the lowest unemployment rate, and it is common knowledge that one needs a bachelors before moving into graduate studies. Therefore overall a University degree is indeed worth-it to not having a university Degree in regard to unemployment. Lets see if our above result is statistically significant or negligible

=====Alternate===== The values for unemployment indicate that those who have a BSc have a higher unemployment rate than those with a lower cost Diploma, is this statistically significant, would this mean that a bachelors is not worth-it in comparison to a diploma? =====

Is the difference in status of unemployment statistically significant, specifically does the status of employment/unemployment depend on education? here we consider only lfsstat level 1 and 3. Employed-at-work and Unemployed respectively. We ignore lfsstat level 2 given they are also employed but absent from work. We focus only on the status of being unemployed vs employed.

```
##
##  Approximative General Independence Test
##
## data:  lfsstat by educ (2, 3, 4, 5, 6)
## maxT = 6.2009, p-value < 2.2e-16
## alternative hypothesis: two.sided
```

Conclusion: The P-value is extremely small, showing that the null hypothesis of unemployment status being independent of education level is very unlikely, therefore there is overwhelming evidence that education affects un-



employment.

```
##
## Approximative Pearson Chi-Squared Test
##
## data:  unempl by educ (4, 5, 6)
## chi-squared = 6.2957, p-value = 0.0441

##
## Approximative Pearson Chi-Squared Test
##
## data:  unempl by educ (5, 6)
## chi-squared = 5.905, p-value = 0.0145

##
## Approximative Pearson Chi-Squared Test
##
## data:  unempl by educ (4, 5)
## chi-squared = 2.2162, p-value = 0.1366

##
## Approximative Pearson Chi-Squared Test
##
## data:  unempl by educ (4, 6)
## chi-squared = 1.3964, p-value = 0.2474
```

Then is there a significant improvement in having a university degree instead of regular High school education?
 Lets perform a TukeyTest

Levels of Education

2: Gr 11 to 13, graduate 3: Some post secondary 4: Post secondary certificate or diploma 5: University: bachelors degree 6: University: graduate degree

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = flowunem ~ educ, data = .)
##
## $educ
##          diff          lwr          upr      p adj
## 3-2  0.3579283 -0.1053373  0.821193825 0.2163613
## 4-2 -0.4054167 -0.7439696 -0.066863693 0.0096529
## 5-2 -0.3349268 -0.6606324 -0.009221139 0.0403182
## 6-2 -0.2016663 -0.6076719  0.204339295 0.6559775
## 4-3 -0.7633449 -1.2182574 -0.308432489 0.0000479
## 5-3 -0.6928551 -1.1382890 -0.247421120 0.0002191
## 6-3 -0.5595946 -1.0667117 -0.052477466 0.0220120
## 5-4  0.0704899 -0.2432210  0.384200816 0.9730059
## 6-4  0.2037504 -0.1926975  0.600198251 0.6257516
## 6-5  0.1332605 -0.2522742  0.518795122 0.8797932
##
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = empl ~ educ, data = .)
##
## $educ
##          diff          lwr          upr      p adj
## 3-2 -0.006283092 -0.021447621  0.008881436 0.7905718
## 4-2  0.023951902  0.014009794  0.033894009 0.0000000
## 5-2  0.019524728  0.009747359  0.029302096 0.0000005
## 6-2  0.028050788  0.016740688  0.039360887 0.0000000
## 4-3  0.030234994  0.015913362  0.044556626 0.0000001
## 5-3  0.025807820  0.011600056  0.040015584 0.0000072
## 6-3  0.034333880  0.019030874  0.049636886 0.0000000
## 5-4 -0.004427174 -0.012838068  0.003983720 0.6044133
## 6-4  0.004098886 -0.006053186  0.014250958 0.8059276
## 6-5  0.008526060 -0.001464735  0.018516856 0.1360285
```

As evident from the Tukey test, Duration of unemployment in weeks is NOT vastly different from University: bachelors degree to Post secondary certificate/diploma ($p > 0.05$). But an University: graduate degree to Post secondary certificate/diploma has a very significant difference in duration of unemployment ($p < 0.05$). Also its significant to note that Duration of unemployment is significantly different between a graduate degree and a bachelors as well.

From this we can conclude based on duration of unemployment, that is assuming that a area of education is “worth-it” given great reduction in unemployment. One should consider getting a graduates degree to greatly reduce change of unemployment. but getting a bachelors only provides a much lesser benefit in comparison to a graduates degree.

Therefore using this criteria, yes a University degree is worth-it
Especially a Graduates Degree!!!.

Summary

Appendix

(Everything here does not count towards page limit) EMPLOYMENT RATE COMPARISON BETWEEN
EDUCATION LEVELS IN THE LABOUR FORCE SURVEY

```
(toronto_emplrate = lfs_toronto %>%  
  summarise(EMPL = sum(lfsstat %in% c(1,2))/sum(lfsstat!=4)) %>% pull())
```

```
## [1] 0.938126
```

```
lfs_toronto %>%  
  filter(educ %in% 2:6) %>% # lfsstat == 3 unemployed  
  mutate(educ = factor(educ)) %>%  
  group_by(educ) %>%  
  summarise(EMPLrate = sum(lfsstat %in% c(1,2))/sum(lfsstat != 4)) %>%  
  arrange(EMPLrate) %>%  
  mutate(diff_from_aggregate = EMPLrate - toronto_emplrate)
```

```
## # A tibble: 5 x 3
```

```
##   educ  EMPLrate diff_from_aggregate  
##   <fct>    <dbl>          <dbl>  
## 1 3      0.918        -0.0202  
## 2 2      0.924        -0.0139  
## 3 5      0.944         0.00561  
## 4 4      0.948         0.0100  
## 5 6      0.952         0.0141
```