The Effect of Non-Traditional vs. Traditional Education and Career Paths on Salary

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I. Introduction

In this paper we will analyze the salaries of students who take traditional educational and career paths versus those that opt out of either path. Traditional educational path is defined by at least high school graduation, followed by a 4 year college degree within a 5 year span for our purposes here. Traditional career path is defined by your educational path followed by an occupation in the degree received. Examples of non-traditional paths generally can include variables such as, a gap year was taken, a career was chosen outside of the degree achieved, additional schooling was attained, etc. Our data is a subsample from the National Survey of College Graduates, 2015. The equation used for our empirical methodology was used to measure the traditional vs nontraditional education path against other variables and also to measure traditional vs nontraditional career path effect. The results obtained suggest there is a slight positive trend with taking a traditional path and mean salary.

II. Data

Our data was taken from a subsample of the National Survey of Colleges graduates in 2015 and includes high school graduate date, gender, degree received, current occupation sector, salary, etc. The subsample had a total of 73,976 observations, 33,765 of those women and 40,211 men. We sorted the data to minimize bias by eliminating data points: salaries with $0, unreported salaries, unreported graduation date, and unreported degree field were all removed. Table 1, illustrated on the following page, summarizes the data set. With roughly 74,000 respondents the mean income salary was $83,631.70 with a standard deviation of $90,565. This salary is higher than the nation's average salary, but is explained because every respondent is required to have a bachelor's degree or higher. Our standard deviation is extremely high so in

our regressions and empirical methodology equation we utilized the truncated salaries. The truncated average salary is $79,233.30; the decrease in salary makes sense because those with higher degrees in high paying jobs would have salaries that can be described as outliers. The standard deviation for the truncated salary is $51,377 which is must more justifiable.

Figure 1, shown below, illustrates the salary change in those who took a nontraditional educational path overlaid onto those that took a traditional path. The dark blue graph in the background represents the salary of those who opted out of going through the non traditional path. The green bars represent the salary of individuals who took the path. Both graphs overlaid onto each other are represented by the light blue coloring. We chose to make our histogram a percentage to see a visible shift in salaries when comparing the two. Although the trend is small, there clearly exists a higher percentage of people that took a traditional path associated with the higher salaries. Overall, both graphs appear to have similar trends in range of salaries so the trend is not as significant as we have seen with other variables. Our regression in Table 2 will go over more detail on the positive trend of salary and individuals taking a traditional route.

Figure 1: Salary Cohort and Educational Pathways

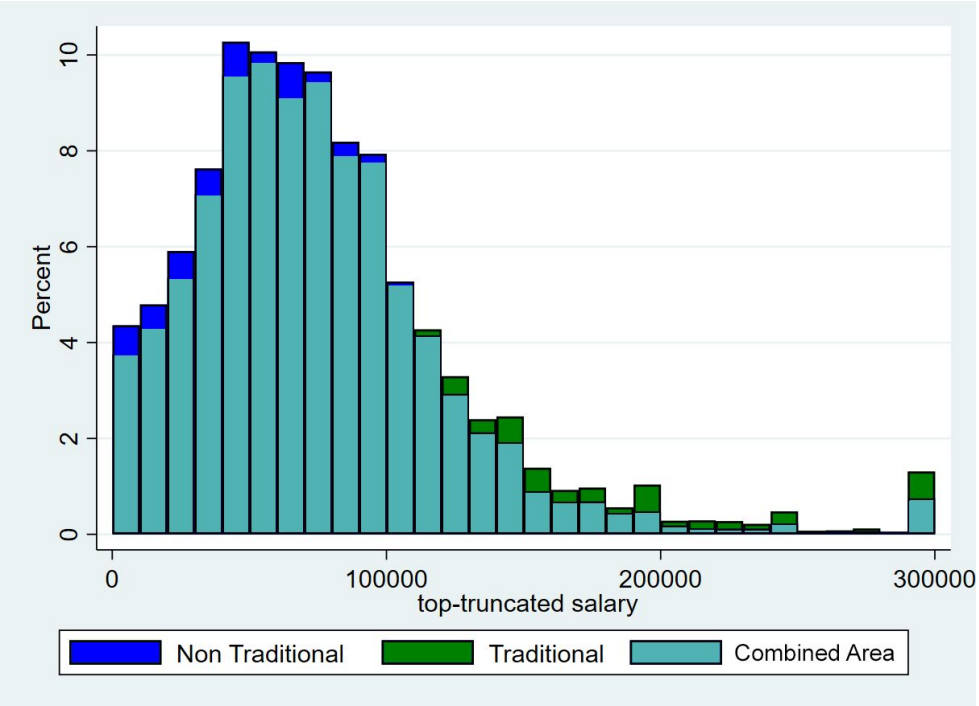

Table1 : Summary Statistics

	(1)
Salary	83631.7 (90565.2)
Truncated Salary	79233.3 (51377.2)
Age	42.11 (12.82)
Non Traditional Path	0.274 (0.446)
Female	0.456 (0.498)
Has more than Bachelor's	0.508 (0.500)
Age*Non Traditional	12.67 (21.55)
Age^2	1937.9 (1173.6)
Job is in same Field as BA	0.130 (0.336)
Job is in same Field as Highest Degree	0.282 (0.450)
Job Requires Education in Same Branch	0.831 (0.374)
Non Traditional Path / Job Requires Education in Same Branch	0.220 (0.414)
Observations	73976

mean coefficients; sd in parentheses

III. Empirical Methodology

We examined the data to see if there was a salary difference between education and career paths. To use the best model in line with OLS we created to log equation:

$$Log(Salary) = \beta_0 + \beta_1 NonTraditional\ Path + \beta_2 Age + \beta_3 Female + \beta_4 OverBA + \beta_5 Age * NonTrad + \beta_6 Age * Age + \beta_7 JobSameFieldBA + \beta_8 JobSameFieldHD + \beta_9 JobReqSameBranch + \beta_{10} NonTrad * JobReqSameBranch$$

Our decision to use a logged dependent variable comes from the clarity in seeing percent changes with our dependent variable, salary. We were able to see the direct effect from a change in our variables holding all else equal. From previous studies we expected to see a positive trend with *Age*, but a negative trend with *Age^2* as overall there are decreasing returns to age given the decrease in energy and increase in health concerns as years pass by. Our first dummy variable, *Female,* is expected to show a negative relationship considering the prevalent gender wage gap across all earners.

We conducted our regression in efforts to measure the significance a traditional educational and career path have on salary. To measure the significance we incorporated 'dummy' variables, signaling if the individual qualified or not. Our parameter *JobSameFieldBA* is expected to be positive to show the correlation between higher salaries and employees in a field where their initial degree is. This expectation also holds true for the following parameter with the only change being highest degree received rather than bachelor's degree. Another interaction term we utilized was *NonTrad*JobReqSameBranch,* we created to see the salary increase or decrease based on a nontraditional path with a job that requires a degree in the same branch. We expected this term to be negative based on the employers views of someone

graduating with a degree specific to the job description, but later in life. Lower salaries are expected of employees that do not fit the ideal.

The data set we utilized initially contained roughly 90,00 data points. As mentioned previously we sorted through the selection to give us more meaningful results, but upon closer examination we still could have run into problems. One of the problems were those making under minimum wage, perhaps they were solely part time or did not care to make a higher salary due to their spouses income. This data may have skewed our results, given the large amount of points we did not think omitting them would cause a significant change. Another problem we want to make note of is the potential of omitted variable bias. We had categories such as region and race, which were not used in our equation but do play a role in income changes. From regressions within other studies those in a minority race have salaries lower than the white race. As well as those who grew up in affluent neighborhoods earn more than those living in a highly impoverished region.

IV. Results

The regression results as seen in Table 2 provide interesting results with regard to specificity. Regression 4 estimates the whole of our equation. Regression 1 is the simplest of the table, consisting of the more common variables and factoring in Non Traditional Path. Regression 2 removes Non Traditional Path, adding in variables for if the job matches a field of study, and regression 3 continues by adding in job requirements.

Referring to our previous descriptions of our parameters, the expectations of trends seem to match the results shown in the regression. As *Age* increases by one year the expected salary increases by 11.6%, but overall age has decreasing returns to salary from the Age^2 term being

negative. Another variable that matched our predictions was the effect of being female. If an individual is female they can be expected to earn 36.9% less than their male counterparts, adding evidence toward a gender salary gap across earners generally. One parameter that did not meet our expected predictions was the interaction term between a nontraditional education route and a job that required a degree in that same branch, *NonTrad*JobReqSameBranch*. If one qualified one would expect a 2.84% increase in salary which is significant at the 0.10 level, slightly mitigating the penalty of a delayed bachelor's degree generally. Investigating more into this result, it makes sense with individuals that acquired a technical degree later than normal and still worked in that field. For example, this may point to the value of a college degree as a powerful signalling mechanism for employers to hire individuals. The most interesting result that we did not make a prediction on was that of $Age * NonTrad$. When compared to *NonTraditionalPath*, $Age * NonTrad$ suggests that the effects of delayed education are decreased later in life given the positive sign. This is consistent with the idea that learning continues while in the workforce, and work experience is worth paying for.

The stars on coefficients in the Table 2 results indicate statistical significance at different levels. At the .05 significance level, *NonTraditionalPath, Age,* $Age * NonTrad$, Age^2, *Female, OverBA, JobSameFieldHD, JobReqSameBranch, and NonTraditionalPath*JobReqSameBranch* all qualify as significant. The R^2 of the main regression is 0.177, which is not as high as would be hoped for generally, but indicates that the increasing addition of our variables improves how well our model fits the data, while not adjusting for salary differences between professions. An F-Test on significance of the *NonTrad* variables in regressions 3 and 4, yields an F-Statistic of

179.745. These variables are significant, given the F-Statistic being significantly higher than the corresponding F-critical value.

The regression results include three alternate specifications, each omitting terms. Specification 1 removes all job information and leaves education time factors, specification 2 removes *NonTraditional*-containing terms and job requirements, while specification 3 only removes *NonTraditional*-containing terms, allowing for regression without graduation date information. To show how the main specification values would work, assume two men with traits differing only when it comes to when they decided to complete their bachelor's degree following high school:

$$Age = 50,\ male,\ OverBA,\ JobSameFieldBA,\ JobSameFieldHD, JobReqSameBranch = 1$$

For the man who took the traditional path and graduate/professional school, predicted salary would be $123,958 per year, with the man who took the delayed, nontraditional path and similar further schooling predicted to earn $105,051. This difference is reasonable, given the broad definition for nontraditional path and that the type of advanced degree is unknown.

Table 2: Education and Job Regression Results

	(1) Log(Salary)	(2) Log(Salary)	(3) Log(Salary)	(4) Log(Salary)
Non Traditional Path	-0.335***			-0.311***
	(0.0261)			(0.0287)
Age	0.119***	0.112***	0.108***	0.116***
	(0.00188)	(0.00183)	(0.00179)	(0.00182)
Female	-0.413***	-0.394***	-0.363***	-0.369***
	(0.00604)	(0.00601)	(0.00589)	(0.00587)
Has more than Bachelor's	0.181***	0.203***	0.116***	0.0990***
	(0.00605)	(0.00702)	(0.00701)	(0.00702)
Age*Non Traditional	0.00373***			0.00291***
	(0.000557)			(0.000539)
Age^2	-0.00127***	-0.00119***	-0.00114***	-0.00123***
	(0.0000206)	(0.0000200)	(0.0000195)	(0.0000200)
Job is in same Field as BA		0.0494***	-0.0138	-0.0117
		(0.0131)	(0.0128)	(0.0128)
Job is in same Field as Highest Degree		0.232***	0.191***	0.192***
		(0.00903)	(0.00885)	(0.00882)
Job Requires Education of Same Branch			0.482***	0.467***
			(0.00808)	(0.00959)
Non-Traditional * Job Required Education of Same Branch				0.0284*
				(0.0166)
Constant	8.628***	8.623***	8.338***	8.228***
	(0.0397)	(0.0393)	(0.0387)	(0.0391)
N	73976	73976	73976	73976
R^2	0.120	0.131	0.171	0.177

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

V. Conclusion

Based on our regression results, we conclude there is a negative trend with the late completion of a first bachelor's degree and earned salary. Additionally, pursuing a job in one's field of study has a positive trend with earned salary. Taking these results into consideration, people would be best served by spending their time figuring out what they would like to do earlier in life, rather than later in their career. Likewise, efforts to gain access and exposure to education should be taken as early as possible, like saving money to attend or seeking out available scholarships. Seeking out education and new careers later in life will often still be a great option for many, but future marginal benefit will continue to decrease while these new opportunities remain unpursued.