Does a Second Major Effect Employment?

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Abstract

This paper examines the effect that having a second major within a bachelor's degree can have on employment. While additional education has generally proven to help an individual to experience better employment, the results of this study suggest that having a second major on average does not help an individual to get a job but rather decreases the chances of being employed by almost 0.1%. However, having two majors in related disciplines is not statistically different than having a single major degree while having two majors in unrelated fields decreases the chances of being employed by 0.15%.

A significant amount of research has been done to examine the effects of additional education. This research shows that individuals with more education on average experience higher wages, less unemployment, and wider opportunities for jobs (Patrinos, Psacharopoulos, and Tansel 2019; Psacharopoulos 1994; Schultz 1961). While the benefits of additional years of education have been widely explored, another body of research has explored the effects that college majors (discipline of study) can have on an individual's wages, employment, and job opportunities. For example, individuals that study engineering as their college major are more likely to experience higher wages than individuals that study the arts or humanities (Carnevale, Cheah, and Strohl 2013).

While pursuing a bachelor's degree in the United States, students must elect a college major which serves as the main discipline of their degree. What motivates a student to select a particular major? Montmarquette et al (2002) find that one of the most important factors in this decision is the expected earnings of individuals with a bachelor's degree in a given major. However, evidence suggests that students are increasingly opting to earn a bachelor's degree that meets the requirements for two college majors in an attempt to get a better job or to merit greater wages (Lewin 2002, Zafar 2012).

While there is much evidence for the benefits of additional education, the evidence for the benefits of a second major is less convincing. Del Rossi and Hersch use the 2003 National Survey of College Graduates[1] to provide estimates of the effect on earnings that possessing a second major can have. They find that students who combine a major in the arts or social sciences and a major in business, engineering, or science experience returns ranging from 7-50% higher than single majors in arts or social sciences. However, this combination does not provide returns higher than single majors in business, engineering, science, or math. When considering a double major in general (not considering the fields of the majors within the bachelor's degree), double majoring on average increases earnings by 2.3% relative to a single major bachelor's degree holder (Del Rossi and Hersch 2008).

A more recent study continued on this research but used data from the American Community Survey[2] from the years 2012 to 2017. This study concluded that having a second major does not have a significant effect on wages (Lyman 2018). This leaves open the question: are there other reasons for having a second major? One of the benefits of additional education is better employment (Mincer 1991). While much research has been done to examine the effects that a second major can have on wages, little has been done to examine the effects that a second major can have on employment. In this paper, I examine whether or not a second major effect can help an individual to be employed. In addition to this, I examine whether having two majors in related fields (double majoring) has any effect or if having two majors in distinct fields (dual majoring) has any effect.

I hypothesize that having a second major does increase the employability of an individual, since additional education has tended to help individuals to be employed (Mincer 1991). In addition to this, I also hypothesize that it is more valuable for an individual to have two majors in related academic disciplines since this might make an individual more valuable for a particular job market or for multiple job markets. Section I examines the data that was used and the variables that it contains. Section II shows the methods used to analyze the data. Section III presents the results for having a second major as

well as the resulting differences between having two majors in related fields (such as accounting and business management) and having two majors in distinct fields (such as accounting and psychology). Section IV presents the conclusion to this research.

Section I: The Data

The data used for this paper comes from the American Community Survey (ACS). The ACS is an annual survey that randomly collects social and economic facts about 1% of the US population. Each annual survey averages around 3.5 million respondents. I excluded any respondents that had less than a bachelor's degree or more than a bachelor's degree.

The dataset included variables that could contribute to employment status such as demographic information, field of college major(s), and age. Individuals who were not participating in the labor force were also excluded, leaving a total of 2.1 million observations (for precise definitions of "employed" and "unemployed", visit https://www.bls.gov/cps/cps_htgm.htm). Dummy variables were made for the qualitative data (employment=1 if employed and 0 if unemployed). Table 1 provides a summary of the social composition of the dataset.

Table 1
Demographic Proportions of the Sample

Social Demographics	Single Majors	Double Majors	Statistically Different?
Obs. N=	1,949,287	222,878	--
Female	50.3%	52.8%	Yes***
Black	7.4%	5.9%	Yes***
Hisp.	7.5%	6.6%	Yes***
Other (Race)	9.0%	7.2%	Yes***
Employed	96.0%	95.7%	Yes***

*** indicates that the percentages are statistically different with 99% confidence

A key dummy variable was made for individuals who held two majors (second major). This raises a question: did these individuals study related majors or completely different majors? To analyze this, dummy variables titled "doublemajor" and "dualmajor" were made to separate individuals who had two related majors from individuals who had two majors in unrelated fields. To avoid multicollinearity, an analysis for a second major is shown in Table 2 while an analysis for double majoring and dual majoring is shown in Table 3 (since a "doublemajor" and a "dualmajor" both have a second major, they must be analyzed apart from the "second major" variable).

Section II: The Method

To address whether or not having a second major effects employment, I used Linear Probability Model[3]. This model is similar to the Ordinary Least Squeares models used to see the effects of double majoring on wages. The main difference is that the dependent variable, wages, has been replaced with a dummy variable for employment. The naive model is the following:

$$employed_i = \beta_0 + \beta_1(second\ major = 1\ if\ yes) + u$$

To control for other factors that contribute to the employability of an individual, several control variables were added.

$$employed_{iysm} = \beta_0 + \beta_1 second\ major_{iysm}$$

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[3] A logit model was also examined. Marginalizing the effects of a second major in the logit model changed the results from a 95% confidence interval to a 90% confidence interval, however, the coefficient was still negative.

$$+\beta_2 Sex_{iysm}$$
$$+\beta_3 Age_{iysm}$$
$$+\beta_4 Maritalstatus_{iysm}$$
$$+\beta_5 Race_{iysm}$$
$$+\theta_y*$$
$$+\alpha_s*$$
$$+\varepsilon_m*$$

$$*\boldsymbol{\theta}\ represents\ year\ of\ survey$$
$$*\boldsymbol{\alpha}\ represents\ state\ of\ residence$$
$$*\boldsymbol{\varepsilon}\ represents\ field\ of\ primary\ major$$

The results for this are found in Table 2.

While the results of this model can indicate the value of having a second major, it does not consider the value of certain combinations of college majors. To analyze whether it matters or not to have a second major in a related or unrelated field to the first major of a bachelor's degree, the following model was made:

$$employed_i = \beta_0 + \beta_1(doublemajor) + \beta_2(dualmajor) + u$$

In this model, "doublemajor" indicates the individuals who have a second major in an academic field related to their first major. "Dualmajor" indicates the individuals who have a second major in an academic discipline unrelated to their first major. The relation between college majors was decided by the ACS's categorization of 'general field of degree' which included 38 general categories of academic disciplines (such as 'Humanities'), as opposed to the actual field of degree which included 182 categories (such as 'Philosophy'). These two variables are mutually exclusive. These are compared against individuals with a single major bachelor's degree. The same controls for social factors are added. The results for this model are found in Table 3.

Section III: The Results

Table 2 presents the effects that having two majors has on employment.

Table 2

OLS Regression Estimates of the Effect of a Second Major on Employment

Dependent Variable: Employment (1=employed, 0=unemployed)

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
Second Major (1=yes)	-0.00314***	-0.00163***	-0.00254***	-0.00255***	-0.00282***	-0.000930**
	[0.000438]	[0.000437]	[0.000437]	[0.000436]	[0.000436]	[0.000440]
Female (1=yes)		0.00196***	0.00267***	0.00267***	0.00241***	0.00197***
		[0.000266]	[0.000266]	[0.000266]	[0.000265]	[0.000289]
Age		-0.000119***	-0.000142***	-0.000143***	-0.000124***	-0.000158***
		[1.09e-05]	[1.10e-05]	[1.10e-05]	[1.10e-05]	[1.11e-05]
Married (1=yes)		0.0296***	0.0281***	0.0283***	0.0272***	0.0262***
		[0.000286]	[0.000287]	[0.000287]	[0.000288]	[0.000289]
Black (1=yes)			-0.0251***	-0.0251***	-0.0248***	-0.0250***
			[0.000517]	[0.000517]	[0.000525]	[0.000526]
Hispanic (1=yes)			-0.0138***	-0.0144***	-0.0104***	-0.0107***
			[0.000509]	[0.000508]	[0.000523]	[0.000524]
Other Race (1=yes)			-0.0141***	-0.0145***	-0.00938***	-0.0111***
			[0.000472]	[0.000471]	[0.000492]	[0.000497]
Fixed Effect (Year)	No	No	No	Yes	Yes	Yes
Fixed Effect (State)	No	No	No	No	Yes	Yes
Fixed Effect (Primary Major)	No	No	No	No	No	Yes
Constant	0.960***	0.946***	0.952***	0.952***	0.945***	0.957***
	[0.000140]	[0.000496]	[0.000507]	[0.000507]	[0.00121]	[0.00164]
Observations	2,172,165	2,172,165	2,172,165	2,172,165	2,172,165	2,172,165
R-squared	0.000	0.005	0.007	0.009	0.010	0.011

Note: Standard errors are shown in parentheses. P-values are indicated as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$
This table displays the results of six OLS regression models. Each model controls for additional factors that could contribute to employment.

Column 6 of Table 2 indicates that individuals who have a second major are 0.09% less likely to be employed than their single major counterparts, and this value is statistically significant at the ninety-five percent confidence level. Why would this be the case? It seems intuitive to assume that an individual who has a second major possesses a wider range of knowledge and skills which are probably valuable. However, it could be the case that employers from particular job markets view individuals who have a second major as having more knowledge and skill but less depth in a particular skill. For instance, an individual applying for a job in accounting that had majored in accounting and psychology obviously spent time and effort learning psychology which could have been devoted to accounting. This might also indicate that students are less passionate or enthusiastic about a particular major if they committed time and effort to studying a different major.

Table 3 presents the effects that double majoring and dual majoring have on employment.

Table 3

OLS Estimates of the effects of Double Majoring vs. Dual Majoring

Dependent Variable: Employment (1=employed, 0=unemployed)

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
Doublemajor (1=yes)	0.000629	0.00166**	0.000714	0.000613	0.000177	0.000329
	[0.000781]	[0.000779]	[0.000778]	[0.000778]	[0.000777]	[0.000783]
Dualmajor (1=yes)	-0.00469***	-0.00299***	-0.00388***	-0.00385***	-0.00405***	-0.00146***
	[0.000512]	[0.000511]	[0.000511]	[0.000510]	[0.000510]	[0.000517]
Female (1=yes)		0.00197***	0.00268***	0.00268***	0.00242***	0.00197***
		[0.000266]	[0.000266]	[0.000266]	[0.000265]	[0.000289]
Age		-0.000119***	-0.000142***	-0.000143***	-0.000124***	-0.000158***
		[1.09e-05]	[1.10e-05]	[1.10e-05]	[1.10e-05]	[1.11e-05]
Married (1=yes)		0.0296***	0.0281***	0.0283***	0.0272***	0.0262***
		[0.000286]	[0.000287]	[0.000287]	[0.000288]	[0.000289]
Black (1=yes)			-0.0250***	-0.0250***	-0.0248***	-0.0250***
			[0.000517]	[0.000517]	[0.000525]	[0.000526]
Hispanic (1=yes)			-0.0138***	-0.0144***	-0.0104***	-0.0107***
			[0.000509]	[0.000508]	[0.000523]	[0.000524]
Other Race (1=yes)			-0.0141***	-0.0145***	-0.00938***	-0.0111***
			[0.000472]	[0.000471]	[0.000492]	[0.000497]
Fixed Effect (Year)	No	No	No	Yes	Yes	Yes
Fixed Effect (State)	No	No	No	No	Yes	Yes
Fixed Effect (Primary Major)	No	No	No	No	No	Yes
Constant	0.960***	0.946***	0.952***	0.952***	0.945***	0.957***
	[0.000140]	[0.000496]	[0.000507]	[0.000507]	[0.00121]	[0.00164]
Observations	2,172,165	2,172,165	2,172,165	2,172,165	2,172,165	2,172,165
R-squared	0.000	0.005	0.007	0.009	0.010	0.011

Note: Standard errors are shown in parentheses. P-values are indicated as follows: *** p<0.01, ** p<0.05, * p<0.1
This table displays the results of six OLS regression models. Each model controls for additional factors that could contribute to employment.

For individuals who study two related fields, it seems like a second major would help in a particular job market. The results of Table 3 (presented below) indicate that there is no significant effect on employment status for individuals who study two related academic fields compared to single majors. However, individuals who dual major, or study two unrelated fields are more likely to experience unemployment by 0.146% than single majors.

There are some implications to the dataset. The greatest implication is the lack of potentially important variables such as college GPA. Several studies examine the effects that GPA has on labor market rewards and tend to find that GPA positively correlates with wages (Cohen 1984; Jones and Jackson 1990). What does this mean for employability? It seems reasonable for an employer to hire an individual with better grades if grades are the only distinguishing factor between two or more job applicants (at least for a first job). Roth and Switzer (1996) find a moderate positive relationship between college grades and job performance. If there is a positive relationship between college grades and employability,

the results will be biased positively. However, this data set does not exclusively include individuals who are new college graduates but also includes other individuals who may be currently seeking employment up to a few decades after college. Other missing variables that might have a relationship with employability are the university attended and whether it was a private or public university.

Section IV: Conclusion and Further Research

Because of the evidence that shows benefits for additional education, students likely anticipate a benefit from studying two fields of study rather than one. Although double majoring and dual majoring will not help an individual's probability of getting a job, there are still reasons to value studying two distinct fields. Outside of employability, such reasons might include recreational pursuits, a "back-up" plan for a dream job, better job security, or a genuine interest in multiple subjects. Nevertheless, findings from this research indicate that students should not double major in order to have an "edge" in the labor market.

An important thing that is not addressed in this research is whether or not a double major graduate is more capable of landing his/her "dream job" or preferred occupation. Del Rossi and Hersch (2008) found that certain combinations of majors led to significant premiums in wages. Further research could examine if such combinations can also help an individual to land a job. Further studies could also examine whether or not individuals with a second major are more satisfied with their jobs or employment.

Given the huge quantity of college majors to choose from and the social pressures that they entail, choosing a college major is a difficult task. If a student further decides to add a second major for a bachelor's degree, such a student should critically examine the reasons for spending more time, effort, and possibly money on a second major degree. As the evidence suggests from this study, these reasons do not include being more employable in the job market.

Work's Cited

Carnevale, A. P., Cheah, B., & Strohl, J. (2013). Hard times: College majors, unemployment and earnings: Not all college degrees are created equal.

Cohen, P. A. (1984). College grades and adult achievement: A research synthesis. *Research in Higher Education*, *20*(3), 281-293.

Del Rossi, A. F., & Hersch, J. (2008). Double your major, double your return?. *Economics of Education Review*, *27*(4), 375-386.

Del Rossi, A. F., & Hersch, J. (2016). The private and social benefits of double majors. *Journal of Benefit-Cost Analysis*, *7*(2), 292-325.

Hemelt, S. W. (2010). The college double major and subsequent earnings. *Education Economics*, *18*(2), 167-189.

Jones, E. B., & Jackson, J. D. (1990). College grades and labor market rewards. *The Journal of Human Resources*, *25*(2), 253.

Lewin, T. (2002). For students seeking edge, one major just isn't enough. *New York Times*, *1*.

Lyman, J. (2018). How Much is That Second Major Worth? *Southern Utah University Working Paper Series*.

Mincer, J. (1991). *Education and unemployment* (No. w3838). National Bureau of Economic Research.

Montmarquette, C., Cannings, K., & Mahseredjian, S. (2002). How do young people choose college majors?. *Economics of Education Review*, *21*(6), 543-556.

Patrinos, H. A., Psacharopoulos, G., & Tansel, A. (2019). *Returns to Investment in Education: The Case of Turkey*. The World Bank.

Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World development*, *22*(9), 1325-1343.

Roksa, J., & Levey, T. (2010). What can you do with that degree? College major and occupational status of college graduates over time. *Social forces*, *89*(2), 389-415.

Roth, P. L., BeVier, C. A., Switzer III, F. S., & Schippmann, J. S. (1996). Meta-analyzing the relationship between grades and job performance. *Journal of applied psychology*, *81*(5), 548.

Schultz, T. W. (1961). Investment in human capital. *The American economic review*, 1-17.

Zafar, B. (2012). Double majors: One for me, one for the parents?. *Economic Inquiry*, *50*(2), 287-308.