

Education and Household Income in the United States

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Overview of Question & Discussion of Importance:

The research question I will be focusing on is: *How does average education affect average household income in the United States?* My null hypothesis is that education does not affect household income. This is an important question to ask, as many people have to make the decision of whether they want to obtain higher education or not. Most people will have some form of education, whether up to high school, college, etc., and every household will have to have some amount of income. Also, in the current day and age, many people have to obtain student loans to afford education after high school. They have to take into account what their income could be with or without a higher education and if they would be able to pay off any loans taken out. Ultimately, they have to decide if it is worth it for them to seek higher education. If there is a pattern between education levels and levels of income, it could answer some important questions for many people.

Literature Summary & Hypothesis:**Education**

In the past, people have followed the ideals that high educational attainment almost always equals higher income. Many people set goals for their children to attend college and start saving for this at a young age. However, we might start to see a shift in the constant uptick of college attendees in the coming years and see more people attending trade schools. “For decades now, the U.S. labor market has experienced increased demand for skilled workers. During times like the 1950s and 1960s, a rising level of educational attainment kept up with this rising demand for skill. But since the late 1970s and early 1980s, the rise in U.S. education levels has not kept

up with the rising demand for skilled workers, and the slowdown in educational attainment has been particularly severe for males.” (Brookings Institute, 2016.)

Obtaining higher education is very costly now, as well. Many people have to take out loans to afford it, but it is not always worth it. “About 48 percent of employed U.S. college graduates are in jobs that the Bureau of Labor Statistics (BLS) suggests requires less than a four-year college education. Eleven percent of employed college graduates are in occupations requiring more than a high-school diploma but less than a bachelor’s, and 37 percent are in occupations requiring no more than a high-school diploma.” (Vedder and Denhart, 2013.) From these statistics, it does not seem like the costs of obtaining a higher education is worth the huge price-tag that comes with it and facing loan repayment for years to come. While there are scholarships and funding available, there are inevitably going to be people left with tremendous amounts of debt from attending college. “Beyond the overall numbers shifting, high school graduating classes will become more diverse. Those classes will have fewer white students and more Hispanic students, according to demographers, and a greater range of academic abilities. Family incomes remain stagnant, so student financial need will increase. In other words, the decade ahead will be tumultuous for college enrollment.” (Selingo, 2018.) So, we might see educational attainment turn a turn down due to finances or a need for trade workers in the future.

Household Income

“Household income includes income of the householder and all other people 15 years and older in the household, whether or not they are related to the householder.” (United States Census Bureau, 2013.) Over time, we can see that the average household income in the United States has increased. “This year’s annual data release from the Census Bureau showed us that the

median household income has risen to \$61,370 in 2017, a 1.8 percent increase even after adjusting for inflation.” However, “real wage growth has been consistently hovering around zero (rising at just a 0.2 percent annual rate from 2016-2017).” (Brookings Institute, 2018.) So, while the average household income is rising, there has not been much wage growth. People might be working more hours, or more members of the household might be entering the workforce. Either way, we are seeing a rise in household income in the United States. As it constantly rises, we need to ask ourselves if this is due to people working more and longer hours, or if more people are obtaining higher education. It does not seem this way.

Other Factors and Hypothesis

College admissions are not expected to rise, but household income is on the rise. What can this suggest? Obviously, the price of attending school beyond high school is a large factor. Education costs are continuously rising. “Over the past 10 years, the average price for tuition and fees at four-year private colleges and universities has jumped to \$34,740 a year, up more than \$7,000, according to statistics from the College Board. Those costs have outpaced the rate of inflation by more than 3 percentage points, continuing a troubling trend that has persisted for decades.” (Caplinger, 2018.) The literature suggests that those who are choosing to obtain a higher education are often leaving with a high amount of debt and not even a secure job in their desired field. The market for trade jobs could be looking more appealing for some, as well. “The future of work may not require a bachelor's degree to get a good job. Of the 10 occupations that are expected to see the most job growth through 2026, only one, a registered nurse, requires a college degree, according to the Bureau of Labor Statistics.” (Akhtar, 2019.) We will study what the relationship between income and educational attainment have been in the past to speculate about the future, but it’s certain that the workforce is seeing some changes.

Proposed hypothesis: No relationship exists between higher education and household income.

Description of Methods:

In order to assess the correlation between education and household income, I have created a research design to analyze the relationship. My independent variable will be education and my dependent variable will be household income. Defining my variables will be fairly simple. My independent variable, education, will be operationalized into nominal categories as whether someone has completed: less than high school, high school, some college, bachelor's degree, and/or professional degrees. My dependent variable, household income, will be operationalized as a scale variable, as the monetary amounts can start at 0 and go up. The data analyzed spans over 9 years, 2009 – 2017 and includes median earnings in the past 12 months (in 2017 inflation-adjusted dollars) for the population 25 and older, as well as the levels of education obtained. The 9 years of data was pulled from the United States Census Bureau. I searched for educational attainment on American FactFinder to find the applicable data set. We are analyzing 2 variables, so we will run a bivariate test with the data set found. Since the dependent variable, household income, is defined as a scale level of measurement and the independent variable, education, is defined into a nominal level of measurement, the most appropriate quantitative analysis to run is ANOVA.

In addition to bivariate statistical tests, I conducted an informative interview with the Parks and Recreation Director of Randolph County, Lance Daniel. The interview was conducted with hopes to capture Mr. Daniels perspective on education and income as a public servant. I chose Mr. Daniel because he has a unique position within Randolph County and has a different past with education as opposed to a typical public servant in his position. The interview took

place over phone and consisted of 5 open ended questions concerning where he falls in my research and his opinions on education, income, and other variables today.

Findings:

The data from the United States Census Bureau was used to run an ANOVA test. The tests yielded some results that allowed us to reject or accept or null hypothesis.

(Table 1: ANOVA Test and Results here.)

After running the ANOVA test in excel, I concluded that we could reject our null hypothesis that education does not affect household income. I knew I could reject the null, because the ANOVA test yielded a p-value of less than .05. The ANOVA ran on the 9 years of data emitted a p-value of 3.4237E-45. This far exceeds the .05 needed to show that we are 95% confident that there is a relationship between educational attainment and household income.

Our ANOVA test also gave us a F-value of 1936.61356, which is very far from the 1.0 ratio that would signify that our null hypothesis is true. The high f-value, again, signifies that we can reject our null hypothesis between educational attainment and household income.

After analyzing our data and test results, I created a graph to show the pattern between educational attainment and income over the 9 years studied.

(Graph 2: Educational attainment x income over 9 years. (2009 – 2017) here.)

It is easy to see that the pattern is constant over the years. It's apparent that people who obtain higher educational make more money than those who do not. It is a constant uptick, with income

rising overall every year! This also supports our rejection of the null hypothesis that education and income do not have an effect on each other. It supports that the two variables do have a positive effect on one another.

Another graph was created to show that the pattern derived from the average educational attainment and income from 2009 – 2017 is the same pattern seen in 2009, as well as 2017.

(Graph 2: Average educational attainment x income over 9 years. (2009 – 2017) here.)

This, again, shows that the pattern and relationships has been steady and constant in the past.

According to the results of our bivariate tests, ANOVA, as well as looking at the patterns over the years, we can reject our null hypothesis that there is no relationship between educational attainment and household income. The results show no indication that negative relationship between the two variables exists in the United States over the past 9 years.

The interview conducted with Mr. Lance Daniel did not support the statistical findings. While he recognized that education can have a positive influence on income, he did not feel that higher education is necessary to succeed. He verified and agreed with the statements that student loan debt is growing and can make obtaining higher education expensive and burdensome. Mr. Lance Daniel stated, “I don’t think there is a correlation between education and income. Obviously, it can help, but in my particular case I didn’t need it. I am in a position that someone with a bachelor or master’s degree might normally be in, but I am in this position with a high school diploma and some college doing just fine. I don’t think I would make more money here if I had graduated from college, so I doubt I’ll ever go back. It’s not worth it for me. I think a lot of

people, especially people in small towns, can do just fine without going into debt over college.”

Mr. Daniel brought to my attention that location could also be a factor in this study!

The literature studied is consistent with our findings, but points to there being a possible change in the future. Mr. Daniel seemed to agree with this line of thinking, as well. We could see debt and loan amounts be a larger variable in the future. While we can reject our null hypothesis for 2009-2017, we cannot reliably say that this pattern will continue in the future.

Conclusions and Limitations

I have presented data that supports a positive relationship between educational attainment and household income during 2009 – 2017 in the United States. It is possible that we could see a change in this in the future, due to outside factors. The literature and Mr. Daniel both attributed loan amounts to be a primary cause of why people would not attend higher education.

While this study is helpful, it cannot be conclusive. There are limitations to this study that could possibly change the outcome in the future. If I were to have all resources available, I would suggest running another study in 5 years that includes external factors, such as location, family backgrounds, and the debt crisis while including recent and updated census data. I would also suggest collecting data through surveys from individuals across the United States to get an idea of their specific background with education and educational attainment. I would also purposely interview someone in the same position as Mr. Daniel, but in a larger city and see what differences could be pointed out between their answers and backgrounds!

Ultimately, our statistical data yielded from the ANOVA test allowed us to be 95% confident that there is a relationship between educational attainment and income, as well as rejecting the null hypothesis that there is no relationship between the two variables.

Tables and Graphs:

Table 1. ANOVA Test & Results

	Less than High School	High School	Some College	Bachelors	Graduate
2009	19,420	27,272	33,457	47,747	62,708
2010	19,492	27,281	33,593	48,485	63,612
2011	19,627	27,640	34,045	49,683	65,369
2012	19,642	27,607	33,857	50,096	66,109
2013	19,652	27,528	33,702	50,254	66,493
2014	19,954	27,868	33,988	50,515	66,944
2015	20,361	28,043	33,820	50,595	66,857
2016	20,924	28,672	34,412	51,094	67,832
2017	21,738	29,815	35,394	52,019	69,903

Anova: Single Factor

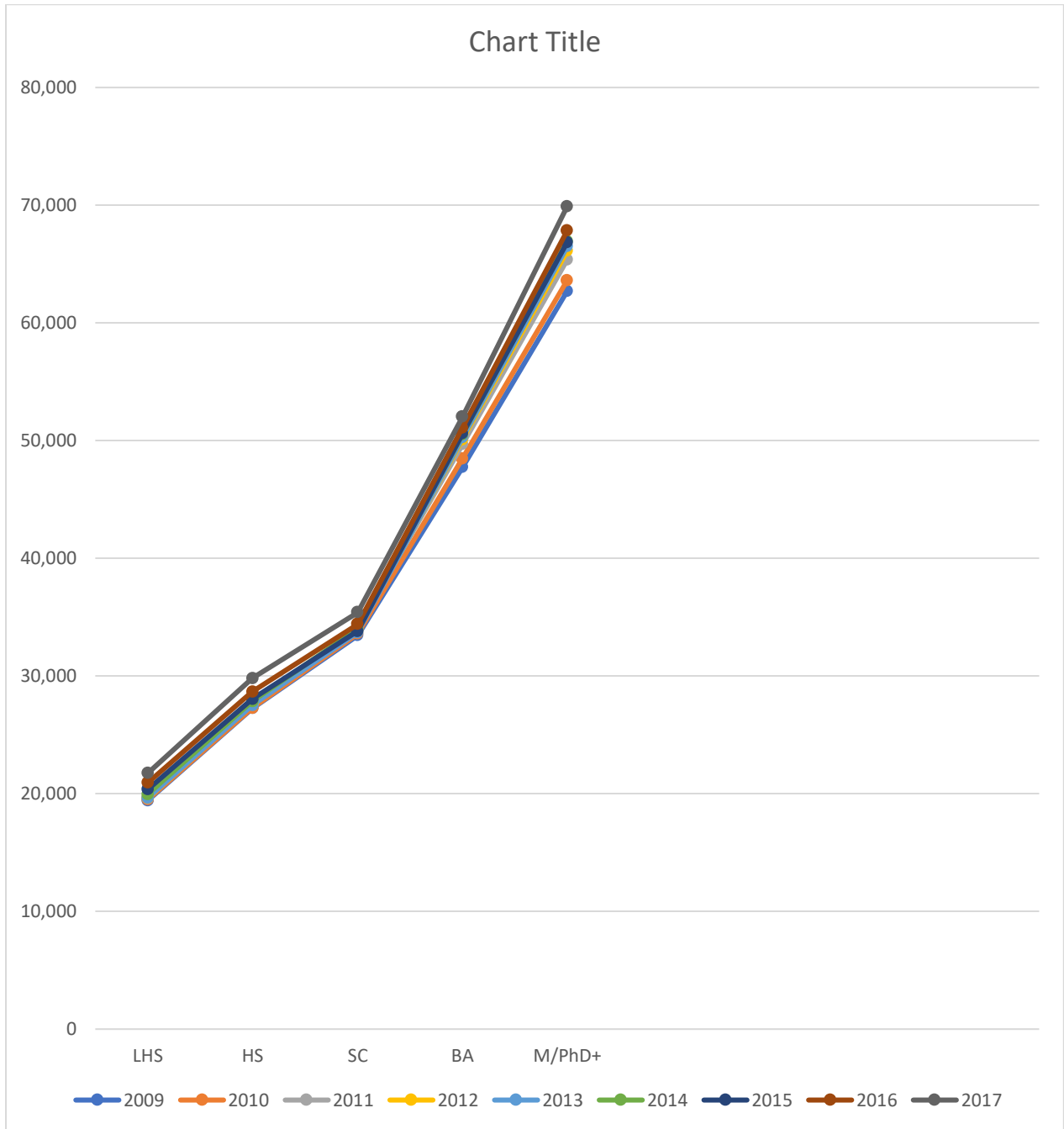
SUMMARY

Groups	Count	Sum	Average	Variance
Less than Hig	9	180810	20090	614602.25
High School	9	251726	27969.55556	663814.778
Some College	9	306268	34029.77778	338664.944
Bachelors	9	450488	50054.22222	1676430.19
Graduate	9	595827	66203	4629654.5

ANOVA

Source of Variati	SS	df	MS	F	P-value	Fcrit
Between Gro	12275289582	4	3068822396	1936.61356	3.4237E-45	2.60597495
Within Group	63385333.33	40	1584633.333			
Total	12338674916	44				

Graph 2. Educational attainment x income over 9 years. (2009 – 2017)



Graph 3. Average educational attainment x income over 9 years. (2009 – 2017)



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Appendix A:**Interview Protocol:**

1. Mr. Lance Daniel was identified as the interviewee for his position as the Director of Parks and Recreation for Randolph County. He was to be asked questions regarding education and household income. He was assured these answers would not be published publicly, but shared between myself and the graders.
2. An interview instrument was designed. It is semi-structured, containing five open-ended question.
3. Interview questions were piloted and edited for better clarification.
4. The interview was conducted via telephone on March 23rd in the afternoon. The interview took 15 minutes to complete. The setting was different for the interview conductor and the participant, as a phone call was made.
5. The interview questions were altered, and replacement questions were asked via telephone on April 24th in the afternoon. This took 10 minutes to complete.
6. The instrument used follows this appendix.

Appendix B:**Interview Instrument:**

Hi, Mr. Daniel! My name is Briana Robinson and I am an MPA and MCP student at Auburn University. I am conducting research on the relationship between education and household income. With your consent, I would like to ask you some open-ended questions on your position and perspective on this topic in the public service field in particular. Your answers will aid my research in this study. If you consent, your answers will not be shared, except for between the grader of this assignment and myself.

Please answer the following:

1. Mr. Daniel, how did you come to be in this position?
 - Lance came into this position without the proper education, but a good reputation in the community. He attended high school and some college, but never graduated. It's a small town, so the competitive was not steep.
2. As a Parks and Recreation Director, how do you feel about your compensation versus your job responsibilities?
 - He feels that he is paid adequately for his job roles, around 40k a year, but noted that someone with more education might not agree if they were in his position. He has no school loans to pay back.
3. How do you feel your education influenced your ability to hold this position?
 - He does not think his education influenced his position at all, but noted that if he lived in a bigger town that he would not be qualified for the position.
4. What is your opinion on educational attainment in the public sector?
 - He thinks it is not necessary, but would obviously help and allow you to make more money. He noted that someone in his same position, even with a MPA, would not make much more than he is now due to the community size and financial situation.
5. What is your opinion on education and income?
 - Lance did not feel education and income are correlated, as he has found success finding a place in public service without a bachelor's degree. His wife is a Registered Nurse and does not make much more than he currently does, so he does not feel like it would be worth it for him to pay and go back to school unless he chooses a different career path. He thinks you can find financial success without higher education.

Appendix C:**Memo Changes to Part B:**

The changes made after comments from Dr. Spice and PhD Candidate Alicia Barnes are detailed below. Sections added after completing Part A:

- Findings
- Conclusions and Limitations
- Tables & Graphs
- Memo Changes to Part B

Along with adding the missing sections, I made some changes to the sections that I included in Part A. A lot of details were added on what data set was being chosen to work with, as well as defining and operationalizing my variables more accurately and choosing the appropriate bivariate test. I did a rework of my literature section to better support my research and added more comments to make it less of a string of quotes, as well as fixed many citation errors. I also reached back out to my interview subject, we're close enough friends that I could do this, and asked more open-ended questions to replace the closed ended questions I had asked in Part A.