THE EFFECTS OF PARENTAL INCOME ON THEIR CHILDREN'S EDUCATIONAL ATTAINMENT AS ADULTS

Abstract:

This paper studies how parental income affects a child's chance of getting higher education. Using data from the IPUMS Current Population Survey (2009-2019), I applied Ordinary Least Squares (OLS) regression while controlling for age, gender, race, and marital status. Results show that higher parental income increases the chance of a child completing higher education, but the effect decreases over time. These findings highlight the impact of family income on educational opportunities.

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INTRODUCTION

The connection between parental income and a child's education is a critical piece of understanding how economic inequality continues across generations. Education is a powerful tool for improving lifetime earnings and breaking cycles of poverty, but not every family starts with the same resources. Parents with higher incomes can afford better schools, tutors, and extracurricular activities, while families with lower incomes often struggle to access even basic educational opportunities.

This topic is both important and personal. It highlights how financial advantages—or disadvantages—shape a child's future in ways that aren't always obvious. By examining how a parent's income impacts their child's chance of completing higher education, this paper sheds light on the persistent inequalities that many families face.

For this analysis, I use data from the IPUMS Current Population Survey (CPS) covering the years 2009 to 2019. These years were chosen to avoid the effects of the Great Recession and the COVID-19 pandemic, both of which could skew the results. I used Ordinary Least Squares (OLS) regression to measure the relationship between parental income and higher education attainment, controlling for factors like age, gender, race, marital status, and employment. The results suggest that a one percent increase in the log of parental income increases the likelihood of a child pursuing higher education by about 0.0253.

This paper is organized as follows: The next section reviews prior research on this topic. After that, I'll explain the data and methods used in the analysis. The results section will dive into the findings, followed by a discussion on what these results mean and how they connect to broader policy issues. The paper concludes with suggestions for addressing educational inequality and ideas for future research.

LITERATURE REVIEW

A lot of research has explored how parental income impacts children's education. For example, Chevalier et al. (2013) found that even a one-year increase in parental education decreases the likelihood of a child repeating a grade by 2-7 percentage points. This highlights the importance of parental investment in their children's academic success. Similarly, Blanden (2019) shows a strong link between the income levels of parents and their children, suggesting that kids from wealthier families are more likely to reach higher levels of education and secure top positions in society as adults. Bloome et al. (2018) take this a step further by looking at how parental income drives educational inequality. They found that

children from high-income families not only tend to achieve higher education but also go on to earn more as adults, perpetuating cycles of economic inequality. On the policy side, Blankenau and Youderian (2015) examined government spending on early education and found that it can significantly reduce these disparities. For instance, increased funding for early education programs weakens the link between family income and total educational spending, creating more opportunities for children from low-income families. These studies all point to the same conclusion: a family's financial resources heavily influence a child's educational path. This paper builds on these findings by analyzing newer data from the IPUMS Current Population Survey (2009-2019). It focuses specifically on how parental income impacts the likelihood of children pursuing higher education, adding fresh insights to the existing research.

EMPIRICAL MODEL

To understand the relationship between parental income and a child's likelihood of attaining higher education, I used Ordinary Least Squares (OLS) regression. This method estimates the connection between one dependent variable and one or more independent variables by finding the line that best fits the data. It works by minimizing the sum of the squared differences (residuals) between the observed values and the predicted values. In simple terms, OLS helps us get the most accurate and unbiased estimate of the relationship we're studying.

OLS is widely considered the Best Linear Unbiased Estimator (BLUE). This means it produces the most precise results by minimizing the variance in the estimates, ensuring they are as close as possible to the actual values. I chose OLS because it provides reliable results, especially when working with multiple variables.

For my analysis, I used multiple regression, which accounts for several factors simultaneously. This approach is helpful because it controls for other variables that might influence the relationship between parental income and a child's education. This approach reduces omitted variable bias, allowing for a clearer understanding of the specific effect of parental income. Many of the variables in this model are dummy variables. Dummy variables are binary indicators used to represent categories or groups in a numerical format, where 1 indicates the presence of a characteristic and 0 indicates its absence.

The dependent variable (child_educ) is a dummy variable that equals 1 if the child is either actively pursuing higher education or has attained a degree above a high school diploma and 0 otherwise. The primary independent variable is the natural logarithm of combined parental income (ln(income)), which allows for the

interpretation of percentage changes in income. To enhance the model, I included several dummy variables as controls. For example, the variable for sex (female) equals 1 if the parent is female and 0 otherwise, the variable for race (white) equals 1 if the parent identifies as White and 0 if they identify as Black, American Indian, or Asian/Pacific Islander, the variable for marital status (married) equals 1 if the parent is married and 0 otherwise, and lastly, the variable for employment status (employed) equals 1 if the parent is employed and 0 otherwise. I also included continuous variables such as age (age) and its square (agesq) to capture the potential nonlinear effects of age on income. This is due to diminishing returns since as you get older, your income increases at a decreasing rate. The regression model is expressed as follows:

$$child\_educ = \beta_0 + \beta_1 \ln(income) + \beta_2 female + \beta_3 white + \beta_4 age + \beta_5 agesq + \beta_6 married + \beta_7 employed + u$$

This setup ensures that the analysis captures not just the direct impact of parental income on a child's education but also the influence of other demographic and socioeconomic factors. Using dummy variables allows the model to include categorical data, making the results more comprehensive and interpretable.

DATA

The data for this study comes from the IPUMS Current Population Survey (CPS), covering the years 2009 to 2019. These years were selected to exclude the effects of the Great Recession and the COVID-19 pandemic, ensuring a more consistent economic context. The CPS provides detailed information on income, education, employment, and demographics, making it ideal for analyzing the relationship between parental income and educational attainment. The dataset includes a representative sample of individuals and households across the United States. Key variables used in this analysis include parental income, a child's education level, employment status, and demographic details such as age, gender, and race. This allows for a focused study of how parental income impacts education outcomes while accounting for other influencing factors.

DESCRIPTIVE STATISTICS

BOTH PARENT'S INCOME ON CHILD'S EDUCATION ATTAINMENT AS ADULTS

Variable	Obs	Mean	Std. Dev.	Min	Max
Child's Education	2,627,138	.4401052	.4963997	0	1
Parent's Income	7,445,276	27.06293	1.633	20.6179	27.63102
Female	7,608,916	.4366404	.4959693	0	1
White	7,021,317	.8627208	.3441419	0	1
Age	7,608,916	39.54672	23.35933	0	85
Agesq	7,608,916	2109.601	1962.731	0	7225
Married	7,608,916	.2089428	.4065535	0	1
Employed	2,113,844	.9725089	.1635096	0	1

The table above summarizes key variables, including child education, parental income, gender, race, age, marital status, and employment. Child education is a dummy variable, where 1 indicates higher education attainment or enrollment. Parental income is logged to reflect percentage impacts, with a mean of 27.06 and a range of 20.62 to 27.63. About 44% of children in the sample attained higher education, while 43% of the population was female and 86% identified as white. The average age was 39.5 years, and most parents were employed (mean of 0.97), though fewer were married (mean of 0.21).

These trends highlight barriers to higher education, particularly for families with lower incomes. The data also supports findings from previous studies, showing that socioeconomic factors like income and race significantly influence educational outcomes.

RESULTS

	Dependent Variable: Child's Education		
VARIABLES	MODEL 1	MODEL 2	MODEL 3
INCOME	-0.0642***	0.0253***	-0.0005***
	(.0002)	(.0002)	(.0002)
FEMALE		0.0309***	0.0025***
		(.0004)	(.0020)
WHITE		0.0137***	-0.0025***
		(.0005)	(.0014)
AGE		-0.0602***	0.1723***
		(.0001)	(.0004)
AGESQ		0.0004***	-0.0030***
		(5.93e-07)	(6.79e-06)
MARRIED			0.0178***
			(.0018)
EMPLOYED			0.0128***
			(.0035)
CONSTANT	2.187***	1.325***	-1.478***
OBSERVATIONS	2,594,854	2,398,849	408,174
R-SQUARED	0.0279	0.6390	0.3255

Standard Error in parentheses

***p<0.01, **p<0.05, *p<0.1

These models above show the result of Ordinary Least Squares (OLS) regression, which examines the relationship between parental income and a child's likelihood of attaining higher education. The numbers with stars to symbolize 99% significance are the betas, showing the impact of each variable from left to right. Out of the three models, Model 2 is the most reliable as parental income has a positive and significant effect, showing that a one-unit increase in the natural log of parental income increases the likelihood of a child pursuing higher education by about 0.0253 percentage points. This finding aligns with expectations and demonstrates the important role parental income plays in shaping educational opportunities.

Models 1 and 3, on the other hand, show a negative relationship between parental income and child education attainment, which was unexpected. In Model 3, the inclusion of age and age squared (agesq) seems to flip the signs of their

effects compared to Model 2. This might suggest an issue with how age was coded, as the results become less consistent when both age variables are included. It's possible that this inconsistency contributed to the unexpected negative results in Model 3, and it highlights the need for further review of how age was handled in the data.

Model 2 also has the highest R^2 value at 0.6390, meaning it explains 64% of the variation in child education attainment—more than either Model 1 or Model 3. This higher explanatory power makes Model 2 the best choice for understanding the relationship between parental income and education outcomes.

These results show that parental income is a key factor in a child's likelihood of pursuing higher education. At the same time, they point to possible coding issues with age that may have influenced the findings in some of the models. Future analysis could benefit from revisiting how age was coded to ensure consistent and reliable results.

TESTS

A t-test is used to measure statistical significance in regression modeling. Using parental income as my variable of interest (income), the test statistics for model 1, model 2, and model 3 are -272.74, 159.83, and -2.38 respectively. For each of them to be 99% significant, these test statistics must lie outside of 2.58 standard deviations away from zero. Only models 1 and 2 show statistical significance with the variable of interest, therefore, the null hypothesis is accepted for model 3 while the null hypothesis is rejected for models 1 and 2. An f-test measures joint significance on whether a model is improving at predicting y. The 99% critical value is 2.575 and the test statistic for model 2 over model 1 is 1,015,189.03 and the test statistic for model 3 over model 2 is 4,410.78. This shows that the utilized regression, model 2, is a more accurate way to predict y rather than just finding the mean.

CONCLUSION

This study looked at how parental income affects a child's chances of attaining higher education, using data from the IPUMS Current Population Survey (2009–2019). The results showed that higher parental income has a significant and positive impact, with Model 2 providing the clearest picture. However, some unexpected findings in the other models, likely due to how age was coded, highlight areas where the data could be refined. Overall, the analysis confirms the critical role that family income plays in shaping educational opportunities.

To address these income-based disparities, there are several policies that could make a difference. For example, increasing government support for low-income communities to improve school quality would help level the playing field. Another important step would be making preschool free, giving all children—regardless of their family's financial situation—a strong start in their education.

Future research could explore other factors that might interact with parental income. For instance, parental education likely has a combined effect with income on a child's educational attainment and understanding that relationship would add depth to this work. It would also be useful to study how these dynamics differ in specific regions, like New York State or other parts of the U.S., to uncover how local factors influence educational outcomes.

In conclusion, parental income is a key factor in determining a child's educational success, and addressing the challenges faced by low-income families is essential for reducing inequality. This research sheds light on these issues and offers a foundation for future studies to build on, with the goal of creating a more equitable education system.

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