

Parents' Incomes and Children's Outcomes: A Quasi-Experiment Using Transfer Payments from Casino Profits

By

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- Household conditions and characteristics play an important role in determining the outcomes of children
- While previous research has found conflicting results with regard to the effect of household income on the young adult outcomes of household children, none of the studies have been able to identify a truly exogenous income change at the household level
- Our approach attempts to overcome the standard household income endogeneity problem in a direct manner
- Our study uses data from the Great Smoky Mountains Study of Youth (GSMS). In this longitudinal study of child mental health in rural North Carolina, both American Indian and non-Indian children were sampled
- **Figure 1** provides a clear depiction of the change in household incomes over the first eight survey waves of our study

Figure 1: Household Income by American Indian Parent Status in Waves 1-8

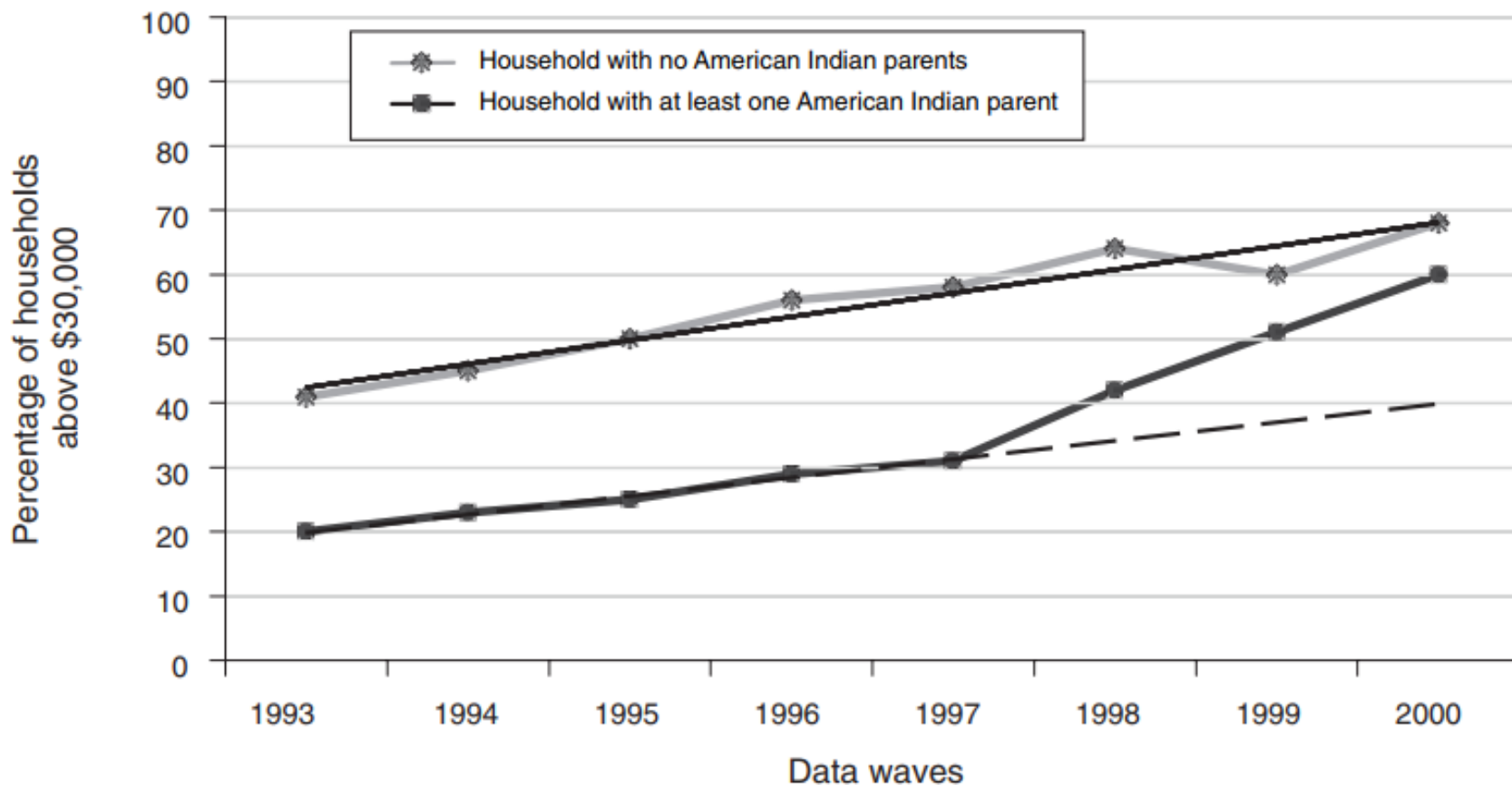


FIGURE 1. HOUSEHOLD INCOME BY AMERICAN INDIAN PARENT STATUS IN WAVES 1-8

1. The Great Smoky Mountains Study of Youth, Empirical Methods, and Data Description

A. Empirical specifications

- *Difference-in-difference regression*
- *Fixed-Effects panel regression*

- *Difference-in-difference regression* — We compare young adult outcomes for children that resided, as minors, in households with increased incomes for six years to children who resided, as minors, in households with exogenously increased incomes for two years
- We treat the number of parents as a continuous variable, and we have two interaction variables that are of interest. The equation below details the specification:

$$\begin{aligned}
 (1) \quad Y_i = & \alpha + \beta_1 \times Age9_i + \beta_2 \times Age11_i + \delta \times NumParents_i \\
 & + \gamma_1 \times Age9_i \times NumParents_i + \gamma_2 \times Age11_i \times NumParents_i \\
 & + \mathbf{X}'_i \theta + \varepsilon_i.
 \end{aligned}$$

- Another point worth mentioning is that the effect of this new industry, casino operations, may have a rather large effect on the demand for labor in the local labor market

- *Fixed-Effects panel regression.*—Given the panel nature of the data, we are also able to utilize individual fixed effects for one of the outcome variables—child’s school attendance
- We employ a fixed effects regression for the number of days a child was present at school in the last three months prior to the interview. The regression is given of the form:

$$(2) \quad Y_{it} = \mathbf{X}'_{it}\beta + \alpha_0 + \alpha_i + \varepsilon_{it}.$$

- We employ a similar model when testing for changes in parental arrests and relationship with their children in the second half of the paper which investigates the mechanisms through which additional household income affects young adult child outcomes
- We use a random effects probit model for changes in parental employment status over time

B. Data description

- *Data means.*—**Table 1** provides the means for the data used in this analysis by the type of household
- Educational Variables
 - Age Cohorts
 - Household Characteristics
 - Criminality Measures
 - Fixed Effects Data
 - Panel Data Characteristics for Parents

- **Educational Variables:** It is worth noting that children from households with at least one American Indian parent have statistically significantly different educational attainment, on average, compared to children from households with no American Indian parents
- **Age Cohorts:** The next group of variables indicates the distribution among the different age cohorts and the number of American Indian parents
- **Household Characteristics:** The third set of variables provides a look at the household conditions prior to the opening of the casino for both groups of children
- **Criminality Measures:** The final set of variables in this panel provide the criminal activity of the sample children
- **Fixed Effects Data:** Panel B of **Table 1** provides the data used primarily in the fixed-effects regressions for changes in parental behavior
- **Panel Data Characteristics for Parents:** The next set of variables provides characteristics of the mother at each stage over the survey time period

Table 1: Mean Values For Panel Variables For All Survey Waves

Variable	At least one American Indian parent household <hr style="width: 100%;"/> Mean	No American Indian parent household <hr style="width: 100%;"/> Mean	<i>t</i> -statistics for difference in group means
<i>Panel A. difference-in-difference regressions</i>			
Education variables			
Years of education	11.21	11.96	-4.10**
High school graduation probability at age 19	0.62	0.69	-2.12**
Received a GED or graduated from high school at age 19	0.76	0.82	-2.26**
Age, parents, and interaction variables			
Age cohort initially 9-year-olds	0.39	0.35	1.26
Age cohort initially 11-year-olds	0.33	0.34	-0.51
Age cohort initially 13-year-olds	0.28	0.31	0.43
Number of American Indian parents	1.34	0.00	20.63**
Interaction age 9 cohort × number of American Indian parents	0.52	0.00	17.98**
Interaction age 11 cohort × number of American Indian parents	0.45	0.00	79.58**

Table 1: Mean Values For Panel Variables For All Survey Waves

Variable	At least one American Indian parent household Mean	No American Indian parent household Mean	<i>t</i> -statistics for difference in group means
<i>Panel A. difference-in-difference regressions</i>			
Household characteristics			
Male child indicator	0.52	0.53	-0.29
Mother has a high school degree/GED	0.36	0.29	2.31**
Father has a high school degree/GED	0.21	0.17	1.53
Mother has more than a high school degree	0.35	0.49	-4.06**
Father has more than a high school degree	0.2	0.31	-3.51**
Average years household in poverty over initial 3 years	1.40	0.66	9.60**
Average household income (by category) for first 3 years	4.58	6.65	-8.79**
Average household income (in dollars using mid point of each category) for first 3 years	20,919	30,377	-3.96**
Crime variables			
Any crime ages 16–17	0.10	0.14	-1.72
Any crime ages 18–19	0.17	0.22	-1.81
Any crime ages 20–21	0.16	0.15	0.28
Any minor crime by age 21	0.25	0.29	-1.10
Any moderate crime by age 21	0.09	0.14	-1.79
Any violent crime by age 21	0.04	0.05	-0.86
Ever dealt drugs by age 21	0.06	0.06	-0.47

Table 1: Mean Values For Panel Variables For All Survey Waves

Variable	At least one American Indian parent household	No American Indian parent household	<i>t</i> -statistics for difference in group means	Total observations
	Mean	Mean		
<i>Panel B. Fixed effect regressions</i>				
Education variable				
Days present at school in last quarter	39.64	39.15	1.27	3,317
Mother's characteristics				
Labor force participation rate	0.88	0.87	1.14	6,780
Arrest status	0.12	0.06	7.51**	5,333
Supervision of child	1.81	1.79	0.89	5,758
Activities spent with child	1.87	1.88	-1.15	6,673
Father's characteristics				
Labor force participation rate	0.90	0.93	-3.95**	4,161
Arrest status	0.27	0.13	9.18**	3,309
Supervision of child	1.11	1.12	-0.27	5,758
Activities spent with child	1.90	1.92	-1.23	3,829

Note: Sample size differs across these variables due to missing information.

** Significant at the 5 percent level.

- *Differences Across Age Cohorts by Observed Characteristics.*—We use the oldest age cohort of children as the control group for the two younger age cohorts
- **Table 2** presents a comparison of these initial household characteristics by age cohort for each of the two types of households
- *Time trends.*—It is extremely important in a difference-in-difference framework that we control for any changes that may have occurred in these communities unrelated to the casino disbursements over time
- **Figure 1** provides the trend in household incomes for the two types of households, and we have already noted that there is a significant difference after the opening of the casino
- **Table 3** shows the unemployment rate for mothers and fathers in the first three survey waves

Table 2: t-Scores of Mean Differences by Age Cohort and American Indian Parent Status

	Difference between cohort 1 and 2	Difference between cohort 2 and 3	Difference between cohort 1 and 3
<i>Panel A. Households with no American Indian parent</i>			
Number of American Indian parents	N/A	N/A	N/A
American Indian indicator	-1.43	-2.00**	-3.35**
Male child indicator	-0.93	1.84	0.95
Mother has a high school degree/GED	0.81	-0.25	0.52
Father has a high school degree/GED	<-0.001	1.49	1.50
Mother has more than a high school degree	-1.51	1.21	-0.23
Father has more than a high school degree	-0.83	0.49	-0.30
Household income	-2.47**	0.36	-2.04**

Table 2: t-Scores of Mean Differences by Age Cohort and American Indian Parent Status

	Difference between cohort 1 and 2	Difference between cohort 2 and 3	Difference between cohort 1 and 3
<i>Panel B. Households with at least one American Indian parent</i>			
Number of American Indian parents	-0.49	1.29	0.84
American Indian indicator	-1.89	1.86	0.04
Male child indicator	-0.56	0.05	-0.46
Mother has a high school degree/GED	1.06	-0.05	0.93
Father has a high school degree/GED	1.00	-1.66	-0.65
Mother has more than a high school degree	-0.63	0.45	-0.14
Father has more than a high school degree	-0.30	0.62	0.34
Household income	0.34	-1.60	-1.29

Note: Each cell provides *t*-statistics for a test of difference in means.

** Significant at the 5 percent level.

Table 3: Time Trends for Parents' Unemployment Rates and Father's Drug and Alcohol Use in the First Three Survey Waves

Year	At least one American Indian parent in household	No American Indian parent in household
<i>Panel A. Mother's unemployment rate</i>		
1993	17	13
1994	12	11
1995	11	8
<i>Notes: The p-value for the hypothesis that the changes in the unemployment rate are the same for each type of household is 0.78. We fail to reject the null hypothesis that the trends are the same.</i>		
<i>Panel B. Father's unemployment rate</i>		
1993	8.5	3.97
1994	7.1	3.6
1995	4.95	1.8
<i>Notes: The p-value for the hypothesis that the changes in the unemployment rate are the same for each type of household is 0.176. We fail to reject the null hypothesis that the trends are the same.</i>		

Table 3: Time Trends for Parents' Unemployment Rates and Father's Drug and Alcohol Use in the First Three Survey Waves

Year	At least one American Indian parent in household	No American Indian parent in household
<i>Panel C. Father's reported drug and alcohol incidence by data waves as reported by mother in percent</i>		
1993	12.2	4.73
1994	9.5	4.91
1995	8.8	3.9

Notes: The p -value for the hypothesis that the change in drug and alcohol incidence is the same for each type of household is 0.39. We fail to reject the null hypothesis that the trends are the same.

2. The Effects of Exogenous Change in Income on Young Adult Educational Attainment and Criminal Behavior

A. Education Outcome Variables

- **Table 4** presents the results from regressions for the educational outcome variables
- It is important to note that the American Indian children had an incentive to finish high school by age 18 as they became eligible for payment of the semi-annual casino payments themselves; otherwise, they would have to wait until age 21

Table 4: Effect of Cash Transfer on Children's Educational Achievement

Independent variables	Years of education, age 21	Probability of HS graduate, age 19	Probability of HS graduate/ GED, age 19
	Coefficient	Marg. eff.	Marg. eff.
Interaction 1: age cohort 1 × number of American Indian parents	0.379 (0.447)	0.156** (0.073)	0.086 (0.054)
Interaction 2: age cohort 2 × number of American Indian parents	0.117 (0.304)	0.042 (0.066)	0.033 (0.044)
Age cohort 1 (9 years old)	-0.269 (0.294)	-0.025 (0.060)	-0.019 (0.0457)
Age cohort 2 (11 years old)	0.072 (0.275)	-0.010 (0.055)	-0.016 (0.041)
Number of American Indian parents in household	-0.503 (0.350)	-0.156 (0.068)	-0.131*** (0.047)
American Indian	0.003 (0.472)	0.081 (0.063)	0.075 (0.038)
Sex	-0.639*** (0.227)	-0.123*** (0.043)	-0.081*** (0.033)
Mother has a high school degree/GED	0.557 (0.399)	0.103* (0.051)	0.079** (0.034)
Father has a high school degree/GED	-0.164 (0.396)	0.001 (0.067)	0.026 (0.044)

Table 4: Effect of Cash Transfer on Children's Educational Achievement

Independent variables	Years of education, age 21	Probability of HS graduate, age 19	Probability of HS graduate/ GED, age 19
	Coefficient	Marg. eff.	Marg. eff.
Mother has more than a high school degree	0.924** (0.367)	0.117** (0.058)	0.129*** (0.045)
Father has more than a high school degree	0.757** (0.306)	0.053 (0.056)	0.051 (0.040)
Household previously in poverty indicator variable	-0.120 (0.174)	-0.045 (0.028)	-0.026 (0.019)
Average household income in first three survey waves	0.214** (0.048)	0.031*** (0.010)	0.022*** (0.007)
Constant	10.554 (0.532)		
Observations	1,045	1,060	1,060

Notes: Years of education regressions are ordinary least squares. The next two regressions are probit regressions with marginal effects calculated. Robust standard errors are given in parentheses below the estimated coefficients.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

B. Educational Outcome by previous poverty status, Child Gender, and parental Gender

- We now investigate whether the exogenous increase in incomes has differing impact by the prior poverty status of households. The first four columns of **Table 5** present the same analysis as **Table 4**, except that the sample has been divided according to whether the household was previously in poverty, prior to casino operation
- **Table 6** disaggregates the data by the gender of the parent receiving the additional household income in order to investigate whether the additional household income has differential effects by the gender of recipient

Table 5: Effect of Cash Transfer on Educational Achievement by Previous Household Poverty Status and Child Gender

Independent variables	Household previously in poverty		Household not previously in poverty		Male child		Female child	
	Years of education, age 21	Probability of HS graduation, age 19	Years of education, age 21	Probability of HS graduation, age 19	Years of education, age 21	Probability of HS graduation, age 19	Years of education, age 21	Probability of HS graduation, age 19
	Coefficient	Coefficient	Marginal effects	Marginal effects	Coefficient	Coefficient	Marginal effects	Marginal effects
Interaction 1: age cohort 1 × number of American Indian parents	1.127*** (0.449)	0.391*** (0.135)	-0.166 (0.722)	0.129 (0.085)	0.586 (0.421)	0.164 (0.100)	0.809 (0.597)	0.196*** (0.086)
Interaction 2: age cohort 2 × number of American Indian parents	0.451 (0.436)	0.298** (0.140)	-0.058 (0.422)	0.011 (0.075)	0.470 (0.384)	0.053 (0.099)	0.100 (0.448)	0.047 (0.082)
Observations	438	444	607	616	548	553	497	507

Table 6: Effect of Cash Transfer on Educational Achievement by Parental Gender

Independent variables	Years of education, age 21	Probability of HS graduation, age 19
	Coefficient	Marginal effects
Interaction 1: age cohort 1	1.48**	0.148*
× American Indian mother	(0.606)	(0.053)
Interaction 2: age cohort 2	0.724	0.0141*
× American Indian mother	(0.507)	(0.052)
Interaction 3: age cohort 1	-0.915	0.114
× American Indian father	(1.158)	(0.076)
Interaction 4: age cohort 2	-0.886	-0.180
× American Indian father	(0.699)	(0.161)
Observations	1,044	1,059

Notes: Includes American Indian indicator, gender, mother's highest educational attainment, father's highest educational attainment, average household income prior to casino operation, age cohorts, and a constant. Robust standard errors are given in parentheses below the estimated coefficients. The years of education regressions are ordinary least squares. The probability of high school graduation regressions are probit regressions with marginal effects calculated.

- ***Significant at the 1 percent level.
- **Significant at the 5 percent level.
- *Significant at the 10 percent level.

C. School Attendance in the past three months

- A secondary check on a child's educational achievement is a simple measure of school attendance
- **Table 7** presents these fixed effects results
- The results indicate that casino payment eligibility increases school attendance by almost two and a half days per quarter

Table 7: Effect of Cash Transfer on Child's School Attendance in Days for the Previous Quarter

Independent variables	Number of days present within the last 3 months	Number of days present within the last 3 months if household previously in poverty	Number of days present within the last 3 months if household never in poverty
	Coefficient	Coefficient	Coefficient
Household eligible for casino disbursement	2.43* (1.280)	3.85** (1.943)	2.420 (1.720)
Age of child	0.105 (0.169)	-0.768 (0.342)	0.295 (0.195)
Number of children less than 6 years old	0.447 (0.614)	1.156 (0.794)	-0.591 (0.946)
Observations	3,317	1,120	2,197
Number of groups	1,110	444	666

Notes: All three regressions are ordinary least squares regressions with fixed effects. Standard errors are clustered at the individual level and are given in parentheses below the estimated coefficients. Includes parents' ages, income and income squared, and a constant.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

D. Criminal Behavior during young Adulthood by Age and Offense type

- **Table 8** examines the criminal behavior of all of the sample children
- We report marginal effects from the difference-in-difference regressions in **Table 8**

Table 8: Effect of Cash Transfer on Drug Dealing and Criminal Arrests by Age and Offense Type

Independent variables	Any crime by age			Ever committed a crime by type			Self-reported drug dealing
	Committed any crime, age 16–17	Committed any crime, age 18–19	Committed any crime, age 20–21	Ever committed a minor crime by age 21	Ever committed a moderate crime by age 21	Ever committed a violent crime by age 21	Ever dealt drugs by age 21
	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects
Interaction 1: age cohort 1 × number of American Indian parents	−0.224*** (0.078)	−0.068 (0.072)	0.051 (0.075)	−0.179** (0.089)	−0.002 (0.065)	0.002 (0.012)	−0.065* (0.033)
Interaction 2: age cohort 2 × number of American Indian parents	−0.108* (0.064)	−0.026 (0.069)	0.008 (0.062)	−0.078 (0.088)	−0.022 (0.049)	−0.005 (0.014)	−0.005 (0.020)
Age cohort 1 (9 years old)	0.076* (0.043)	−0.011 (0.052)	−0.068** (0.033)	−0.051 (0.055)	−0.017 (0.026)	−0.003 (0.009)	0.000 (0.016)
Age cohort 2 (11 years old)	−0.017 (0.036)	−0.047 (0.049)	−0.056 (0.033)	−0.097* (0.053)	−0.044* (0.022)	0.009 (0.011)	0.023 (0.017)
Number of American Indian parents	0.136 (0.091)	−0.043 (0.063)	0.091 (0.078)	0.096 (0.094)	0.114* (0.068)	−0.011 (0.010)	−0.019 (0.019)
Observations	1,093	1,061	1,045	1,045	1,045	1,045	1,045

3. Potential Mechanisms

A. Parental Labor Force participation rates

- A second potential explanation is that parents use their additional income to substitute away from full-time employment and into more childrearing
- In the first two columns of **Table 9**, we regress mother's labor force participation on whether the household was eligible for casino disbursements, a lag of household income, number of children less than six years old in the household, and mother's age

Table 9: Effect of Cash Transfer on Parental Labor Force Participation

Independent variables	Mother's labor force participation (FT, PT, UE)	Mother's labor force participation (FT)	Father's labor force participation (FT, PT, UE)	Father's labor force participation (FT)
	Marginal effects	Marginal effects	Marginal effects	Marginal effects
Household eligible for casino disbursement	0.069 (0.196)	-0.089 (0.287)	-0.013 (0.385)	0.044 (0.392)
Lag of household income	0.020 (0.028)	-0.011 (0.370)	0.072 (0.072)	-0.046 (0.073)
Number of children less than 6 years old	0.031 (0.096)	-0.03 (0.125)	-0.236 (0.285)	0.054 (0.296)
Mother's age	0.011 (0.017)	0.021 (0.023)		
Father's age			-0.102** (0.044)	0.122*** (0.047)
Observations	3,318	3,318	1,988	1,988
Number of groups	1,076	1,076	643	643

B. Parental Behavior and Quality measures

- A third explanation is that parental quality improves with additional income
- In **Table 10**, we examine the effect of the per capita transfer on parental arrests
- Overall, the results indicate that parents in households with additional incomes make better choices in their personal behavior and with regard to criminal behavior

Table 10: Effect of Cash Transfer on Parenting Measures and Parental Arrests

Independent variables	Parental arrests		Parental supervision			Parental activities with child	
	Mother arrest since last interview	Father arrest since last interview	Mother's supervision	Father's supervision	Parental supervision	Activities with mother	Activities with father
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Household eligible for casino disbursement	-0.039** (0.019)	-0.107*** (0.039)	0.062*** (0.023)	0.096*** (0.032)	0.179** (0.067)	0.069*** (0.024)	0.035 (0.036)
Mother's age	-0.008*** (0.002)		-0.001 (0.004)		-0.003 (0.010)	-0.003 (0.004)	
Father's age		-0.021*** (0.003)		0.003 (0.003)	0.003 (0.008)		-0.007 0.004
Age of child			-0.014*** (0.005)	-0.023*** (0.006)	-0.045*** (0.016)	-0.007 (0.005)	-0.009 (0.006)
Number of children less than 6 years old	0.032** (0.014)	0.010 (0.029)	-0.018 (0.012)	-0.045 (0.030)	-0.067 (0.060)	-0.014 (0.018)	0.002 (0.017)
Observations	3,483	2,169	3,802	2,365	2,025	3,802	2,367
Number of groups	1,139	723	1,163	745	637	1,163	745

4. Discussion and Conclusion

- Our results indicate that changes in the permanent income of a household can have permanent effects
- We have also explored a couple of the potential mechanisms that transform additional household income into better child outcomes
- It is important to note the differences from this research and previous efforts
- Future work will allow us to explore the effect of this additional income on the geographic mobility of the children
- In future survey waves, we will also have additional employment information for the children at ages 24 and 25, which will allow us to explore whether they enter into different occupations and industries, and any resulting wage differentials