Parents' Incomes and Children's Outcomes: A Quasi-Experiment

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Abstract

Identifying the effect of parental incomes on child outcomes is difficult due to the correlation of unobserved ability, education levels and income. Previous research has relied on the use of instrumental variables to identify the effect of a change in household income on the young adult outcomes of the household's children. In this research, we examine the role that an exogenous increase in household incomes due to a government transfer unrelated to household characteristics plays in the long run outcomes for children in affected households. We find that children who are in households affected by the cash transfer program have higher levels of education in their young adulthood and a lower incidence of criminality for minor offenses. These effects differ by initial household poverty status as is expected. Second, we explore two possible mechanisms through which this exogenous increase in household income affects the long run outcomes of children – parental time (quantity) and parental quality. Parental quality and child interactions show a marked improvement while changes in parental time with child does not appear to matter.

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1 Introduction

Household conditions and characteristics certainly play a role in determining the outcomes of children. The strength and nature of that role has been an important research area for social scientists. One characteristic is of special importance for economists – household incomes. Does having more money in the household produce better child outcomes over time? Alternatively, does growing up in poverty produce worse outcomes for children? It is exceedingly difficult to answer these questions because household incomes are not exogenously given. Income depends crucially on parental characteristics, both observed and unobserved. Therefore, simply observing that children from high (low) income families tend to have positive (negative) educational, income and employment outcomes in young adulthood tells us little about the actual causation. Parents transmit to their genetic offspring some of their innate abilities and the observed correlation between parental incomes and child outcomes later in life may simply reflect this intergenerational transfer and not the effect of income per se.

Researchers have sought to overcome this endogeneity problem by using a number of instrumental variables and fixed effects techniques that attempt to isolate the difference in household incomes that are not due to parental characteristics or ability. Using father's union and occupational status as instruments for income, Shea (2000) finds that income has no effect on child outcomes while Chevalier et al. (2005) finds that permanent income matters in children's educational attainment. Maurin (2002) uses grandparent socioeconomic status as a predictor of parental incomes which is then used to explain a child's performance in early education. He finds that a child is much less likely to be held back in school the higher the household income. Loken (2007) uses the Norwegian oil boom of the 1970's and 1980's, which only affected a few regions of the country, as an instrument for increases in household income that is unrelated to parental characteristics. She finds that there is no effect of family income on child educational attainment. Mayer (1997) uses household assets and child support payments as measures of household income (these are taken to be less closely related to parental characteristics) and she finds that income has a positive and significant effect on educational attainment and wages. Blau (1999) uses child fixed effects in the NLSY data and finds that parental income (at least the transitory component) does not affect child test scores.

Previous research has found conflicting results with regard to the effect of household income on the young adult outcomes of household children. None of those studies have been able to identify a truly exogenous income shock at the

household level. Our approach attempts to overcome the standard household income endogeneity problem in a direct manner - we observe households where incomes are increased exogenously and permanently through a governmental transfer program without regard to parental human capital, ability or other household characteristics. In our study, the increase in incomes is community-wide. We follow children that reside in households with and without exogenously increased incomes. The children are sampled in three age cohorts. The youngest children reside as minors in households with higher incomes for a longer period of time than the oldest children in this study. We compare outcomes from the youngest age cohort to the oldest age cohort to determine the effect of residing in a household with exogenously higher incomes. The children from households without additional household income serve as a control for any changes in local labor market opportunities that may have arisen between the age cohorts.

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. Halfway through the data collection, a casino opened on the Eastern Cherokee reservation. A portion of the profits from this new business operation is distributed every six months on an equalized, per capita basis to all adult tribal members regardless of employment status, income or other household characteristics. Non-Indian households are not eligible for these cash disbursements. Figure 1 provides a clear depiction of the change in household incomes over the first eight survey waves of our study. A marked increase is noted in the number of households with incomes above $30,000 for the treatment (American Indian) households after the disbursement of casino payments in 1997.[1] No long-run change is observed for non-Indians households.

We find that children who reside the longest in households with exogenously increased incomes tend to do better later in life on several outcome measures. The children in these households are more likely to have graduated from high school by age 19; by age 21 the children from the poorest households have almost an additional year of schooling. Additionally, we find, using administrative records on criminal arrests, that these same children have statistically significantly lower incidence of criminal behavior for minor offenses. These children also self-report that they have a lower probability of having dealt drugs than children from households unaffected by the additional income.

As expected, the poorest households in the survey experience the largest gains in terms of child outcomes. Separating the data according to prior poverty status, we find that results are driven primarily by changes in the poorer households.

There are numerous mechanisms that may translate higher household incomes into better child outcomes. We explore two potential mechanism: parental quality and parental quantity. The additional income may allow the poorer

[1] We use the percentage of households by group (American Indian vs. non-Indian) that have household incomes greater than $30,000. This corresponds to the median value of non-Indian households in the survey wave 3 which was just prior to the opening of the casino.

households to substitute away from full-time employment towards part-time employment thus allowing for more child care. This does not appear to happen in our data; parents do not reduce their working time and we find some evidence that they may actually intensify their labor efforts. On the other hand, we find that parental interactions and experience with the children in the affected households tends to improve dramatically. Both child and parent report improved behavioral effects and parent-child interactions relative to unaffected households. We observe that parent behavior, similar to those of the child, tend to improve with regard to criminality and drug use.[2] Previous research has found a direct relationship between poverty and parenting ability (McLeod, 1993; Sampson, 1994; Ennis, 2000) and we confirm this result in our research. There is at least some indication that one of the mechanisms responsible for translating higher household incomes into better child outcomes is through increased parental quality; while parenting time does not appear to have been an important causal factor.

The next section describes the data from the Great Smoky Mountains Study of Youth and our empirical methods. Section III provides our estimation results. We explore some potential mechanisms which may play a role in translating increased incomes into better child outcomes in Section IV. Section V concludes.

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

The Great Smoky Mountains Study of Youth (GSMS) is a longitudinal survey of 1420 children aged 9, 11 and 13 years at intake that were recruited from 11 counties in western North Carolina. The children were selected from a population of approximately 20,000 school-aged children using an accelerated cohort design.[3] American Indian children from the Eastern Band of Cherokee Indians were over sampled for this data collection effort, survey weights are used in the child outcome regressions that follow. The federal reservation is situated in two of the 11 counties within the study. The initial survey contained 350 Indian children and 1070 non-Indian children. Proportional weights were assigned according to the probability of selection into the study; therefore, the data is representative of the population. Attrition and non-response rates were found to be equal across ethnic and income groups.

The survey began in 1993 and has followed these three cohorts of children annually up to the age of 16 and then re-interviewed them at ages 19 and 21. Additional survey waves are scheduled for these children when they turn 24 and

[2] Similar results were found in the Moving to Opportunity program (Kling, et. al, 2007; Kling, et. al, 2005). In this case, low-income households were given the means to move into lower poverty neighborhoods. Incidence of mental illness decreased for parents and youth. Additionally, in previous research utilizing the GSMSY data, Costello, et al. (2003) found decreased mental illness for children from households that were lifted out of poverty as a result of the casino income.

[3] See Costello, et. al (1996) for a thorough description of the original survey methodology.

25 years old. Both parents and children were interviewed separately up until the child was 16 years old; interviews after that were only conducted with the child alone.

After the fourth wave of the study, a casino was opened on the Eastern Cherokee reservation. The casino is owned and operated by the tribal government. A portion of the profits are distributed on a per capita basis to all adult tribal members.[4] Disbursements are made every six months and have occurred since 1996. The average annual amount per person has been approximately $6000. This income is subject to the federal income tax requirements.

2.1 Empirical Specifications

We compare young adult outcomes for children that resided for a total of six years as minors in households with increased incomes to children who resided for just two years as minors in households with increased incomes. Essentially the older children (initially 13 year old cohort) serve as a control group for the younger children (initially 9 year old cohort) in this study. This specification allows us to compare the effect of four additional years of higher household incomes on young adult outcomes for these children. The data also contains a middle age cohort (initially 11 year old age cohort) which allows us to test whether or not two additional years of higher household incomes have an effect on young adult outcomes.

The size of the exogenous increase in household incomes can take on two different values depending upon the number of American Indian parents in each household. It is possible for there to be 0,1 or 2 American Indian parents in each household.[5] Clearly households with two American Indian parents will have double the amount of exogenous income than households with only a single American Indian parent. Households without an American Indian parent serve as a control household. These control households are also representative of the entire income distribution – both rich and poor households are represented in this group.

We employ a methodology based on a difference-in-differences methodology. In our case, we employ the two youngest age cohort variables (Age 9 and Age 11) which function as the "after-treatment" cases and the oldest age cohort (Age 13) functions as the "before-treatment" case. The number of American Indian parents in the household (NumParents) serves to distinguish between

[4] All adult tribal members received these per capita disbursements. If there were any non-compliers (American Indian parents that either did not receive or refused the additional income) then any estimates found here would be an under estimate of the true effects of additional income.

[5] In some cases, the biological parent does not live in the same household. In these cases, while the child is not necessarily living in a household with the additional income, he or she still has a parent with exogenously increased income. The inclusion of these households should actually reduce the effect of household incomes on child outcomes if there is no direct effect of the additional income for non-resident parents on their children. We have excluded these households and find that in general while the sample size is reduced and standard errors increase, the results tend to hold for most of the reported outcomes.

the control and test groups. We treat the number of parents as a continuous variable and we therefore have two interaction variables which are of interest. The equation below details the specification:

(1) $Y_i = \alpha + \beta_1 * Age9_i + \beta_2 * Age11_i + \delta * NumParents_i + \gamma_1 * Age9_i * NumParents_i + \gamma_2 * Age11_i * NumParents_i + X_i\theta + \epsilon_i$

In the equation above, Y is the outcome variable of interest for the child at ages 19 or 21. We will examine educational attainment, high school completion variables and measures of criminal arrests at various ages. In the equation above, the Age9 and Age11 variables indicate whether or not the child is drawn from the initially age 9 or age 11 cohorts respectively – the age 13 cohort is the omitted category in this regression. The variable NumParents indicates the number of American Indian parents in that child's household. The two coefficients of interest for this research are and , which measure the effect of receiving the casino disbursements and being in either the age 9 or age 11 cohorts relative to the 13 year old cohort and not receiving any household casino disbursements. The vector X controls household conditions prior to the opening of the casino and includes household poverty status, average household income over the four years, the sex of the child, the race of the child and education levels of both parents. Survey weights are employed in all of these difference in difference regressions. Appendix I provides robustness tests, where possible, for the outcome variables described above. Additionally, robustness tests are provided for changes in parental outcomes as well.

Identification of equation 1 relies on the fact that the different age cohorts of children were randomly sampled within American Indian and non-Indian groupings. The next section provides evidence for this fact and also indicates that the two groups of households (American Indian and non-Indian) faced similar conditions in the labor market and with regard to social conditions. It is also important to note that there were no new health or educational programs which were created immediately after the advent of casino disbursements by the tribal government. This is important in establishing the fact that time variant characteristics that were related only to American Indians (such as tribally-funded anti-crime programs or tutoring programs) are not the causal factor here. In later years new programs have been developed, but for the crucial period in which these children were minors in their parents' households, there is little evidence of any new programs. An additional important point is that the effect of this new industry, casino gambling, may have a rather large effect on the demand for labor in the local labor market. This increase in demand may affect the long-run aspirations, discount rates and human capital investment for children in the community. I control explicitly for this by using distance of the household to the casino. Using global positioning data (GPS) I compute a distance measure and find that inclusion of this measure does not diminish the effects reported in later tables. The distance measure is meant to capture the increased likelihood of a household which is located in close proximity to

be affected through the labor demand effects than a household located further away from the casino.

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. This educational measure is meaningful at various points throughout the child's life, not just at young adulthood as is the case with the other educational attainment measures. Therefore, we employ a fixed effects regression for the number of days a child is present at school in the last three months prior to the interview. The regression is given of the form:

$$(2)\ Y_{it} = X'_{it}\beta + \alpha_0 + \alpha_i + \epsilon_{it}$$

In this regression, α_i is the individual fixed effect and X is the vector of control variables, including whether the individual child, i, belongs to a household that is eligible for casino payments. This indicator variable is always zero for households without American Indian parents; for households with American Indian parents the variable is zero for the first four survey waves and then take the value of one thereafter. We employ a similar model when testing for changes in parental employment status, drug use, arrest, 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.

2.2 Data Description

Table 1 provides the means for the data used in this analysis by the type of household. The first panel provides the variables used primarily in the difference in difference regressions, while the second panel provides the data used in the fixed-effects regressions. In panel A, the first set of columns provides the means and standard deviations for the households with at least one American Indian parent and the second panel contains the means and standard deviations for households that do not have any American Indian parents. It is worth noting that children from households with at least one American Indian parent have statistically significantly different educational attainment on average as compared to children from households with no American Indian parents.[6] On all measures, children from the first type of household have lower recorded educational attainment or completion. Interestingly, there is almost no difference in the drug or alcohol use between children from these two types of households at age 21. This result stands in stark contrast to the results for their parents. Fathers from households with at least one American Indian parent have almost twice the incidence of drug and alcohol abuse (9% versus 5%) of households with no American Indian parents.

The next group of variables indicates the distribution among the different age cohorts and the number of American Indian parents. There is a slightly higher

[6] The other races in this data set are White and African-American. The African-American children make up less than 6% of the total observations; therefore, using Non-Indians refers to these two other groups but Whites make up the highest proportion of that group.

proportion of children found in the 9 year old age cohort for the American Indian parent household than for the non-Indian parent household – but this difference is not statistically significant. The second age cohort is much closer in number distribution between the two types of households. The number of American Indian parents and the interaction terms differ between the two household types by design.

The third set of variables provides a look at the household conditions prior to the opening of the casino for both groups of children. There are level differences between all of the initial household conditions except for the gender distribution for children from both types of households. Children from households with at least one American Indian parent are much more likely to be American Indian than from the households with no American Indian parents; however, there are a few cases where American Indian children reside in households without their biological American Indian parents. The parental education variables, unlike the education measures for the child, are given in categories not in years. The value for the first parent (3.95) from a household with at least one American Indian parent corresponds to approximately a high school diploma.[7] While statistically different, the actual difference in years of educational content is very small on average. The second parent's educational level differs on average between the categories of "some high school" and "GED or high school equivalency" for the two types of households. Finally, the last two variables provide insight into the economic conditions of the households. On average, households with at least one American Indian parent have spent at least one year in poverty in the first three years of the study while the figure is 0.66 years for the households with no American Indian parents. Income is also given in categories and the value of 4.58 corresponds to an annual income between $15,001 and $20,000. For households with no American Indian parents, the average household income value of 6.65 falls in the $25,001 to $30,000 annual income category.

The final set of variables in this panel provide the criminal activity of the sample children. These data are gathered independently from the GSMS data. Searches of public databases in the North Carolina Administrative Office of the Courts produced these data. All counties in North Carolina are covered by these data including arrests made on the American Indian reservation. Arrests after the 16th birthday fall under the jurisdiction of the adult criminal justice system. Arrest records were found for juvenile arrests with the permission of the juvenile court judges. We have classified the arrest records into three broad categories: minor arrests which includes arrests for disorderly conduct, trespassing and shoplifting; moderate arrests which are primarily property crimes that do not involve serious harm to a person such as simple assault, felony larceny and drug-related offenses; violent arrests which include sexual assault, armed robbery and assault with deadly weapons. The first set of variables reports whether a child has committed any crime in the years indicated. The categories are not cumulative and are independent of one another. Therefore, we see that a child

[7] Category 3 is a GED or high school equivalency; Category 4 indicates having a high school diploma in this data; Category 5 indicates some post-high school training or vocational education.

from a household with at least one American Indian parent had a 10 percent chance of committing any type of crime (minor, moderate, violent) between the ages 16-17. A child from an American Indian household had a 17% chance of committing any type of crime between the ages 18-19. The next set of variables measures whether a child has committed any crime by age 21 by arrest category. The first variable indicates that a child from a household with at least one American Indian parent had a 25 percent chance of having committed a minor crime by age 21, while the same figure for a household with no American Indian parents was 29 percent. Interestingly, children from American Indian households are less likely to have been arrested for all crimes across the board and statistically signficantly less (at the 10% level) for moderate crimes by age 21. The final variable is found within the GSMS survey and indicates the child's self-reported drug dealing behavior at each survey wave. The mean of this variable indicates that children from both types of household report having dealt drugs in 6 percent of the time.

Panel B of Table 1 provides the data used primarily in the fixed-effects regressions for changes in parental behavior. The first variable gives the number of days the child was present in school in the last quarter. This question is asked at every survey wave while the child is less than 18 years old. There is no statistically significant difference between children in the two types of households.

The next set of variables provides characteristics of the mother at each stage over the survey time period. This variable is coded 1 for individuals who are in the labor force (working outside of the home) and 0 otherwise. There is no statistically significant difference between the labor force participation of mothers by household type. Labor force attachment is a categorical variable which measures (on a scale of 0 to 4) an individual's degree of involvement in the labor force: a zero indicates full time employment, one indicates part-time employment, two indicates currently unemployed, three indicates work only in the home, while four indicates no work whatsoever (student, retired or disabled). For mothers it does not appear that there is any difference in the attachment to the labor force. For mothers who are working, they tend to be less than full-time employed. The next variable indicates whether an individual has no drug alcohol problems (coded 0), a single problem (coded 1) or a combination of the two (coded 2). Mothers from households with at least one American Indian parent have a statistically significantly higher incidence of these types of problems. Arrest status is simply an indicator variable for whether the mother was arrested since the last survey wave. Once again there is a statistically significant difference here. The child supervision variable measures the adequacy of parental supervision of their child. There are three options here: a zero indicates that the parent has age appropriate supervision or control over the child; the next option indicates that the parent does not have adequate control at least once a week; the final option indicates that the parent does not have adequate control at least fifty percent of the time or more. The final variable is a measure of the percentage of parent-child activities and interactions that are categorized as enjoyable by the child at each

survey wave. The three options possible here are: a zero indicates that at least 75% of all activities are enjoyable; the next option indicates that between 25% and 74% of all activities are a source of tension, worry or disinterest to the child; the final option indicates that less than 25 % of all activities with the parent are enjoyable to the child. We observe that there is no statistically significant difference between household types for these last two variables. The results for fathers are presented in the next section. There is a statistically significant difference for fathers by type of household for labor force participation, labor force attachment, drug or alcohol problems and arrest status.

Table 2 presents a comparison of these initial household characteristics by age cohort for each of the two types of households. This table provides information on the suitability of the third age cohorts to serve as controls for the two other age cohorts in this study. In this table, t-statistics are presented for a test of a mean difference between the indicated age cohorts for a given variable. In the top panel of Table 2 we show the differences in age cohorts for households that have no American Indian parents. There are statistically significant differences in the number of American Indian children in these households for cohorts 2 and 3 (age 11 and age 13 initially) and cohorts 1 and 3 (age 9 and age 13 initially). The difference is driven by the relatively large amount of American Indian children in the third age cohort (7%). There is no difference in the gender distribution for any of the three cohorts. We do find a statistically significant difference between cohorts 1 and 3 in the first parent's educational attainment. This difference, while statistically significant, is not large in absolute magnitude (4.5 vs. 5). In qualitative terms the difference is having a high school diploma versus having completed some post-high school (non-college) training. We observe little difference in education levels for the second parent by age cohorts. We do find statistically significant differences for household income levels for cohorts 1 and 2 as well as for cohorts 1 and 3. The mean difference between income categories is very small here 0.7 and 0.6 for each respectively. Each income category represents a step of $5,000 each. Therefore, the difference represented here on average is between $3,000 - $3,500 per year.

The bottom part of Table 2 provides a similar analysis for the households with at least one American Indian parent. There appears to be very little differences between these age cohorts. The one statistically significant difference is found for the second parent's educational level for cohorts 2 and 3. The mean values for each cohort is 1.7 and 2.7 which indicates a qualitative difference of "some high school" and "GED or high school equivalency". In sum, it appears that the data are reasonably similar across age cohorts for both types of households. While there are some statistically significant differences, the magnitude of these differences for most variables is in fact quite small.

Finally, we provide some evidence on the similarity of the time trends of the two types of households in the time period prior to the opening of the casino. It is not, of course, possible to show how the unobserved heterogeneity effect evolves over time for the two types of households; however we do show that the households have similar trends in a number of dimensions. 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. However, prior to the opening of the casino, the growth in the percentage of households with incomes greater than $30,000 was similar between the two groups. Figures 2 and 3 show the changes in the unemployment rate for mothers and fathers respectively. Both figures indicate that unemployment was generally decreasing and consistent for both household types. Figure 4 shows the difference in reported incidence of alcohol or drug abuse problems for the second parent (reported by the first parent).[8] The distance between the two time trends decreases slightly between periods 1 and 2, but then is a relatively constant distance between waves 2 and 3.

Taken together these figures indicate that the two types of households, while differing in levels, appear to be equally affected by the same social conditions, macroeconomic conditions and labor market experiences. The Eastern Cherokee reservation is located in the middle of the eleven counties surveyed in this research. There is little evidence to support that the two household types are affected differently by changes at the local level in the period prior to the casino opening.

Additionally, testing between the nature of household types across time, it appears that there is not statistically significant difference in the composition of households across time. Appendix Table 1 provides t-tests of differences between in marital status for the household types after the casino begins operations. The additional casino funds does not appear to affect the marital status of couples included in this data. This finding indicates that the casino payments are not creating incentives for the dissolution or the creation of new partnerships which may directly affect the young adult outcome of children.

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

In this section, we present the results from the difference-in-difference regression described in equation 1 and the fixed-effects regression described in equation 2. All of the results control for robust standard errors and employ survey weights. Where the outcome variables are indicator variables, we use a probit specification and report marginal coefficients. For continuous outcome variables, such as years of education, we use a simple ordinary least squares regression for our analysis.[9]

[8] We take the report of the first parent about the second parent's drug and alcohol abuse to be more accurate than the self-reported information about the first parent's own drug and alcohol problems. There is reason to suspect that there would be problems with a self-reported measure of drug and alcohol abuse, but less so with regard to the other parent.

[9] In the following regressions, the sample sizes vary primarily because of missing information in the outcome variables. We take advantage of the maximum number of observations possible for each outcome variable and do not restrict our analysis to a smaller subset. Reducing the sample size does not appear to affect the sign or magnitude of results, however, the standard

3.1 Education Outcome Variables

Table 3 presents the results from regressions for the educational outcome variables. The first column presents the regression of years of completed child's education at age 21 on the level and interaction variables previously described. The two interaction variables presented in the first two rows indicate that there is a positive, but not statistically significant, effect of residing in a household with exogenously increased incomes for six or four years relative to just two years. The other variables of interest in the regression are the parental education variables which are positive and statistically significant as expected. The average household income variable is also positive and statistically significant in this and the other two regressions as well. Column two presents the probability of a child being a high school graduate by age 19. The marginal coefficient on the first interaction variable indicates that the effect of having four more years of exogenously increased household income increases a child's probability of finishing high school by age 19 by almost 15 percent. The second interaction coefficient is positive, but smaller in absolute magnitude and not statistically significant. The third column outcome variable measures whether an individual has a high school diploma or a general equivalency degree. The first interaction coefficient is once again positive but it only reaches statistical significance at the 10% level.

3.2 Educational Outcome by Previous Poverty Status

We now investigate whether the exogenous increase in incomes has differing impact by the prior poverty status of households. Table 4 presents the same analysis as Table 3, except that the sample has been divided according to whether the household has ever previously been in poverty prior to casino operation.[10] We find in these first three regressions, for households previously in poverty, that the coefficient on the first interaction term is always statistically significant at the 5 % level and larger in magnitude than in Table 3. The coefficient for the interaction variable for the years of education regression triples in size and implies that the treatment of four additional years of exogenously increased income increases educational attainment at age 21 by almost a full year (0.9 years).[11] The coefficient in the two high school graduation and GED regressions increases in magnitude and are highly statistically significant. The next set of columns present the results from the subsample of households that were never previously in poverty in the first three survey waves. None of the coefficients on the interaction variables are statistically significant. These results explain why the results for the full sample yielded statistically insignificant results for the years of education regression – the additional household income does not have a noticeable effect in households not previously in poverty.

errors do increase somewhat, as expected.

[10] Using the US poverty levels adjusted for household size.

[11] Future survey waves will collect data on educational attainment when the children are 24 and 25 years old. This will allow for an additional look at the educational attainment as well as college completion rates.

3.3 Education Outcome by Child Gender

We disaggregate the data in this section by the child's gender in order to investigate whether the additional household income has differential impacts for boys or girls. Table 5 presents the same analysis for the educational outcome variables. In the first set of columns, the sample is restricted to male children and the next set of columns present only the female children's regressions. Examining the years of education regressions for each gender, it appears that females are reaping the most benefits from the exogenous increase in household income; the coefficient is three times as large as that for the males and reaches statistical significance at the 10% level.[12] The same holds for the probability of high school graduation by age 19; females have a 21 % higher probability of finishing high school on time when they reside in households with four more years of exogenously increased incomes. Interestingly, the reverse is true for the high school diploma or GED regressions. Males have a higher probability of receiving this type of educational attainment when they come from households with increased household incomes than the female children.

A secondary check on a child's educational achievement is a simple measure of school attendance. Given that there is data on the number of days present in school in the past three months at each interview wave as reported by the primary parent, we can investigate whether this additional income affects school attendance rates throughout childhood. We remove all time-invariant household characteristics (both observed and unobserved) and control for the time-varying characteristics directly in our fixed-effects regression. Table 6 presents these fixed-effects results; in the first column we regress the number of days present in school in the last three months on the household's casino payment eligibility, household income, parental ages, child's age and the number of children less than six years old in the household. The results indicate that casino payment eligibility increases school attendance by almost two and half days per quarter. Dividing the data once again by households that previously were in poverty we find that the effect almost doubles in size: children from households with this additional income are present at school for almost four additional days than their untreated counterparts. The effect persists, albeit smaller in magnitude and statistical significance, for the households that previously were not in poverty. Overall, the additional household income appears to have a very strong effect on the child's school attendance.

3.4 Criminal Behavior during Young Adulthood

Table 7 examines the criminal behavior of all of the sample children. Administrative data has been merged with the GSMS data at the individual level with information on the number and nature of each crime for all of the survey chil-

[12] Others have found that increasing household incomes in developing countries can have a differential impact on children depending upon their gender; different household responsibilities along gender lines imply that additional income will change the composition of work or duties for the household children. See for instance Chen (2006).

dren. We classified the arrests into three broad categories of minor, moderate and violent offenses. Additionally, information about when the arrests occurred allows us to identify the ages (16-21) of arrests for each person.

The difference in difference regressions in Table 7 Panel A indicates that children from households that receive casino payments are 22% less likely to have been arrested at ages 16-17 than their untreated counterparts. Examining the effect on criminality in later years, specifically ages 18 -21, the additional household income has no direct effect on criminal arrests for either first age cohort or the second age cohort. This result is somewhat puzzling but may be due to the fact that the children are no longer under their parents direct control after age 18. Therefore, the diversion in criminal behavior and arrests appears to be directly related to the child's minor status.

3.5 Criminal Behavior During Young Adulthood by Gender and Previous Poverty Status

The second panel of Table 7 restricts the analysis to males and the reduction in criminal arrests at ages 16-17 are due primarily to the changes of the boys. The coefficient on the first interaction term is larger in magnitude than in the full sample which includes the females and highly statistically significant. Similar analysis for the girls alone results in insignificant results and is not reported here. We find that males from households with higher incomes at older ages, 18-21, do not differ systematically in their criminal arrests from households without the additional income. A final restriction, provided in the third panel of Table 7, divides the data by previous household poverty status and finds that the children from previously poor households were the ones that had the largest reduction in criminal arrests at age 16 and 17. We find no results for children who come from households that were never previously in poverty; this held true for all the older ages as well (18-21).

3.6 Criminal Behavior During Young Adulthood by Type of Crime

Table 8 presents the effect of additional household income on the child's criminal behavior by the type of crime committed. The first panel indicates that the reduction in criminal behavior occurs only in minor crimes. By age 21, a child who resided in a household with the additional casino income has a 16% lower probability of having ever committed a minor crime than a similar child from an untreated household. Further regressions that examined the effect of additional household income on the number of crimes (by category) did not yield significant results. This indicates that the additional income affected whether an individual entered into criminal behavior but not on the number of crimes once they had entered into criminality. Conducting a separate analysis for males alone, provided in the second panel of Table 8, we find that the results hold up for minor crimes, if slightly diminished in significance, and become rather strong for moderate crimes. Consequently, we observe that women have a coefficient

that is positive for moderate crimes, but not statistically significant at even the 15% level.

The third panel of Table 8 shows that prior household poverty status matters. However, the direction differs from that of previous results in that the household which were never in poverty are the ones that exhibit the largest changes. We find that children from households which receive casino payments and were never previously in poverty had lower levels of minor crimes by age 21. The deterrent effect of additional household income on crime appears to matter most for the previously wealthier households in our sample.

A final measure of child criminal behavior is provided in Table 9. The child's self-reported drug dealing activities are regressed on the same set of explanatory variables used in the previous regression. The first interaction term indicates that children from households with exogenously increased incomes are 7% less likely to have reported dealing drugs at all in their youth. Restricting this to households that were previously in poverty, we find that the poorer households are driving the main results - the coefficient changes very little but loses statistical significance at the 5% level. Households that previously were not in poverty do not yield any statistically significant results.

4 Potential Mechanisms

The previous section provided evidence that the exogenous increase in household income has positively affected young adult outcomes for children from these households. The results indicate that children from households with additional income have better educational attainment and reduced criminal behavior. In this section, we discuss a few of the potential mechanisms that may be contributing to the observed changes in child outcomes.

There are several potential explanations for why increased incomes may affect the young adult child outcomes. One potential and direct explanation is that the additional household income is used to purchase better quality educational inputs. Unfortunately, the data does not contain consumption or expenditure data.

4.1 Parental Labor Force Attachment

A second potential explanation is that parents use their additional income to substitute away from full time employment and into more childrearing. We have information on both parents' labor force attachment for each interview wave. Because we have panel data with regard to the parental labor force attachment, we employ a fixed-effects regression model for mother's and father's labor force attachment. In the first panel of Table 10 we regress mother's labor force attachment 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. The outcome variable is categorical

data for full time employment, part time employment, unemployment, household employment and out of the labor force status. A negative coefficient on the casino eligibility variable indicates that the additional household income increases the labor force attachment of the mother. The coefficient is negative and statistically significant at the 10% level in the second regression. This indicates that mothers are actually increasing their labor force attachment given the additional income. Creating a binary variable for labor force participation and running a quasi fixed-effect probit regression (Wooldridge, 2005), we find that there is no overall change in mother's labor force participation given the additional household income. Therefore, the additional household income does not appear large enough to affect the mother's labor force participation; however, it appears to allow mothers to increase their labor force attachment. While it is not possible to determine exactly what is driving this process, potentially the additional income allows mothers to afford child care so that they may work more at the margin. Nevertheless, the simple explanation that mothers are using the additional income to substitute away from work into leisure or childcare is not supported in our data.

While fathers appear to have outcomes that differ from the mothers, they, too, do not appear to make any significant changes to their labor force attachment at either the extensive or intensive margins. The coefficients on the casino income variable are positive, but it loses statistical significance once father's age is controlled. Similar to the result found for the mothers, when we examine father's labor force participation using a quasi fixed-effects probit regression we find that the result is highly insignificant.

4.2 Parental Behavior and Quality Measures

A third explanation is that parental quality improves with additional income. Increased household incomes may translate into lower levels of household stress and disruption. There is existing research that indicates poverty decreases parental quality. McLeod et. al. (1993) find using NLSY data that currently poor mothers are more likely to spank their children and are less responsive to child needs. They also find that the persistence of poverty increases the direct internalization symptoms in children. Sampson et. al. (1994) find that poverty decreases adult stability and good decision-making. Ennis et al. (2000) have found that poverty can adversely affect mental health and depression among parents. Conger (1994) finds direct evidence that not having sufficient income produces stresses on individual parents.

4.2.1 Parental Arrests

Additional information is available with regard to the two parents' arrests since the last interview at each survey wave. Table 11 indicates that fathers have a reduced probability of being arrested when they come from households with casino payments. This effect is intensified for the households that were previously in poverty, however the sample size falls dramatically and is not shown

here.

4.2.2 Parental Supervision of Children

The two preceding tables appear to indicate that parents are engaging in less destructive behavior as a result of the increased incomes. This improvement in parental behavior and choices also tends to spill over into parent-child interactions and supervision. Contained in the GSMS data is a parental supervision variable which asks the parent at each interview wave the percentage of time they know their child's whereabouts and activities. In Table 12 we conduct a fixed-effects regression of the mother and father's reported supervision of their child on the household's eligibility for casino payments, the child's age, household income, parental ages and the number of children below age six in the household. The negative coefficient on the casino disbursement indicates an improvement in parental supervision (the outcome variable is actually the inadequacy of parental supervision) for those households receiving additional income. This is conditional on child's age and the other covariates as well as the time invariant family fixed-effects. Our results indicate that fathers have an improvement in supervision of their child with the additional incomes as well. The third column reports the joint outcome of parental supervision on casino disbursements; the results indicate that there's an increase in overall supervision for their children.

4.2.3 Parent-Child Interactions

Finally, Table 13 presents a direct measure of parental quality as reported by the child. Previous parental behavioral information was provided by the parent at all survey waves. The variable we consider here measures the amount of negative interactions between the child and parent from the child's perspective. In both cases, the estimated coefficient is negative which indicates an improvement in parent – child interactions. The results indicate that there is a large improvement for the relationship between the child and the mother and that this improvement is statistically significant. The results are not statistically significant with regard to the father, while the estimated coefficient is of the same sign as the mother.

Overall, the results indicate that parents in households with additional incomes make better choices in their personal behavior with regard to drug and alcohol abuse and criminal behavior. They do not appear to make significant changes in their labor force participation efforts. Children report better relationships overtime in the households with additional income and parents report better supervision of their children over time in these same households. While there are many potential causal mechanisms at work here, it is instructive to learn that parental time is not responsible for the observed changes in child outcomes. Parental quality and interactions with their children appears to be an important candidate for explaining how additional household income translates into better child outcomes.

5 Discussion and Conclusion

Our results indicate that changes in a household's permanent income can have permanent effects. The effect on children continues on into young adulthood in our sample. We have seen that an exogenous treatment of increasing incomes tends to improve the overall child outcomes in terms of educational attainment at ages 19 and 21 and reduced criminal behavior at ages 16 and 17. Given the unique design of the research, we are able to control for several important confounding factors that might otherwise be the cause of the observed changes. We have been able to control for cohort differences by using a control group of non-treated households in our sample. Additionally, the comparison between the age 9 and age 13 cohorts provides us with the counterfactual observations of a household where incomes were unchanged for a shorter period of time (6 years versus 2 years).

We have also explored a couple of the potential mechanisms that transform additional household income into better child outcomes. While it is not possible in this analysis to definitively identify the true causal mechanism responsible for the improvement in young adult outcomes, we have been able to identify a few changes in parental behavior (parental quality) that is suggestive of a mechanism. Parents have a better overall relationship with their children after the additional household income is introduced as evidenced by responses from both the parent and child. Additionally, parents appear to have less problems over time once the exogenous income is introduced: we see that fathers are less likely to be arrested themselves over time. On the other hand, we do not have much evidence that the additional income is by parents to make a dramatic shift from labor force participation towards more child care (parental quantity). While our data is not perfect, it appears that neither mothers nor fathers are leaving the labor force because of the additional household income. There is some evidence, in fact, that mothers may be increasing their labor force attachment (work intensity) but we do not have actual hours of work here, so our results once again do not provide conclusive evidence. More research that focuses on the mechanisms that translate household incomes into child well-being is certainly needed.

It is important to note the differences from this research and previous efforts. The program described here differs in at least two dimensions: size and duration. The size of the casino payments is large relative to other income augmentation programs and certainly with regard to other quasi-experimental policies. The additional $5-10,000 dollars per year represents anywhere from 1/4 to 1/3 of many of these household's incomes. Second, this casino disbursement program has no foreseeable end date. While it is contingent upon successful and continued operations of the casino, there has been no indication that there would be a change in the program or that profits have decreased over time. Therefore, people treat these changes in their income as permanent and spend accordingly. These two effects are probably responsible for the large effects found in this research which are not often evident in studies with smaller amounts and temporary income changes.

Future work will allow us to explore the effect of this additional income on the geographic mobility of the children. The casino payments are not limited by geographic proximity to the Eastern Cherokee reservation. Therefore, in future work we anticipate evaluating how this additional income has increased the geographic distribution of these children from American Indian households- individuals may move out of state and they will still be eligible for casino payments. In future survey waves we shall also have additional employment information for the children at ages 24 and 25 which will allow us to explore whether they differentially enter into different occupations and industries and any resulting wage differentials.

6 Appendix I

In this appendix, we discuss a few of the robustness tests that we conduct to investigate whether these observed outcomes were already prevalent in the data prior to the advent of the casino payments. With regard to the children's outcomes, it is unfortunately not possible to run placebo tests on all of the outcomes variables as many of them have little meaning at earlier ages. For instance, high school completion rates will be uniformly zero in the period prior to the casino operations as the children are all below the ages of 15 in this time period. . Therefore, it is not possible to create a placebo test in these cases. We can, however, investigate whether there is any difference in number of days of school attendance in the previous three months in the period prior to the casino operations given the panel nature of the data. In Appendix Table 2 we restrict analysis to the four survey waves prior to the casino opening and create a false treatment that occurs in wave 3 and 4 only; we find that there is no effect on children's schooling attendance in this fixed effects regression. Previously in Table 6 we established that the additional household income increased school attendance by an average of 2.5 days. The second model in Appendix Table 2 provides the difference in difference regression for educational attainment at age 16. There appears to be no difference for the two interaction variables in this regression. However, school attendance is compulsory up to age 16 in North Carolina and therefore, we are not clear whether finding no result is due to there being no actual difference in behavior or because of the effect of the law.

Additionally, the arrest data that we have collected on the children in this survey is for ages 16-21, therefore, it is not possible to create a placebo test here in the period prior to the casino operations. Although we have no data on arrests at this early age it would also most likely be a very low probability event and any resulting tests would be expected to have very low power in any case.

Examining parental changes in the period prior to casino disbursements is a little more straightforward. Appendix Table 3 provides outcomes for parents when the period is restricted to the first four survey waves as above. A placebo

treatment is created for waves 3 and 4 as we did for the school attendance rates previously. In column one and two, we show that there is no statistical difference in the labor force attachment outcome variable for parents prior to the casino disbursements and operations. The next two sets of columns provides the same analysis for mother's and father's activities with the child. We see once again that there is no statistically significant coefficient on the casino disbursement eligibility variable. The last two columns provides the placebo test for mothers' and fathers' supervision of their children. While the coefficients on casino disbursement eligibility is statistically significant in both cases it is in positive - indicating that prior to the casino operations mothers and fathers in these households actually had a lower level of supervision of their children. In Table 12 we have previously shown that the exact opposite occurs once the additional household income arrives from the casino disbursements; parents have better supervision of their children when their incomes are exogenously increased.

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Table 1: Mean Values for Variables

Panel A: Difference in Difference Regressions

Variable	At least one AI Parent Household Mean	No AI Parent Household Mean	T-Statistics for Difference in Group Means
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	*ref.*	ref.	
Number of American Indian Parents	1.34	0.00	20.63
Interaction Age 9 Cohort x Number of American Indian Parents	0.52	0.00	17.98
Interaction Age 11 Cohort x Number of American Indian Parents	0.45	0.00	79.58
Household Characteristics			
Male Child Indicator	0.52	0.53	-0.29
Parent 1's Educational Level	3.95	4.92	-5.63
Parent 2's Educational Level	2.15	3.06	-4.11
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
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

Note: Sample size is 1060 observations for all three age cohorts when they are 21 years of age

Table 1: Mean Values for Variables, cont.

Panel B: Fixed Effect Regressions

Variable	At least one AI Parent Household Mean	No AI Parent Household Mean	T-Statistics for Difference in Group Means	Total Observations
Education Variable				
Days Present at School in Last Quarter	39.64	39.15	1.27	3317
Mother's Characteristics				
Labor Force Participation Rate	0.88	0.87	1.14	6780
Labor Force Attachment	0.76	0.78	-0.61	6780
Drug or Alcohol Problem	0.24	0.13	8.66	5333
Arrest Status	0.12	0.06	7.51	5333
Supervision of Child	0.08	0.10	-0.79	5758
Activities spent with Child	0.21	0.20	0.97	6673
Father's Characteristics				
Labor Force Participation Rate	0.90	0.93	-3.95	4161
Labor Force Attachment	0.59	0.33	6.63	4161
Drug or Alcohol Problem	0.08	0.05	2.75	3316
Arrest Status	0.27	0.13	9.18	3309
Supervision of Child	0.05	0.06	-0.41	5758
Activities spent with Child	0.18	0.15	1.30	3829

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

Table 2: Differences by Age Cohort and American Indian Parent Status

	Households with No American Indian Parent		
	Difference Between Cohort 1 and 2	Difference Between Cohort 2 and 3	Difference Between Cohort 1 and 3
Number of American Indian Parents			
American Indian Indicator	-1.43	**-2.00**	**-3.35**
Male Child Indicator	-0.93	1.84	0.95
Parent 1's Educational Level	-1.08	-1.39	**-2.36**
Parent 2's Educational Level	-0.47	-0.09	-0.53
Household Income	**-2.47**	0.36	**-2.04**

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

	Households with at least one American Indian Parent		
	Difference Between Cohort 1 and 2	Difference Between Cohort 2 and 3	Difference Between Cohort 1 and 3
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
Parent 1's Educational Level	-0.29	0.51	0.27
Parent 2's Educational Level	1.05	**-2.56**	-1.50
Household Income	0.34	-1.60	-1.29

Table 3: Education Variables

	Years of Education, Age 21		Probability of HS Grad, Age 19		Prob of HS Grad/GED, Age 19	
Independent Variables	Coeff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	0.332	0.477	0.149***	0.072	0.080*	0.046
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.039	0.347	0.029	0.065	0.022	0.040
Age Cohort 1 (9 yo)	-0.143	0.291	-0.009	0.060	-0.005	0.039
Age Cohort 2 (11 yo)	0.256	0.275	< 0.001	0.055	-0.007	0.037
Number of American Indian Parents in Household	-0.111	0.426	-0.122*	0.066	-0.092**	0.039
American Indian	-0.400	0.480	0.053	0.060	0.046	0.034
Sex	-0.547**	0.227	-0.118***	0.043	-0.070**	0.030
Parent 1 Education	0.221***	0.052	0.013	0.009	0.014**	0.006
Parent 2 Education	0.080*	0.043	0.020***	0.008	0.022***	0.005
HH in Poverty Indicator Variable	-0.183	0.165	-0.054*	0.028	-0.033*	0.018
Average HH Income	0.163	0.051	0.020**	0.010	0.010	0.007
Constant	10.298***	0.509				
Observations	1044		1059		1059	
Wald Chi-Squared (15)	33.33		95.81		94.5	
Pseudo R2	0.2731		0.1645		0.1936	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 4: Education Variables by Poverty Status

	Household Previously in Poverty						Household Not Previously in Poverty					
	Years of Education, Age 21		Probability of HS Grad, Age 19		Prob of HS Grad/GED, Age 19		Years of Education, Age 21		Probability of HS Grad, Age 19		Prob of HS Grad/GED, Age 19	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	0.903*	0.462	0.336***	0.133	0.239**	0.115	-0.111	0.787	0.124	0.086	0.040	0.053
Interaction 2: Age Cohort 2 x Number of American Indian Parents	0.169	0.462	0.190	0.137	0.112	0.115	-0.240	0.509	0.006	0.071	0.001	0.045
Age Cohort 1 (9 yo)	-0.612	0.532	-0.130	0.126	-0.050	0.121	0.096	0.360	0.037	0.049	0.012	0.031
Age Cohort 2 (11 yo)	0.299	0.526	-0.156	0.126	-0.021	0.121	0.263	0.322	0.048	0.045	0.003	0.029
Number of American Indian Parents in Household	-0.659*	0.402	-0.451***	0.130	-0.348***	0.108	0.309	0.603	0.010	0.074	-0.001	0.046
American Indian	-0.038	0.423	0.237**	0.104	0.201**	0.082	-0.906	0.696	-0.054	0.090	-0.030	0.061
Sex	-0.528	0.366	-0.097	0.092	-0.070	0.087	-0.528*	0.283	-0.099**	0.040	-0.063**	0.026
Parent 1 Education	0.177**	0.088	0.011	0.023	0.037*	0.022	0.243***	0.062	0.011	0.008	0.008	0.005
Parent 2 Education	0.053	0.074	0.009	0.024	0.065***	0.020	0.085*	0.049	0.018***	0.006	0.012***	0.004
Average HH Income	0.263**	0.133	0.066*	0.034	0.033	0.032	0.133**	0.060	0.007	0.008	0.003	0.005
Constant	9.956***	0.852					10.332***	0.583				
Number	437		443		443		607		616		616	
Wald Chi-Squared (15)	6.03		28.07		36.94		11.49		45.53		32.6	
Pseudo R2	0.146		0.065		0.115		0.204		0.111		0.121	

Table 5: Education Variables by Child's Gender

	Male Child						Female Child					
	Years of Education, Age 21		Probability of HS Grad, Age 19		Prob of HS Grad/GED, Age 19		Years of Education, Age 21		Probability of HS Grad, Age 19		Prob of HS Grad/GED, Age 19	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error	Marg. Eff.	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	0.315	0.452	0.137	0.105	0.158**	0.069	0.992*	0.580	0.218***	0.082	0.061	0.043
Interaction 2: Age Cohort 2 x Number of American Indian Parents	0.181	0.438	0.040	0.097	0.092	0.065	0.066	0.468	0.055	0.077	-0.016	0.039
Age Cohort 1 (9 yo)	0.054	0.415	0.066	0.097	0.035	0.064	-0.361	0.408	-0.097	0.070	-0.048	0.046
Age Cohort 2 (11 yo)	-0.035	0.416	0.053	0.086	-0.027	0.065	0.354	0.370	-0.059	0.067	-0.005	0.034
Number of American Indian Parents in Household	-0.071	0.411	-0.069	0.092	-0.113	0.057	-0.531	0.592	-0.159**	0.080	-0.044	0.036
American Indian	-0.326	0.439	0.001	0.099	0.006	0.062	-0.372	0.715	0.048	0.060	0.025	0.029
Parent 1 Education	0.174**	0.084	0.009	0.016	0.003	0.011	0.255***	0.064	0.016*	0.010	0.020***	0.007
Parent 2 Education	0.113*	0.059	0.013	0.012	0.030***	0.009	0.064	0.059	0.026***	0.008	0.014***	0.004
HH in Poverty Indicator Variable	0.062	0.238	0.005	0.046	0.003	0.032	-0.371	0.227	-0.091***	0.032	-0.045***	0.016
Average HH Income	0.277***	0.083	0.0455***	0.016	0.027**	0.011	0.079	0.062	-0.004	0.012	-0.002	0.006
Constant	8.91***	0.730					10.923***	0.655				
Number	547		552		552		497		507		507	
Wald Chi-Squared (15)	17.910		38.750		48.160		23.360		72.160		88.980	
Pseudo R2	0.265		0.125		0.166		0.284		0.220		0.264	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 6: Child School Attendance

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	
	Coeff.	Std Error	Coeff.	Std Error	Coeff.	Std Error
Household Eligible for Casino Disbursement	2.442**	1.124	3.85**	1.914	2.485*	1.419
Household Income	-0.298**	0.145	0.142	0.266	-0.421**	0.174
Primary Parent's Age	-0.181*	0.093	-0.212	0.266	-0.159	0.125
Secondary Parent's Age	-0.056	0.068	-0.193	0.114	0.058	0.085
Age of Child	0.105	0.174	-0.768**	0.346	0.283	0.209
Number of Children Less than 6 years old	0.448	0.604	1.157	0.896	-0.547	0.853
Constant	49.373***	3.416	64.825***	5.945	43.034***	4.469
Number of obs	3317		1120		2197	
Number of groups	1110		444		666	
Wald chi2(7)	2.550		3.95		2.04	
Prob > chi2	0.0183		0.0007		0.0571	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 7: Any Criminal Behavior of the Child in Young Adulthood

Independent Variables	Committed Any Crime, Age 16-17		Committed Any Crime, Age 18-19		Committed Any Crime, Age 20-21	
	Marg Coeff	Std Error	Marg Coeff	Std Error	Marg Coeff	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.226***	0.076	-0.047	0.073	0.052	0.075
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.108*	0.062	-0.020	0.069	0.008	0.062
Age Cohort 1 (9 yo)	0.077*	0.043	-0.018	0.053	-0.072**	0.034
Age Cohort 2 (11 yo)	-0.017	0.037	-0.042	0.049	-0.059*	0.034
Number of American Indian Parents in Household	0.125	0.090	-0.050	0.064	0.090	0.078
American Indian	-0.051	0.049	-0.019	0.058	-0.092***	0.030
Sex	0.069**	0.029	0.149***	0.040	0.110***	0.032
Parent 1 Education	-0.003	0.006	-0.001	0.009	0.000	0.007
Parent 2 Education	-0.005	0.005	-0.005	0.007	-0.001	0.006
HH in Poverty Indicator Variable	0.004	0.017	0.013	0.026	0.014	0.018
Average HH Income	-0.006	0.006	-0.004	0.009	-0.004	0.007
Number of obs	1092		1060		1044	
F(11, 1032)	43.87		25.75		29.76	
Prob > F	0		0.0071		0.0017	
R-squared	0.0763		0.0534		0.0709	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Independent Variables	Committed Any Crime if Male, Age 16-17		Committed Any Crime if Male, Age 18-19		Committed Any Crime if Male, Age 20-21	
	Marg Coeff	Std Error	Marg Coeff	Std Error	Marg Coeff	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.251***	0.089	-0.028	0.112	-0.055	0.092
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.169*	0.093	-0.056	0.106	-0.133	0.109
Age Cohort 1 (9 yo)	0.107	0.071	0.054	0.093	-0.088	0.063
Age Cohort 2 (11 yo)	-0.036	0.057	0.009	0.083	-0.017	0.071
Number of American Indian Parents in Household	0.222*	0.128	-0.042	0.092	0.155	0.129
American Indian	-0.111*	0.058	-0.052	0.096	-0.114	0.072
Sex						
Parent 1 Education	0.006	0.011	0.014	0.015	0.003	0.013
Parent 2 Education	-0.007	0.008	-0.015	0.013	0.004	0.010
HH in Poverty Indicator Variable	0.021	0.027	0.002	0.043	0.037	0.033
Average HH Income	-0.004	0.010	-0.013	0.015	-0.007	0.011
Number of obs	587		553		547	
F(11, 1032)	20.37		11.37		11.96	
Prob > F	0.026		0.330		0.287	
R-squared	0.062		0.031		0.035	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 7 cont: Any Criminal Behavior of the Child in Young Adulthood

Independent Variables	Committed Any Crime if Household Previously in Poverty, Age 16-17	
	Marg Coeff	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.244***	0.084
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.060	0.066
Age Cohort 1 (9 yo)	0.259***	0.078
Age Cohort 2 (11 yo)	0.044	0.055
Number of American Indian Parents in Household	0.071	0.071
American Indian	0.004	0.065
Sex	0.091*	0.052
Parent 1 Education	-0.011	0.013
Parent 2 Education	-0.001	0.014
HH in Poverty Indicator Variable	-0.011	0.033
Average HH Income	-0.011	0.020
Number of obs	465	
F(11, 1032)	27.98	
Prob > F	0.003	
R-squared	0.138	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 8: Likelihood of Committing Crime by Type at Any Time in Late Teen Years (16-21)

Independent Variables	Ever Committed A Minor Crime by Age 21		Ever Committed A Moderate Crime by Age 21		Ever Committed A Violent Crime by Age 21	
	Marg. Coeff	Std Error	Marg. Coeff	Std Error	Marg. Coeff	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.167*	0.086	-0.006	0.064	-0.002	0.013
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.072	0.084	-0.024	0.047	-0.009	0.014
Age Cohort 1 (9 yo)	-0.059	0.056	-0.016	0.026	0.000	0.010
Age Cohort 2 (11 yo)	-0.096*	0.054	-0.043**	0.022	0.014	0.013
Number of American Indian Parents in Household	0.095	0.092	0.118*	0.067	-0.003	0.009
American Indian	-0.099	0.067	-0.074***	0.015	0.003	0.010
Sex	0.179	0.044	0.072***	0.024	0.047***	0.014
Parent 1 Education	-0.001	0.010	0.002	0.006	0.003	0.002
Parent 2 Education	-0.012	0.008	-0.006	0.004	-0.001	0.002
HH in Poverty Indicator Variable	0.059*	0.029	0.013	0.013	-0.001	0.004
Average HH Income	0.008	0.010	-0.005	0.005	-0.004***	0.002
Number of obs	1044.000		1044		1044	
Wald chi2(10)	40.150		46.81		55.160	
Prob > chi2	0.000		0.000		0.000	
Pseudo R2	0.073		0.096		0.164	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Independent Variables	Ever Committed A Minor Crime by Age 21 if Male		Moderate Crime by Age 21 if Male		Violent Crime by Age 21 if Male	
	Marg. Coeff	Std Error	Marg. Coeff	Std Error	Marg. Coeff	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.185	0.115	-0.162**	0.075	-0.032	0.047
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.162	0.135	-0.132*	0.080	-0.054	0.046
Age Cohort 1 (9 yo)	-0.061	0.090	-0.038	0.052	0.017	0.035
Age Cohort 2 (11 yo)	-0.095	0.088	-0.051	0.048	0.061	0.050
Number of American Indian Parents in Household	0.209	0.142	0.161	0.122	-0.009	0.034
American Indian	-0.210**	0.103	-0.104**	0.046	0.001	0.031
Sex						
Parent 1 Education	0.010	0.016	0.005	0.010	0.010	0.006
Parent 2 Education	-0.020	0.014	-0.005	0.008	-0.004	0.005
HH in Poverty Indicator Variable	0.083*	0.046	0.028	0.027	-0.005	0.014
Average HH Income	0.011	0.016	-0.009	0.009	-0.012*	0.007
Number of obs	547		547		547	
Wald chi2(10)	14.83		26.93		24.96	
Prob > chi2	0.138		0.003		0.005	
Pseudo R2	0.040		0.063		0.085	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 8 cont: Likelihood of Committing Crime by Type at Any Time in Late Teen Years (16-21)

	Ever Committed A Minor Crime by Age 21 if Household Previously in Poverty		Ever Committed A Minor Crime by Age 21 if Household Never Previously in Poverty	
Independent Variables	Marg. Coeff	Std Error	Marg. Coeff	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.146	0.111	-0.231*	0.136
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.020	0.111	-0.118	0.119
Age Cohort 1 (9 yo)	0.137	0.116	-0.129**	0.056
Age Cohort 2 (11 yo)	-0.017	0.117	-0.119**	0.055
Number of American Indian Parents in Household	0.085	0.095	0.114	0.116
American Indian	-0.142*	0.084	-0.033	0.108
Sex	0.252***	0.085	0.150*	0.050
Parent 1 Education	0.009	0.025	-0.005	0.010
Parent 2 Education	-0.014	0.020	-0.013	0.008
HH in Poverty Indicator Variable	0.016	0.065		
Average HH Income	0.037	0.037	0.013	0.010
Number of obs	437		607	
Wald chi2(10)	18.18		29.32	
Prob > chi2	0.078		0.001	
Pseudo R2	0.078		0.077	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 9: Likelihood of Dealing Drugs

Independent Variables	Ever Dealt Drugs by Age 21		Ever Dealt Drugs by Age 21 if Household Previously in Poverty	
	Coeff.	Std Error	Coeff.	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.072**	0.033	-0.073	0.055
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.010	0.020	-0.013	0.040
Age Cohort 1 (9 yo)	0.003	0.016	-0.005	0.034
Age Cohort 2 (11 yo)	0.025	0.018	0.048	0.038
Number of American Indian Parents in Household	-0.013	0.018	-0.021	0.036
American Indian	0.036	0.029	0.031	0.039
Sex	0.066***	0.012	0.075***	0.022
Parent 1 Education	0.005**	0.003	0.005	0.006
Parent 2 Education	-0.003	0.002	-0.004	0.006
HH in Poverty Indicator Variable	-0.004	0.007	-0.013	0.015
Average HH Income	-0.007**	0.003	-0.007	0.010
Number of obs	1044		437.000	
Wald chi2(10)	59.90		18.660	
Prob > chi2	0.000		0.068	
Pseudo R2	0.125		0.097	

Table 10: Parents' Employment Status Changes

	Mother's Labor Force Attachment				Mother's Labor Force Participation	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error	Marg. Coeff	Std Error
Household Eligible for Casino Disbursement	-0.171**	0.074	-0.153*	0.079	0.069	0.196
Lag of Household Income	-0.013	0.011	-0.010	0.011	0.021	0.028
Number of Children Less than 6 years old	0.086*	0.045	0.077*	0.046	0.031	0.096
Mother's Age			-0.010	0.008	0.012	0.018
Mother's Initial Labor Force Status					0.964***	0.145
Constant	0.817***	0.073	1.170***	0.311	0.117	0.358
Number of obs	3567		3487		Number of obs	3318
Number of groups	1145		1140		Number of group	1076
Wald chi2(7)	4.01		3.350		Wald chi2(9)	343.31
Prob > chi2	0.0074		0.0095		Prob > chi2	0

Note: Probit regression includes the mean over all time periods for the following variables: household eligibility for casino, mother's age, the lag of household income, number of children below age 6

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% leve.

	Father's Labor Force Attachment				Father's Labor Force Participation	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error	Marg. Coeff	Std Error
Household Eligible for Casino Disbursement	0.121*	0.068	0.077	0.071	-0.011	0.384
Lag of Household Income	-0.008	0.009	-0.008	0.010	0.072	0.072
Number of Children Less than 6 years old	0.024	0.051	0.030	0.051	-0.235	0.285
Father's Age			0.005	0.007	-0.102**	0.044
Father's Initial Labor Force Status					2.093**	0.582
Constant	0.358***	0.074	0.134	0.277	0.423	0.765
Number of obs	2227		2177		Number of obs	1988
Number of groups	729		723		Number of grou	643
Wald chi2(7)	1.22		0.740		Wald chi2(9)	105.95
Prob > chi2	0.3023		0.5676		Prob > chi2	0.00

Note: Probit regression includes the mean over all time periods for the following variables: household eligibility for casino, mother's age, the lag of household income, number of children below age 6

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 11: Parent's Arrest Since the Last Interview

	Mother Arrest Since Last Interview		Father Arrest Since Last Interview	
Independent Variables	Marg. Coeff	Std Error	Marg. Coeff	Std Error
Household Eligible for Casino Disbursement	-0.181	0.210	-0.550**	0.260
Mother's Age	-0.036	0.022		
Father's Age			-0.043	0.032
Household Income	0.026	0.035	-0.137**	0.064
Labor Force Status - Mother	-0.105**	0.052		
Labor Force Status - Father			0.053	0.143
Number of Children Less than 6 years old	0.160	0.103	-0.044**	0.020
Initial Arrest Status for Mother	0.821***	0.127		
Initial Arrest Status for Father			0.699***	0.113
Number of obs	3473		2158	
Number of groups	1135		721	
Wald chi2(7)	523.46		458.200	
Prob > chi2	0		0	

Note: The first regressions includes means for all of the independent variables over all time periods: household eligibility for casino, mother's age, household income, labor force status of the mother, number of children below age 6; the second regression includes : household eligibility for casino, father's age, household income, labor force status of the father, number of children below age 6. This is a random effects probit specification as suggested by Wooldridge (2005).

Table 12: Parental Supervision

	Mother's Supervision		Father's Supervision		Parental Supervision	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error	Coeff.	Std Error
Household Eligible for Casino Disbursement	-0.105***	0.041	-0.154***	0.056	-0.277**	0.125
Household Income	0.011*	0.006	0.010	0.008	0.020	0.019
Mother's Age	-0.006	0.011			0.102	0.098
Father's Age			0.017	0.021	0.012	0.020
Age of Child	0.004	0.007	-0.005	0.008	-0.008	0.020
Number of Children Less than 6 years old	0.021***	0.009	0.038***	0.011	0.069***	0.027
Labor Force Status - Mother	0.027	0.023			0.002	0.033
Labor Force Status - Father			0.067*	0.040	0.038	0.047
Constant	-0.397**	0.182	-0.295	0.250	-1.024*	0.621
Number of obs	3802		2365		2025.0	
Number of groups	1163		745		637	
Wald chi2(7)	5.74		5.260		3.5	
Prob > chi2	0		0		0.0	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Table 13: Activities With Parent

	Activities With Mother		Activities With Father	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error
Household Eligible for Casino Disbursement	-0.089*	0.046	-0.054	0.057
Household Income	0.012**	0.006	0.003	0.007
Number of Children				
Less than 6 years old	0.033	0.026	-0.007	0.041
Mother's Age	0.004	0.007	0.009	0.009
Age of Child	0.013	0.009	0.012	0.012
Constant	-0.243	0.195	-0.427	0.264
Number of obs	3910		2448	
Number of groups	1172		760	
Wald chi2(7)	3.73		2.310	
Prob > chi2	0.0023		0.0422	

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Figure 1: Household Income By American Indian Parent Status in Waves 1-3

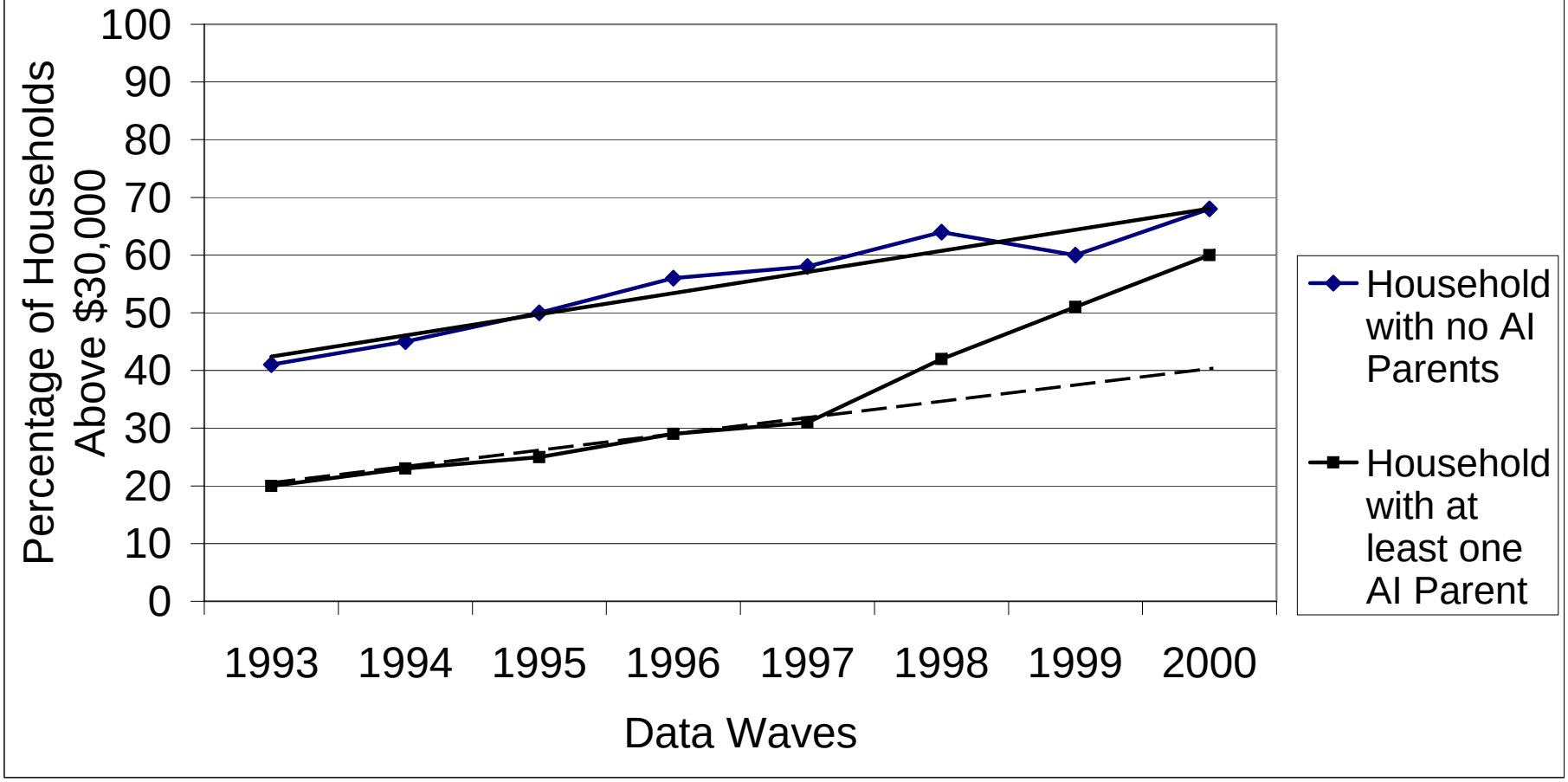


Figure 2: Mother's Unemployment Incidence by Waves 1-3

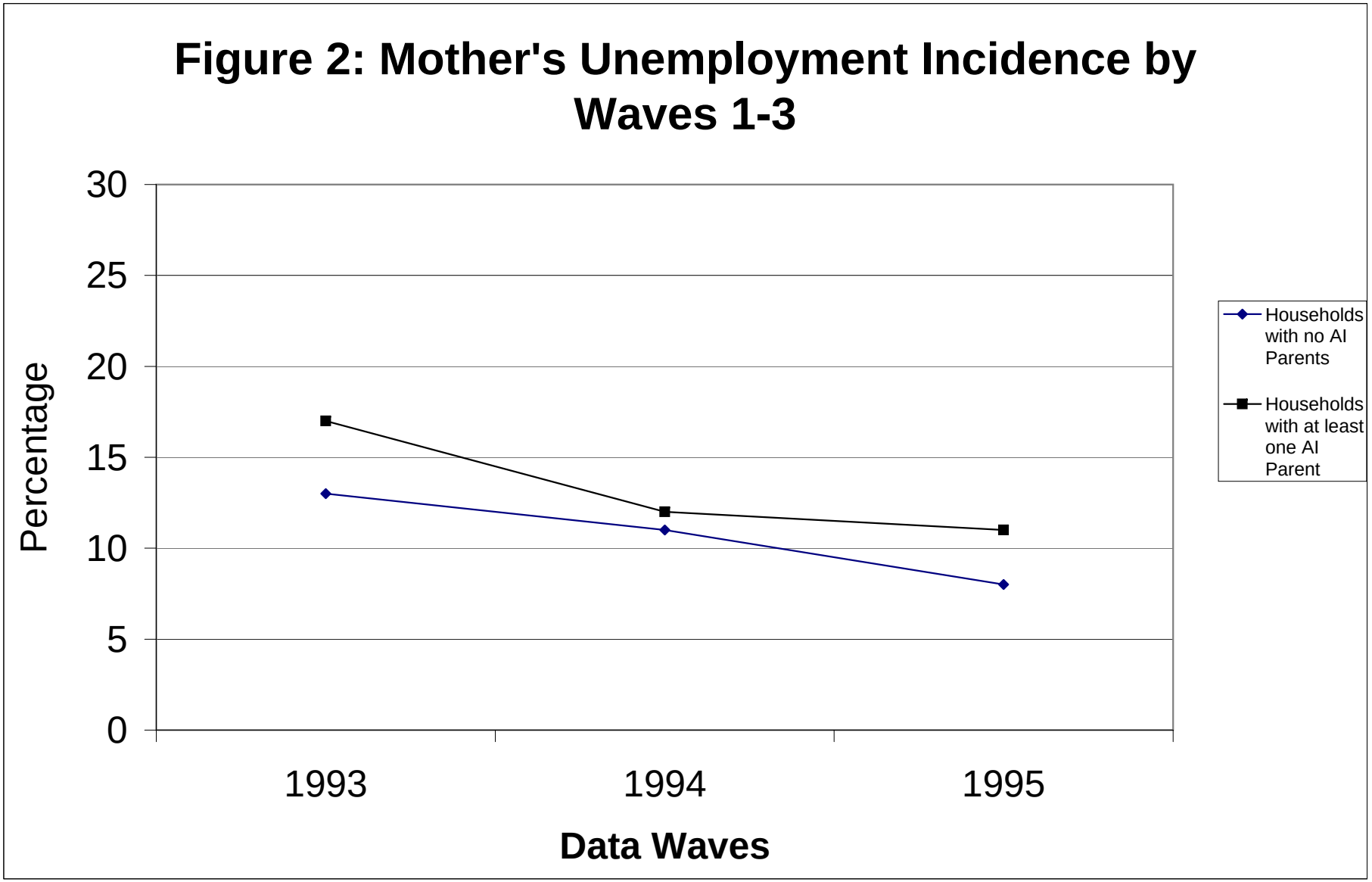


Figure 3: Father's Unemployment Incidence by Waves 1-3

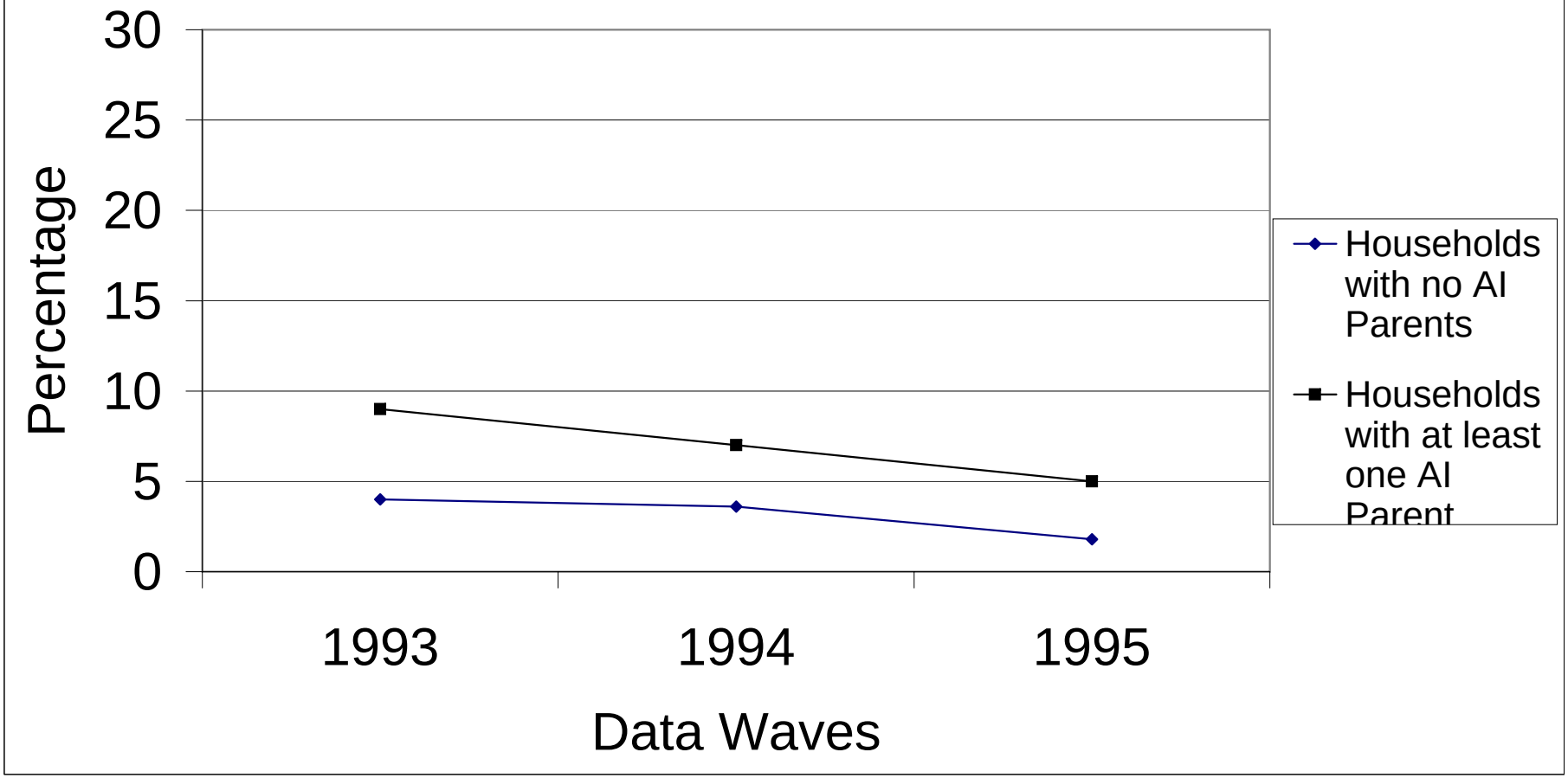
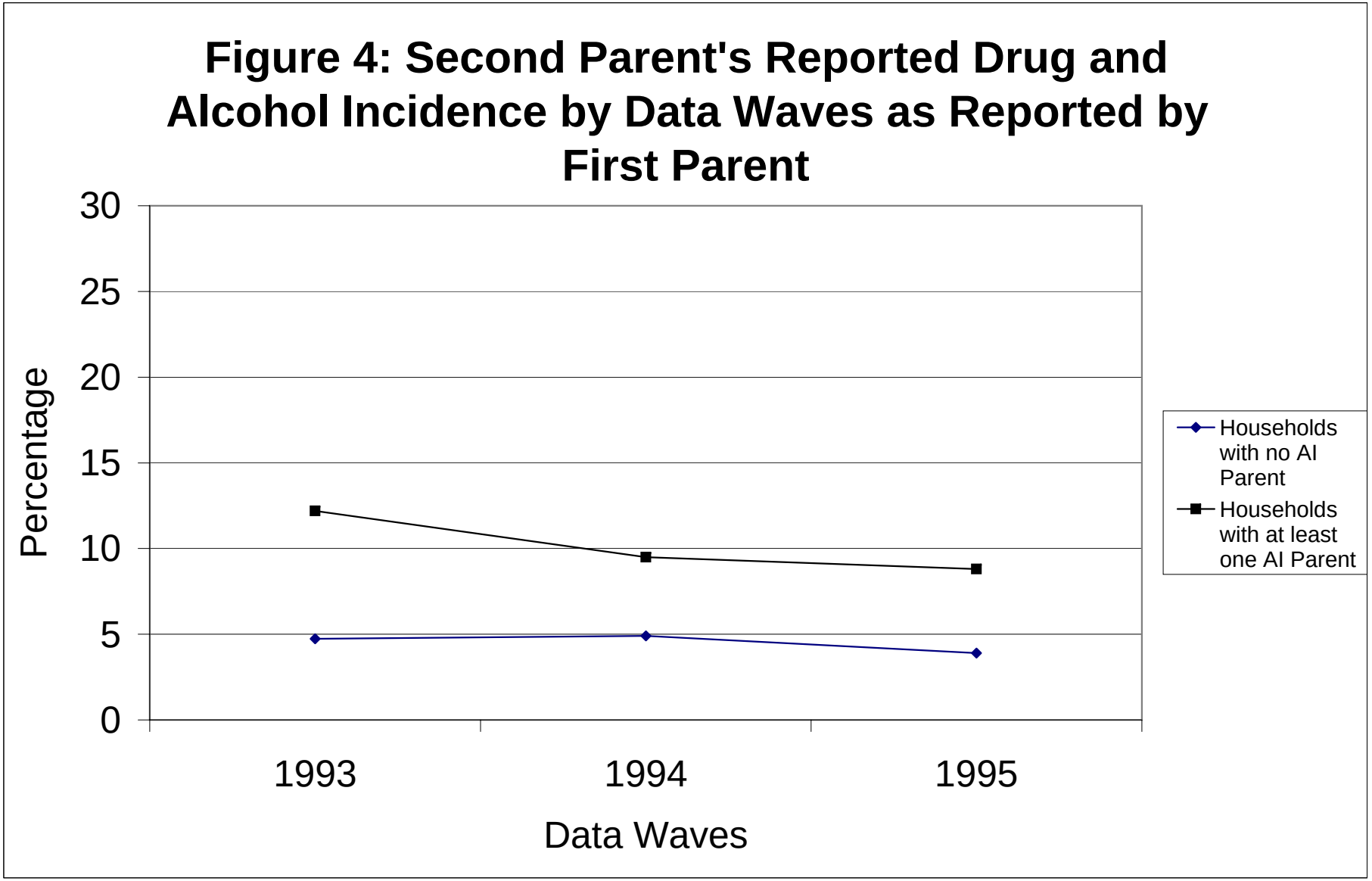


Figure 4: Second Parent's Reported Drug and Alcohol Incidence by Data Waves as Reported by First Parent



Appendix Table 1: Comparison of Marital Status of Parents Across Time by Age Cohort and Household Type

	Comparison Ages:	12/13 with 14	14 with 15	15 with 16	12/13 with 16
Non-Indian Household	Age Group 1	-0.377	-0.898	-0.513	0.270
	Age Group 2	1.400	0.520	-0.794	0.000
	Age Group 3	-0.530	0.522	0.444	-0.545
American Indian Household	Age Group 1	0.000	-0.650	-0.145	1.040
	Age Group 2	0.140	-0.146	-0.146	0.044
	Age Group 3	0.000	-0.629	-1.002	-0.480

Note: Reported figures are t-ratios for difference in the mean value of whether the child's parents are currently married at each survey wave. Ages 12 or 13 are used as not every age group was surveyed at ages 12 and 13, therefore, we combine those years for comparison.

Appendix Table 2: Placebo Tests on Children's Outcomes

Independent Variables	Days in School in the Previous Quarter Coeff.	Std Error
Household Eligible for Casino Disbursement	-0.919	1.081
Household Income	-0.448**	0.207
Mother's Age	-0.200	0.131
Father's Age	-0.027	0.089
Child's Age	-0.411	0.346
Number of Children Less than 6 years old	0.481	0.853
Constant	56.827***	5.879
Number of obs	2372	
Number of groups	1062	
F(6,1304)	2.92	
Prob > F	0.0079	

Independent Variables	Educational Attainment at age 16 Coeff.	Std Error
Interaction 1: Age Cohort 1 x Number of American Indian Parents	-0.012	0.130
Interaction 2: Age Cohort 2 x Number of American Indian Parents	-0.062	0.139
Age Cohort 1 (9 yo)	0.148*	0.080
Age Cohort 2 (11 yo)	0.203***	0.078
Number of American Indian Parents in Household	0.069	0.109
American Indian	0.034	0.141
Sex	-0.072	0.062
Parent 1 Education	-0.009	0.013
Parent 2 Education	0.004	0.011
HH in Poverty Indicator Variable	-0.081**	0.044
Average HH Income	0.016	0.015
Constant	8.992	0.144
Number of obs	1064	
F(11, 1052)	2.67	
Prob > F	0.0022	
R-squared	0.0655	

Note: The first regression is conducted with a child fixed effect and is restricted to only the first four survey waves, with a placebo treatment introduced in waves 3 and 4. The second regression restricts analysis to age 16 for all of the children, which is five years earlier than the analysis presented in the main part of the paper; compulsory schooling laws may play a role as ages 7-16 are compulsory in North Carolina.

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5% level and * at the 10% level.

Appendix Table 3: Placebo Tests on Parental Behaviors

	Mother's Labor Force		Father's Labor Force		Mother's Activities		Father's Activities		Mother's Supervision		Father's Supervision	
Independent Variables	Coeff.	Std Error	Coeff.	Std Error	Coeff.	Std Error	Coeff.	Std Error	Coeff.	Std Error	Coeff.	Std Error
Household Eligible for Casino Disbursement	-0.092	0.072	-0.027	0.066	0.058	0.051	-0.039	0.056	0.078**	0.039	0.131***	0.050
Household Income	0.003	0.015	0.000	0.014	-0.003	0.010	-0.009	0.012	0.002	0.008	0.015	0.011
Number of Children Less than 6 years old	0.034	0.058	0.145**	0.074	-0.003	0.038	-0.002	0.060	0.010	0.029	-0.003	0.054
Mother's Age	-0.022*	0.012			-0.003	0.009			-0.003	0.007		
Father's Age			0.004	0.011			0.004	0.010			-0.005	0.009
Child's Age					0.003	0.017	0.041**	0.020	0.024*	0.013	0.036**	0.018
Labor Force Participation Mother									0.018	0.013		
Labor Force Participation Father											-0.012	0.024
Constant	1.594***	0.466	0.159	0.441	0.246	0.303	-0.454	0.365	-0.165	0.245	-0.320	0.326
Number of obs	2655		1644		2727		1697		2721		1685	
Number of groups	1114		699		1135		724		1135		718	
F(6,1304)	1.69		1.03		0.36		1.39		2.59		4.12	
Prob > F	0.1495		0.3885		0.8743		0.2258		0.0169		0.0004	

Note: All regressions contain a household fixed effect and is restricted to only the first four survey waves, with a placebo treatment introduced in waves 3 and 4.

Note: *** indicates coefficient statistically significant at the 1% level, ** at the 5%