How Does Household Income Affect Child Personality Traits and Behaviors?

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- Social scientists have spent a considerable amount of effort uncovering the theoretical and empirical linkages between family resources and human capital formation in children (Currie and Almond 2011; Cunha et al. 2006; Becker and Tomes 1986; Duncan and Brooks-Gunn 1997; Cameron and Heckman 1998; Blau 1999)

- Existing studies have been able to show the link between increased household income and child health and labor market outcomes

- Our study allows us to peer into this black box at the household level and identify some of the mechanisms that translate extra household income into better child outcomes

- Our results on mental health correspond to findings in the existing literature

- The next **Section I** discusses related literature
- We describe the data used in our analysis in **Section II**
- We discuss the conceptual framework for our analysis in **Section III**
- We provide the empirical framework in **Section IV**
- **Section V** presents the empirical results from our analysis, the potential mechanisms at work
- **Section VI** outlines several robustness checks
- In **Section VII** we discuss our findings, their potential long-run effects for treated children, and conclude

1. Related Literature

A. Identifying the Effects of Extra Income on Child Outcomes

- Using the Fragile Families and Child Well-Being Study, Berger, Paxson, and Waldfogel (2009) find a strong correlation between measures of children's mental health at age three, cognitive skills test scores, and family income

- In the United States, Akee et al. (2010, 2013) used the Great Smoky Mountain Study data to examine the effect of changes in household income on child educational attainment, arrests, and obesity

B. Household Income and Parental Behaviors

- One potential channel linking children's behavioral health and household income is related to parental well-being
- To our knowledge, ours is the first study that uses longitudinal data on both parents and children to demonstrate that children's personality traits and emotional well-being respond positively to permanent unconditional cash transfers *and* that there are concurrent positive changes in the household environment related to parental strife

2. Great Smoky Mountains Study of Youth: Design and Background

A. Dataset Creation

- he Great Smoky Mountains Study of Youth (GSMS) is a longitudinal survey of 1,420 children aged 9, 11, and 13 years at the survey intake, who were recruited from 11 counties in western North Carolina

- In **Appendix Figure 1**, we provide a table identifying the survey timing for all three cohorts across survey waves

- We find no statistically significant difference in attrition between the sample of Native American children and the rest of the surveyed individuals

Appendix Figure 1: Great Smoky Mountain Study of Youth Survey Schedule by Age Cohort and Year

Wave	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	17
Year	1993	1994	1995	1996		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Age																		
9	C1				Casino opening													
10		C1																
11	C2		C1															
12		C2		C1														
13	**C3**		C2															
14		**C3**		C2			C1											
15			**C3**			C2		C1										
16				**C3**			C2		C1									
17																		
18																		
19								**C3**		C2		C1						
20																		
21										**C3**		C2		C1				
22																		
23																		
24													**C3**		C2		C1	
25														**C3**		C2		C1

B. Quasi-Experimental Income Intervention

- After the fourth wave of the study, a casino opened on the Eastern Cherokee reservation
- We estimate the amount of change in household incomes for those that were eligible for the unconditional transfers to be approximately $3,500 on average per year during the study period

C. Creation and Description of Personality Traits and Psychological Measures

- The Great Smoky Mountains Study was designed to assess mental health and well-being in children
- We provide the summary statistics for these two outcome variables for the first survey wave aggregated across all age cohorts by American Indian status in **Table 1**
- We use a number of questions contained in the GSMS data that align with the Big Five Measures of Personality

- Three dimensions of the Big Five are well suited to the GSMS survey questions. They are
  (i) *Conscientiousness*: tendency to be organized, responsible and hardworking;
  (ii) *Agreeableness*: tendency to act in a cooperative and unselfish manner;
  iii) *Neuroticism* (also called Emotional Stability): chronic level of emotional instability and prone to psychological distress

- The full set of survey questions that were used to determine the three subparts of the Big 5 Personality traits are listed in **Appendix Table 1**

- In **Appendix Table 2**, we provide correlations between personality traits and several related SES outcomes estimated using our definitions and sample

- **Appendix Table 3** summarizes data from several additional sources to demonstrate comparability of the American Indian population sampled in the GSMS to other demographic groups in the United States

Table 1: Table of Means for Outcomes at Initial Survey Wave

	American Indian		Non-Indian		Tests of equality of means	
	Mean	Standard deviation	Mean	Standard deviation	Diff. in means	SE of diff.
Number of children < 6 years old	0.486	0.781	0.289	0.866	−0.197	0.051
Average household income in first three survey waves ($)	22,781	13,893	35,624	26,283	12,842	1,131
Biological parents married	0.443	0.497	0.578	0.738	0.134	0.036
Behavioral disorders	−0.228	0.694	−0.212	0.812	0.015	0.046
Emotional disorders	−0.268	0.804	−0.027	1.295	0.241	0.060
Conscientiousness	0.207	0.998	0.091	1.373	−0.116	0.071
Agreeableness	0.043	1.289	−0.164	1.534	−0.207	0.089
Neurotic	0.160	1.040	−0.123	1.698	−0.282	0.080
Adequate supervision of mother[a]	1.963	0.240	1.972	0.257	0.009	0.017
Enjoyable activities with mother[a]	1.875	0.389	1.897	0.505	0.022	0.028
Full-time employed mother	0.574	0.495	0.575	0.744	0.001	0.039
Poor relationship between parents	0.343	0.475	0.443	0.752	0.099	0.037
Arguments with parents	3.553	14.864	4.687	15.260	1.134	0.960

Notes: The number of observations for non-Indians ranges between 884–1,015 due to missing information for some variables; the number of observations for American Indians ranges between 323–270 due to missing information for some variables. Means and standard deviations are weighted using sample probability weights.

[a] On a scale of 0 to 2, higher values indicates more supervision or enjoyable activities.

Appendix Table 1: Variables from GSMS Used to Create Big 5 Personality Traits: Agreeableness, Conscientiousness, and Neuroticism

	Emotional	Behavioral
Agreeableness		
Number of arguments with Parent1[a]	Sep. distress from home or att. figure	Often bullies, threatens, or intimidates others
Number of arguments with other adults[a]	Worry about possible harm	Often initiates physical fights
Number of arguments with peers at school	Worry about calamitous separation	Has used a weapon that can cause serious physical harm to others
Irritability intensity[a,b]	Persistent reluctance/refusal to go to school	Has been physically cruel to people
Bullies/extortion[a]	Avoidance of being alone	Has been physically cruel to animals
Cruelty to animals[a]	Reluctance to sleep away	Has stolen while confronting a victim (e.g., mugging, purse snatching, extortion, armed robbery)
Rumors	Separation nightmares	Has forced someone into sexual activity
Spiteful or vindictive[a]	Physical symptoms	Has deliberately engaged in fire setting with the intention of causing serious damage
Loses temper[a]	Diagnosed panic attacks	Has deliberately destroyed others' property (other than by fire setting)
Angry or resentful[a]	Meeting criteria for obsessive compulsive disorder	Has broken into someone else's house, building, or car
	Social anxiety	Often lies to obtain goods or favors or to avoid obligations (i.e., "cons" others)

Cont.

Appendix Table 1: Variables from GSMS Used to Create Big 5 Personality Traits: Agreeableness, Conscientiousness, and Neuroticism

	Emotional	Behavioral
Conscientiousness	Fear public performance	Has stolen items of nontrivial value without confronting a victim
Lying intensity[a]	Social phobia, animal type	Often stays out at night despite parental prohibitions, beginning before age 13 years
Impulsive intensity	Social phobia, natural, other	Has run away from home overnight at least twice while living in parental or parental surrogate home
Rule-breaking intensity	Social phobia, blood, injection, injury	Is often truant from school, beginning before age 13 years
Concentration/difficulty paying attention[a,b]	Agoraphobia	Often loses temper
	Post-traumatic stress painful recall screen positive	Often argues with adults

Cont.

Appendix Table 1: Variables from GSMS Used to Create Big 5 Personality Traits: Agreeableness, Conscientiousness, and Neuroticism

	Emotional	Behavioral
Neuroticism	Post-traumatic stress hyperarousal screen positive	Often actively defies or refuses to comply with adults' requests or rules
Feels unloved	Post-traumatic stress avoidance screen positive	Often deliberately annoys people
Feeling of inferiority to others	Restlessness, keyed up, on edge	Often blames others for his or her mistakes or misbehavior
Subject feels sorry for himself[b]	Easy fatigability	Is often touchy or easily annoyed by others
Feels helpless in general	Difficulty concentrating, mind blank	Is often angry and resentful
Depressed mood[b]	Irritability	Is often spiteful or vindictive
	Muscle soreness	Often fails to give close attention to details or makes careless mistakes
	Trouble falling or staying asleep	Often has difficulty sustaining attention in tasks or play activities
	Excessive worry (a symptoms of generalized anxiety disorder)	Often does not seem to listen when spoken to directly
	Frequent somatic complaints for which no physical basis could be found	Often does not follow through on instructions and fails to finish school work, chores

Cont.

Appendix Table 1: Variables from GSMS Used to Create Big 5 Personality Traits: Agreeableness, Conscientiousness, and Neuroticism

	Emotional	Behavioral
	Excessive need for reassurance	Often has difficulty organizing tasks and activities
	Marked feelings of tension or inability to relax	Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort
	Depressed/irritable mood	Often loses things necessary for tasks or activities
	Anhedonia or lose interest	Is often easily distracted by extraneous stimuli
	Weight loss or gain/dysthymia	Is often forgetful in daily activities
	Insomnia or hypersomnia	Often fidgets with hands or feet or squirms in seat
	Psychomotor agitation/ retardation	Often leaves seat in classroom or in other situations in which remaining seated is expected
	Fatigue or loss of energy	Often runs about or climbs excessively in situations in which it is inappropriate
	Low self-esteem/worthlessness/ guilt	Often has difficulty playing or engaging in leisure activities quietly
	Diff concentrating/thinking/ deciding	Is often "on the go" or often acts as if "driven by a motor"
	Think about, plan, or attempt suicide	Often talks excessively
	Hopelessness	Often blurts out answers before questions have been completed
		Often has difficulty awaiting turn
		Often interrupts or intrudes on others (e.g., butts into conversations or games)

[a] indicates overlap with behavioral
[b] indicates overlap with emotional

Appendix Table 2: Summary of Relevant Background Findings in the Previous Literature

Big 5 measure	Study	Education measure used in correlation	Correlation coefficient	Reporting source
Conscientiousness	Our study	Years of attained education	0.311 (0.105)	Parent report
	Pororat (2009)	Education grade: primary, secondary, or tertiary	0.283 (primary)	Meta analysis
			0.206 (secondary)	
			0.241 (tertiary)	
	Denissen et al. (2008)	Education level (1-primary through 5-higher professional)	0.15	Self assessment
	Borghans et al. (2008)	Years of attained education	0.11	Meta analysis
	Goldberg et al. (1998)	Years of attained education	0.11	Self reported
Agreeableness	Our study	Years of attained education	0.181 (0.1)	Parent report
	Pororat (2009)	Education grade: primary, secondary, or tertiary	0.298 (primary)	Meta analysis
			0.051 (secondary)	
			0.06 (tertiary)	
	Denissen et al. (2008)	Education level (1-primary through 5-higher professional)	0.05	Self assessment
	Borghans et al. (2008)	Years of attained education	−0.13	Meta analysis
	Goldberg et al. (1998)	Years of attained education	−0.12	Self reported
Neuroticism "Emotional Stability"	Our study	Years of attained education	0.29 (0.111)	Parent report
	Pororat (2009)	Education grade: primary, secondary, or tertiary	0.242 (primary)	Meta analysis
			0.014 (secondary)	
			0.0 (tertiary)	
neuroticism	Denissen et al. (2008)	Education level (1-primary through 5-higher professional)	−0.15	Self assessment
"Emotional Stability"	Borghans et al. (2008)	Years of attained education	0.06	Meta analysis
"Emotional Stability"	Goldberg et al. (1998)	Years of attained education	0.06	Self reported

Appendix Table 3: Comparison of Economic Characteristics with Other American Indian Tribes and Relevant Demographic Groups

	1990 Census report on American Indians	Social explorer	IPUMS 1990				
	Eastern Cherokee (reservation)	All 11 counties	All Native Americans	Rural Native Americans	Rural African Americans	All of United States	Rural United States
Rural status	99%[a]	65%	54%	100%	100%	32%	100%
Median family income	$17,778	$27,275	$20,000	$18,000	$17,000	$32,030	$29,400
Family size	2.95		3.86	4.17	4.11	3.28	3.4
Own house	70%	75%	58%	68%	70%	69%	80%
Married	50%	60%	47%	49%	41%	58%	66%
Percent of age 25+ with a high school degree	70%	69%	69%	64%	53%	79%	75%
Unemployment rate	12%[a]	6%	15%	18%	12%	6%	6%
Per capita income	$6,543	$11,691	$11,362	$9,905	$9,165	$17,922	$15,677

Source: 1990 Census Report on American Indians; Social Explorer, 1990 County Data; IPUMS 1990, 1% Sample

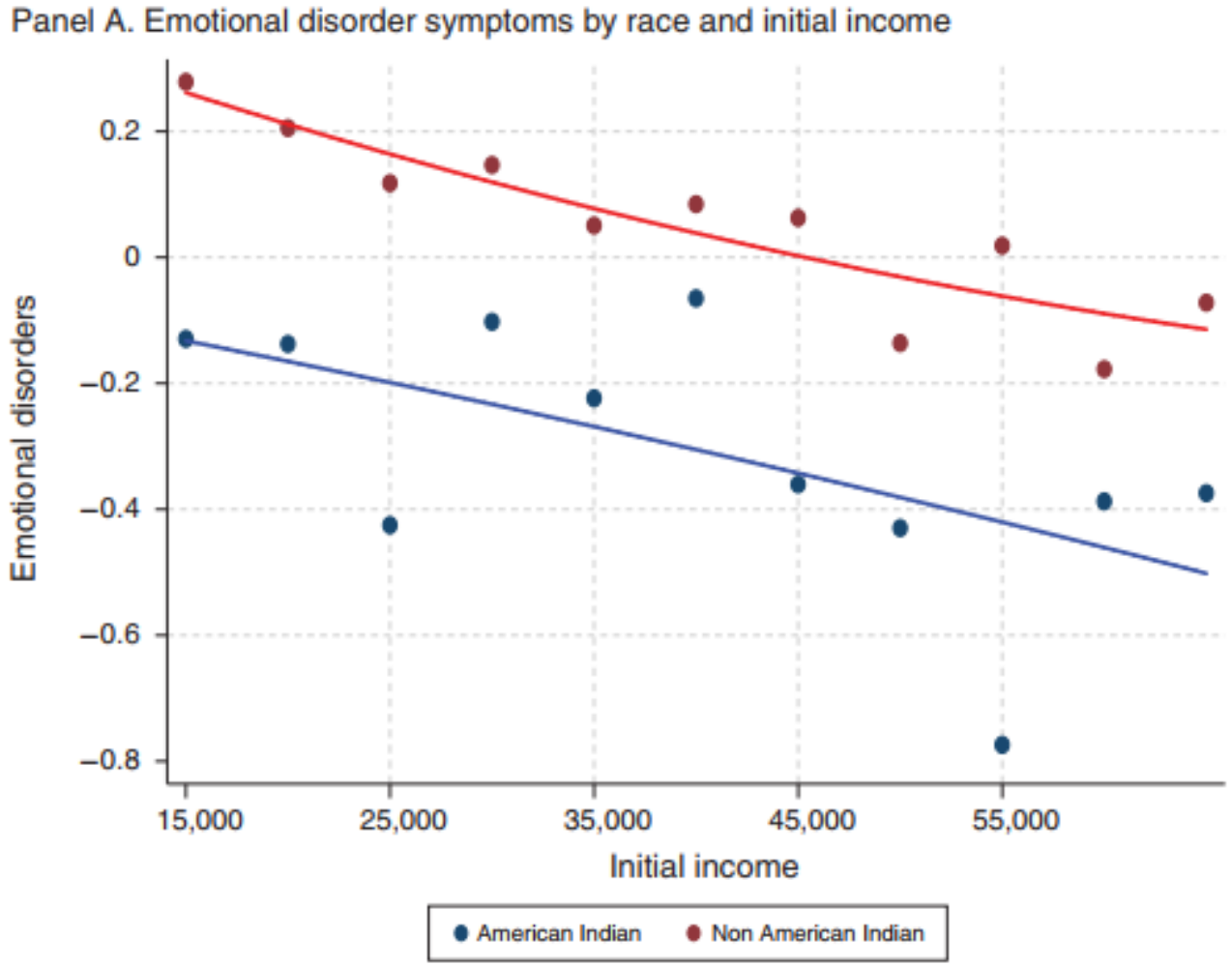
[a] Taylor and Akee (2014)

3. Conceptual Framework

A. Effects of Exogenous Income Shocks on Child Well-Being

- In **Appendix Figure 2**, we provide the initial distribution of two of our outcome measures by initial household income using data prior to the income intervention
- The prediction from this model would be that children from households with lower initial investments in child skills would exhibit greater human capital gains from an increase (shock) in unconditional household income

Appendix Figure 2: Relationship between Initial Income and Psychological Traits



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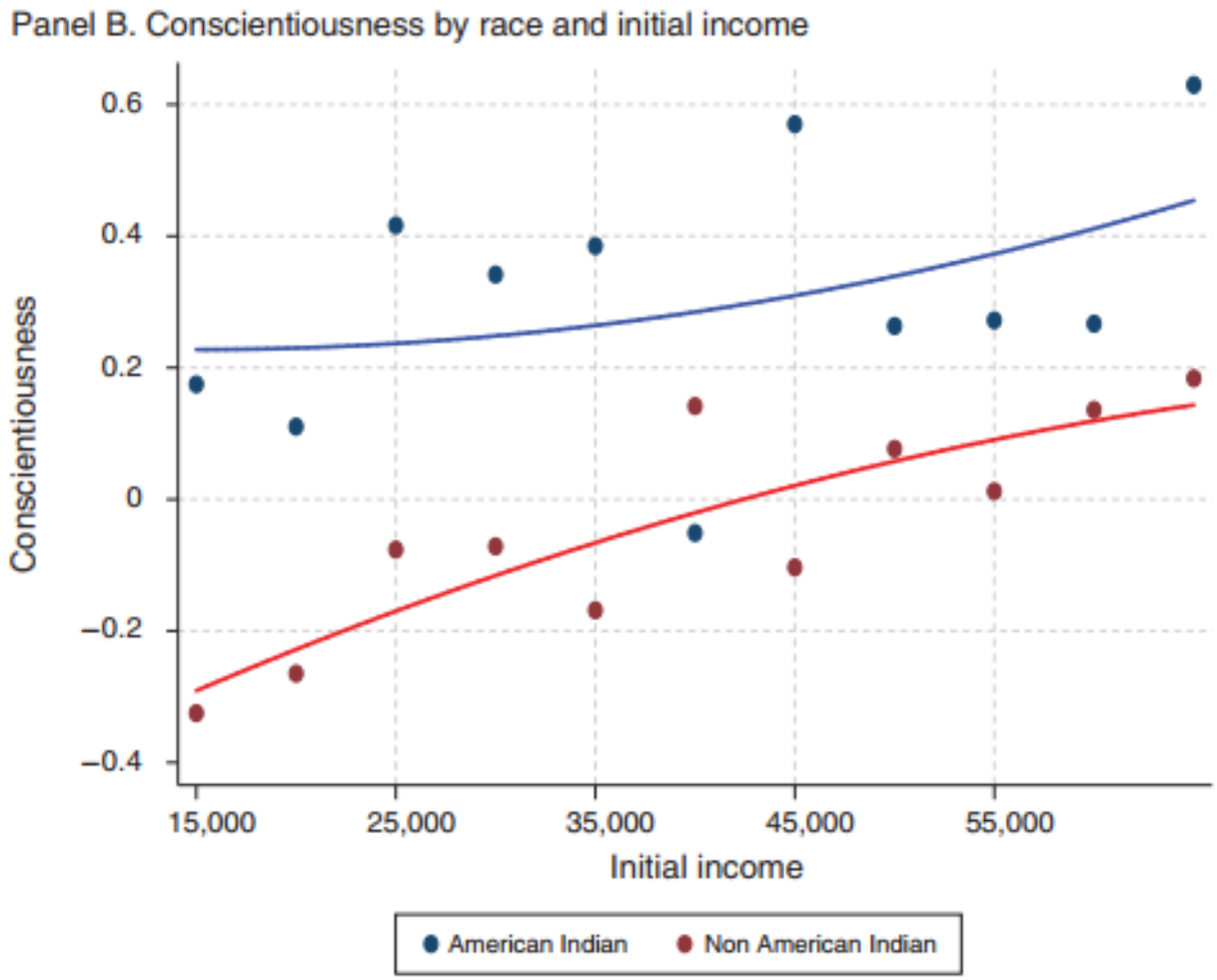
Appendix Figure 2: Relationship between Initial Income and Psychological Traits



B. Identifying Mechanisms Affecting Child Outcomes

- Our analysis also sheds some light on the mechanisms responsible for improving child outcomes
- First, we examine whether the casino payment has an effect on parental behavior and quality of home life
- Second, we measure whether the casino transfers affect marital status or parental employment

4. Empirical Methodology

- Our goal is to identify the effect of an unconditional cash transfer on child personality traits and behavioral and emotional disorder symptoms

- **One version** of the difference-in-differences setup is to restrict the analysis to American Indian children only and exploit variation in the casino treatment across the three age cohorts

- **Second**, we could restrict the sample by cohort and compare American Indian and non-Indian children across time

- A **third** possible cut of the data is to consider only children of the same ages, and compare outcomes across American Indian and non-Indian children using all cohorts

- We present estimates from the three difference-in-differences frameworks as described above in **Table 4**

- The treatment effect is identified as the difference-in-differences-in-differences across age cohorts and race. The main estimating equation is

$$(1)\quad Y_{it} = \alpha_0 + \beta_1 YoungestCohorts_i + \beta_2 After_t + \beta_3 AmericanIndian_i + \delta_1 YoungestCohorts_i \times After_t + \delta_2 YoungestCohorts_i \times AmericanIndian_i + \lambda YoungestCohorts_i \times After_t \times AmericanIndian_i + X'\mu + \epsilon_{it}.$$

- We control for all level effects by including indicator variables for survey waves, a dummy for American Indian race and indicators for the various cohorts

- The panel nature of the data allows us to include individual-specific fixed effects in equation (1)

- **Appendix Figure 3** tests for differences in the pre-casino trends for the five outcome variables for American Indian children and non-Indian children

Table 4: Difference-in-Differences Analyses for Various Subgroups

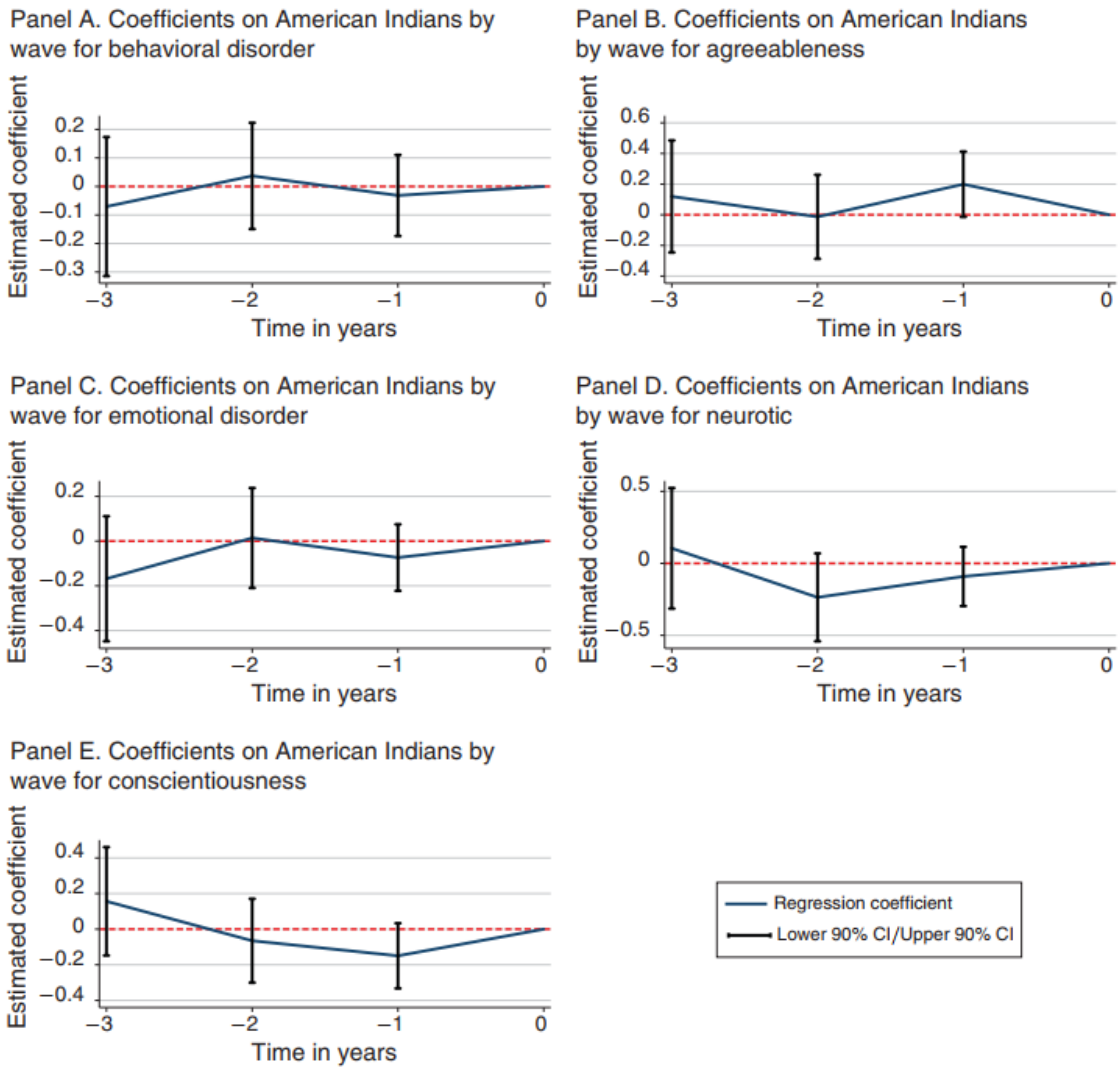
		Behavioral disorder symptoms (1)	Emotional disorder symptoms (2)	Conscientiousness (3)	Agreeableness (4)	Neuroticism (5)
Panel A						
Age 15–16 year olds only	Receipt of cash transfer	−0.263	−0.0686	0.299	0.301	0.148
		(0.0791)	(0.111)	(0.0989)	(0.119)	(0.106)
	Observations	2,237	2,237	2,005	1,978	2,027
	R^2	0.021	0.020	0.062	0.033	0.020
Panel B						
Youngest age cohort alone	Receipt of cash transfer	−0.362	−0.565	0.428	0.208	0.481
		(0.153)	(0.188)	(0.216)	(0.222)	(0.261)
	Observations	2,698	2,698	2,495	2,419	2,482
	R^2	0.026	0.021	0.058	0.065	0.044
Panel C						
American Indians alone	Receipt of cash transfer	−0.355	−0.191	0.391	0.773	0.334
		(0.195)	(0.198)	(0.232)	(0.284)	(0.300)
	Observations	1,591	1,591	1,494	1,450	1,494
	R^2	0.021	0.010	0.019	0.034	0.012
Panel D						
Age 12–13 year olds only: placebo	Receipt of cash transfer	−0.0871	0.0663	0.0810	0.121	−0.245
		(0.101)	(0.103)	(0.129)	(0.130)	(0.125)
	Observations	1,687	1,687	1,638	1,567	1,637
	R^2	0.017	0.019	0.021	0.044	0.047

Cont.

Table 4: Difference-in-Differences Analyses for Various Subgroups

		Behavioral disorder symptoms (1)	Emotional disorder symptoms (2)	Conscientiousness (3)	Agreeableness (4)	Neuroticism (5)
Panel E						
Oldest age cohort alone: placebo	Receipt of cash transfer	0.147	−0.226	−0.306	0.221	−0.0241
		(0.167)	(0.173)	(0.205)	(0.216)	(0.241)
	Observations	1,432	1,432	1,371	1,317	1,370
	R^2	0.017	0.019	0.015	0.052	0.038
Panel F						
Wave 4 observations only: placebo	Receipt of cash transfer	−0.118	0.0468	0.174	0.0731	0.0254
		(0.0974)	(0.101)	(0.135)	(0.131)	(0.0977)
	Observations	1,109	1,109	1,068	1,024	1,078
	R^2	0.004	0.010	0.018	0.008	0.006
Panel G						
Non-Indians alone: placebo	Receipt of cash transfer	0.203	0.0369	−0.0358	0.383	0.229
		(0.139)	(0.117)	(0.158)	(0.159)	(0.173)
	Observations	5,083	5,083	4,815	4,634	4,804
	R^2	0.011	0.013	0.031	0.055	0.041

Appendix Figure 3: American Indians and Non-Indians Combined (Triple Difference Coefficients) in First Three Survey Waves: All Three Cohorts



5. Empirical Results

A. Main Effects of Income Intervention on Child Personality Traits and Behaviors

- In **Figure 1** we plot the coefficients on the *SurveyWave* × *YoungestCohorts* × *AmericanIndian* interaction terms in the triple difference specification
- **Table 2** shows the estimates from the average treatment effects from the triple difference specification and the event-study results

Figure 1: The Effects of Unconditional Transfers on Income around the Start of Casino Operations

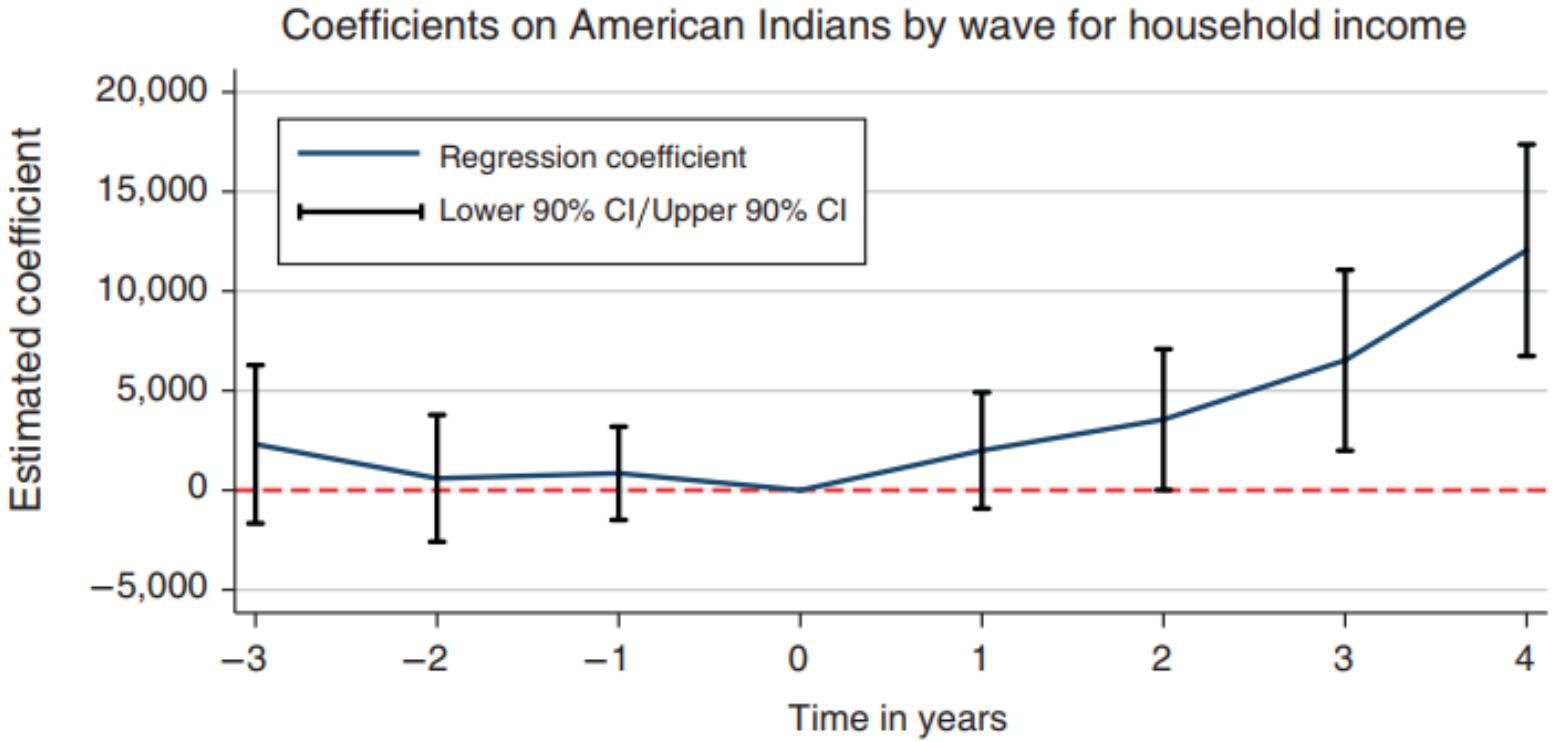


Table 2: The Effects of Casino Transfers on Household Income

	Total household income (1)	Total household income (2)
Receipt of cash transfer	3,472 (1,624)	
SurveyWave 1 × YoungestCohorts × AI		2,309 (2,416)
SurveyWave 2 × YoungestCohorts × AI		595.1 (1,936)
SurveyWave 3 × YoungestCohorts × AI		850.8 (1,422)
SurveyWave 4 × YoungestCohorts × AI		Omitted category
SurveyWave 5 × YoungestCohorts × AI		1,996 (1,774)
SurveyWave 6 × YoungestCohorts × AI		3,550 (2,149)
SurveyWave 7 × YoungestCohorts × AI		6,527 (2,758)
SurveyWave 8 × YoungestCohorts × AI		12,055 (3,228)
Individual fixed effects	N	N
Observations	6,674	6,674
R^2	0.077	0.078

- We provide similar event-style analysis in **Figure 2** for the five outcome variables of interest

- **Appendix Table 5** provides the corresponding regression output that was used to create these figures

- In **Table 3** we provide the regression results showing the average treatment effect estimated using our specification in equation (1)

  - Panel A shows the results without including person-specific fixed effects
  - Panel B reports the estimates from specifications in which we account also for child-specific fixed effects

- An important take-away from these findings is that personality traits and behavioral and emotional disorder symptoms can be affected by public interventions as late as the adolescent years

- *Difference-in-Differences Analyses*.—Our preferred set of analyses relies on specification (1)

- **Table 4** displays the estimates

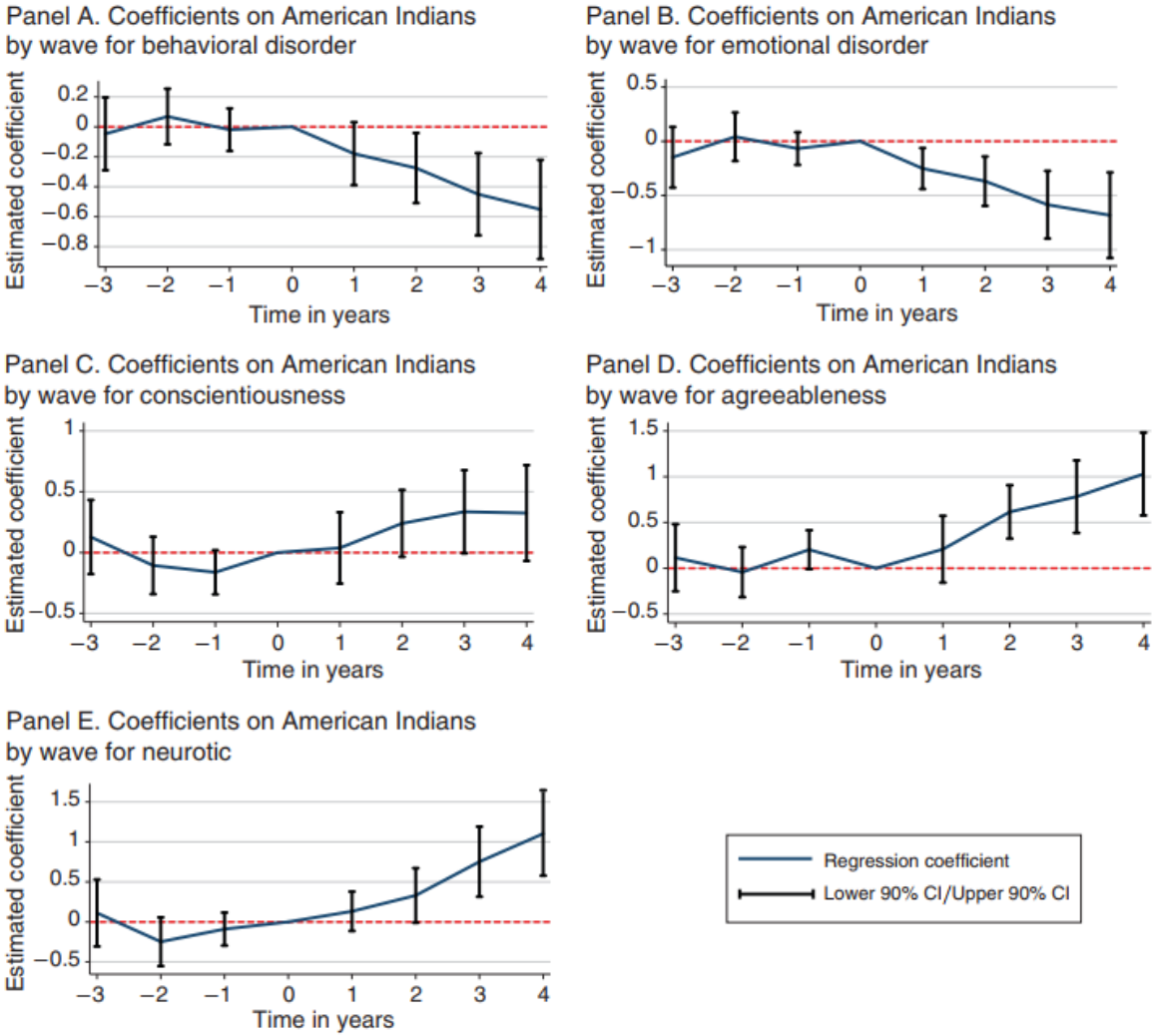
  - **Panel A** restricts the analysis to children of age 15 or age 16
  - In **panel B** we report results for the youngest age cohort alone
  - In **panel C** we restrict the analysis to American Indians only, comparing outcomes across treated and untreated cohorts of children
  - In **panel D** we restrict analysis to observations from ages 12 or 13 which predates the casino transfer for all age cohorts
  - In **panel E** we restrict the analysis to the oldest age group that was never treated to the cash transfers (during our period of analysis) and compare differences in the outcome variables by age and race
  - In **panel F** we restrict analysis to wave 4 only which predates the casino transfer payments
  - Finally, in **panel G** we restrict analysis only to non-Indians

- *Testing for Heterogeneities in Treatment*.—We explore potential heterogeneities in the effects across children with different initial (pre-transfer) endowments in personality skills or disorder symptoms

- In **Table 5** we show results from models that include an interaction of an indicator variable that is equal to 1 if the behavioral and emotional disorder symptoms or the personality traits were ever recorded as respectively above or below the median level in the first three survey waves and the treatment variable

- Specifications including individual fixed effects produce qualitatively similar results, presented in **Appendix Table 6**.

Figure 2: The Effects of Casino Transfers on Child Personality Traits and Behaviors around the Start of Casino Operations



Appendix Table 5: The Effect of Casino Transfers on Children's Emotional and Behavioral Disorder Symptoms and Personality Traits

	Behavioral disorder symptoms (1)	Emotional disorder symptoms (2)	Conscientiousness (3)	Agreeableness (4)	Neuroticism (5)
SurveyWave 1 × YoungestCohorts × AI	−0.0705	−0.168	0.157	0.119	0.104
	(0.148)	(0.170)	(0.185)	(0.222)	(0.254)
SurveyWave 2 × YoungestCohorts × AI	0.0369	0.0138	−0.0651	−0.0134	−0.236
	(0.113)	(0.136)	(0.143)	(0.167)	(0.185)
SurveyWave 3 × YoungestCohorts × AI	−0.0316	−0.0738	−0.150	0.199	−0.0912
	(0.0863)	(0.0903)	(0.111)	(0.129)	(0.125)
SurveyWave 4 × YoungestCohorts × AI	Omitted category	Omitted category	Omitted category	Omitted category	Omitted category
SurveyWave 5 × YoungestCohorts × AI	−0.144	−0.241	−0.0278	0.187	0.137
	(0.126)	(0.114)	(0.177)	(0.220)	(0.151)
SurveyWave 6 × YoungestCohorts × AI	−0.257	−0.392	0.210	0.608	0.338
	(0.143)	(0.137)	(0.168)	(0.178)	(0.206)
SurveyWave 7 × YoungestCohorts × AI	−0.408	−0.568	0.286	0.749	0.754
	(0.169)	(0.189)	(0.210)	(0.242)	(0.265)
SurveyWave 8 × YoungestCohorts × AI	−0.501	−0.655	0.292	0.993	1.097
	(0.203)	(0.238)	(0.241)	(0.276)	(0.318)
Individual fixed effects?	N	N	N	N	N
Mean of dependent variable	0	0	0	0	0
Observations	6,674	6,674	6,309	6,084	6,298
Adjusted R^2	0.026	0.028	0.050	0.070	0.049
Number of individuals	1,420	1,420	1,420	1,420	1,420

Table 3: The Effect of Casino Transfers on Children's Emotional and Behavioral Disorder Symptoms and Personality Traits

	Behavioral disorder symptoms (1)	Emotional disorder symptoms (2)	Conscientiousness (3)	Agreeableness (4)	Neuroticism (5)
Panel A					
Receipt of cash transfer	−0.233	−0.374	0.254	0.374	0.381
	(0.104)	(0.104)	(0.128)	(0.147)	(0.141)
Individual fixed effects	N	N	N	N	N
Mean of dependent variable	0	0	0	0	0
Standard deviation of dep. variable	1	1	1.221	1.390	1.454
Observations	6,674	6,674	6,309	6,084	6,298
R^2	0.025	0.027	0.049	0.068	0.046
Number of individuals	1,420	1,420	1,414	1,404	1,413
Panel B					
Receipt of cash transfer	−0.183	−0.306	0.200	0.292	0.311
	(0.0910)	(0.102)	(0.121)	(0.146)	(0.137)
Individual fixed effects	Y	Y	Y	Y	Y
Mean of dependent variable	0	0	0	0	0
Standard deviation of dep. variable	1	1	1.221	1.390	1.454
Observations	6,674	6,674	6,309	6,084	6,298
R^2	0.030	0.025	0.045	0.075	0.048
Number of individuals	1,420	1,420	1,414	1,404	1,413

Table 5: Heterogeneous Effect of Casino Transfers by Standardized Initial Conditions

	Behavioral disorder symptoms	Emotional disorder symptoms	Conscientiousness	Agreeableness	Neuroticism
	(1)	(2)	(3)	(4)	(5)
Receipt of cash transfer	−0.00430	−0.0855	−0.0459	0.133	0.156
	(0.0942)	(0.121)	(0.121)	(0.131)	(0.137)
Pre-casino behavioral disorder symptoms ever above median × receipt of cash transfer	−0.284				
	(0.0707)				
Pre-casino emotional disorder symptoms ever above median × receipt of cash transfer		−0.315			
		(0.0874)			
Pre-casino conscientiousness ever below median × receipt of cash transfer			0.513		
			(0.113)		
Pre-casino agreeableness ever below median × receipt of cash transfer				0.421	
				(0.112)	
Pre-casino neuroticism ever below median × receipt of cash transfer					0.830
					(0.203)
Pre-casino outcome variable below/above median	0.645	0.684	−1.061	−0.953	−1.163
	(0.0277)	(0.0259)	(0.0300)	(0.0350)	(0.0484)
Individual fixed effects	N	N	N	N	N
Mean of dependent variable	0.000	0.000	0.000	0.000	0.000
Observations	6,674	6,674	6,309	6,084	6,298
R^2	0.060	0.058	0.213	0.144	0.185

Appendix Table 6: Heterogeneous Effect of Casino Transfers by Standardized Initial Conditions

	Behavioral disorder symptoms	Emotional disorder symptoms	Conscientiousness	Agreeableness	Neuroticism
	(1)	(2)	(3)	(4)	(5)
Receipt of cash transfer	−0.0560	−0.0712	0.0403	0.115	0.215
	(0.0813)	(0.114)	(0.119)	(0.130)	(0.134)
Interaction of pre-casino behavioral disorder symptoms ever above median × receipt of cash transfer	−0.163				
	(0.0705)				
Interaction of pre-casino emotional disorder symptoms ever above median × receipt of cash transfer		−0.257			
		(0.0796)			
Interaction of pre-casino conscientiousness ever below median × receipt of cash transfer			0.328		
			(0.104)		
Interaction of pre-casino agreeableness ever below median × receipt of cash transfer				0.334	
				(0.123)	
Interaction of pre-casino neuroticism ever below median × receipt of cash transfer					0.417
					(0.215)
Individual fixed effects	Y	Y	Y	Y	Y
Mean of dependent variable	0.000	0.000	0.000	0.000	0.000
Observations	6,674	6,674	6,309	6,084	6,298
R^2	0.031	0.025	0.047	0.076	0.049
Number of individuals	1,420	1,420	1,414	1,404	1,413

B. Mechanisms Explaining Changes in Personality Traits and Behaviors

- In this section, we explore several channels through which the unconditional transfers may affect child outcomes
- *Parental Behaviors*.—One of the potential mechanisms affecting children's outcomes could be a change in parental behaviors and relationships

- **Figure 3** provides event study analyses for the four variables that capture parental relationships in the GSMS dataset

- We provide the corresponding regression results in **Appendix Table 7**

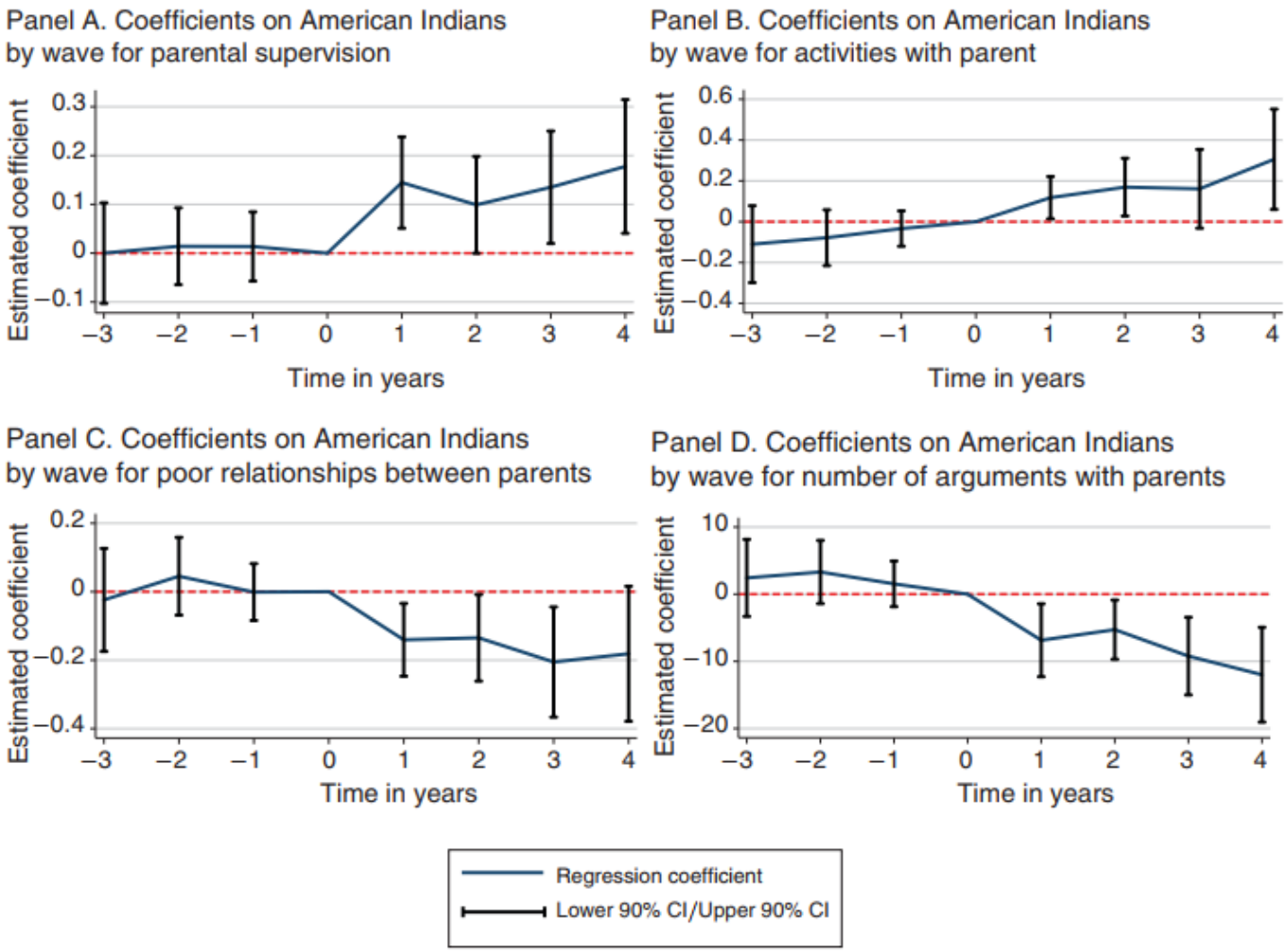
- **-** In **panel A**, we show the effect of the casino payment on the level of parental supervision of their child (as reported by the parent)

  - In **panel B**, we show a similar analysis for the effect of the casino payments on whether the child reports enjoyable activities with the parent

  - In **panel C**, we test whether the primary respondent parent reports a poor relationship with the other parent

  - Panel D shows the reporting of the number of arguments between parents and children by survey wave

Figure 3: The Effects of Casino Transfers on Parental Behaviors around the Time of Casino Opening



Appendix Table 7: Effects of Casino Payments on Parental Behaviors and Relationships

	Adequate parental supervision	Enjoyable relationship with parent	Poor relationship between parents	Arguments with parent
	(1)	(2)	(3)	(4)
Panel A				
Receipt of cash transfer	0.118	0.109	−0.160	−6.245
	(0.0440)	(0.0499)	(0.0548)	(2.397)
Individual fixed effect	N	N	N	N
Mean of dependent variable	1.942	1.885	0.319	5.635
Observations	5,334	5,906	6,101	6,477
R^2	0.018	0.018	0.024	0.014
Panel B				
Receipt of cash transfer	0.0954	0.0952	−0.148	−5.287
	(0.0453)	(0.0506)	(0.0544)	(2.318)
Individual fixed effect	Y	Y	Y	Y
Mean of dependent variable	1.942	1.885	0.319	5.635
Observations	5,334	5,906	6,101	6,477
R^2	0.015	0.011	0.036	0.011
Number of individuals	1,279	1,343	1,407	1,417

Cont.

Appendix Table 7: Effects of Casino Payments on Parental Behaviors and Relationships

	Adequate parental supervision	Enjoyable relationship with parent	Poor relationship between parents	Arguments with parent
	(1)	(2)	(3)	(4)
Panel C				
SurveyWave 1 × YoungestCohorts × AI	<0.0001	−0.110	−0.0241	2.424
	(0.0626)	(0.114)	(0.0914)	(3.487)
SurveyWave 2 × YoungestCohorts × AI	0.0141	−0.0785	0.0451	3.302
	(0.0478)	(0.0830)	(0.0690)	(2.858)
SurveyWave 3 × YoungestCohorts × AI	0.0137	−0.0335	−0.00121	1.536
	(0.0431)	(0.0526)	(0.0504)	(2.063)
SurveyWave 4 × YoungestCohorts × AI	Omitted category	Omitted category	Omitted category	Omitted category
SurveyWave 5 × YoungestCohorts × AI	0.145	0.118	−0.141	−6.860
	(0.0568)	(0.0629)	(0.0646)	(3.300)
SurveyWave 6 × YoungestCohorts × AI	0.0990	0.169	−0.135	−5.285
	(0.0603)	(0.0859)	(0.0768)	(2.679)
SurveyWave 7 × YoungestCohorts × AI	0.135	0.161	−0.206	−9.224
	(0.0700)	(0.117)	(0.0977)	(3.510)
SurveyWave 8 × YoungestCohorts × AI	0.178	0.306	−0.181	−12.00
	(0.0832)	(0.149)	(0.120)	(4.290)
Individual fixed effect	N	N	N	N
Mean of dependent variable	1.942	1.885	0.319	5.635
Observations	5,334	5,906	6,101	6,477
R^2	0.018	0.019	0.024	0.014

- We note that there is no change in parental marital status as a result of the unconditional cash transfers, as evidenced by the estimates reported in **Appendix Table 8**

- In **Appendix Table 9** we show that the results do not appear to be driven by changes in parental leisure or work activities

- *Parental Mental Health Outcomes*.—The unconditional transfers may contribute to an improvement in a parent's own mental health and a reduction in their own stress levels as found in other studies

- In **Figure 4**, we examine the evolution of parental mental health during the period of observation using an indicator of whether none, one, or both parents ever sought treatment by a mental health professional

- We provide the regression results for the receipt of the casino transfer in **Appendix Table 10**

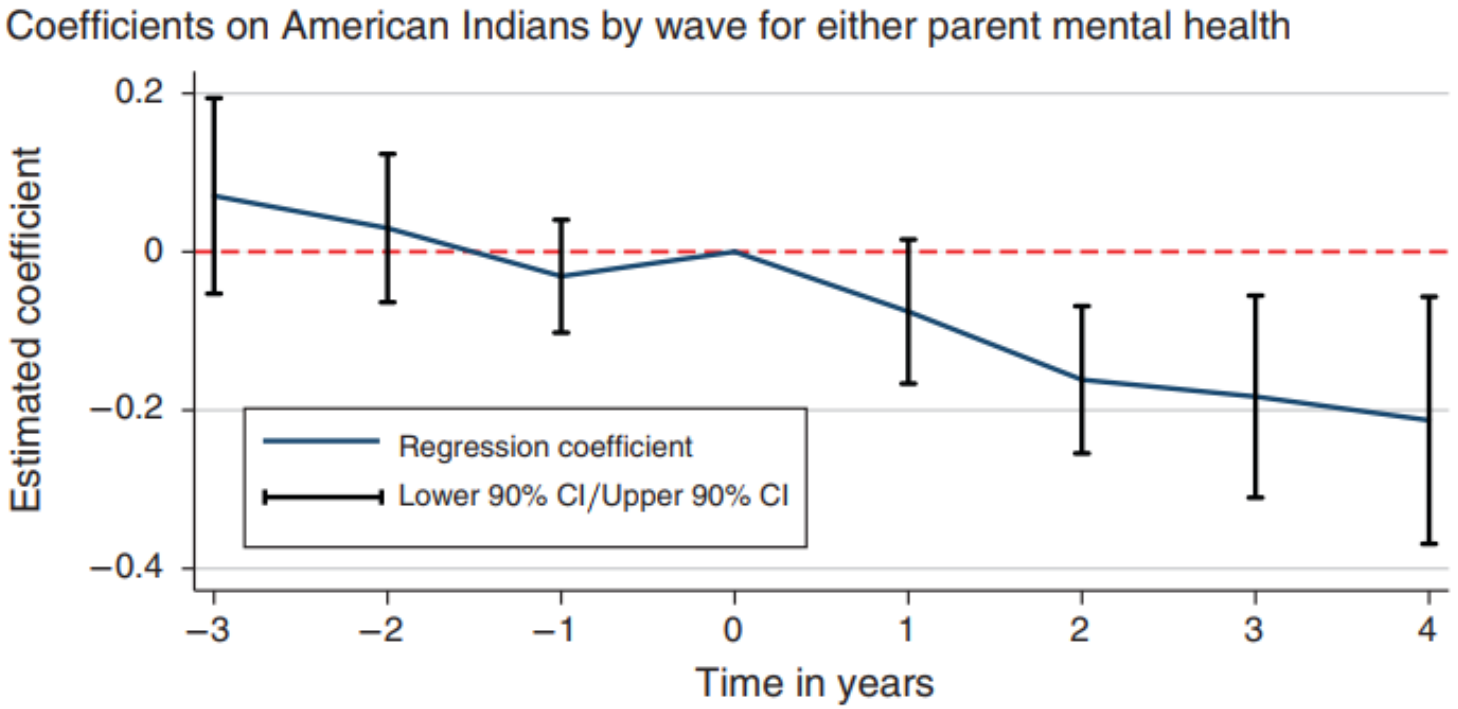
Appendix Table 8: Effects of Casino Transfers on Parental Marital Status

	Parents currently married (1)	Parents currently married (2)
Receipt of cash transfer	−0.0336	−0.00262
	(0.0261)	(0.0362)
Individual fixed effects	Y	N
Mean of dependent variable	0.457	0.457
Observations	6,443	6,443
R^2	0.050	0.046
Number of individuals	1,417	1,417

Appendix Table 9: Casino Transfers and Parental Employment

Variables	Labor force participation			Full-time			Full- or part-time		
	Mother in labor force	Father in labor force	Either in labor force	Mother full-time employed	Father full-time employed	Either parent full-time employed	Mother part-time employed	Father part-time employed	Either parent part-time employed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A									
Receipt of cash transfer	0.00405	0.0223	−0.0123	0.00405	0.0159	−0.0123	0.0175	−0.00841	0.0113
	(0.0489)	(0.0332)	(0.0384)	(0.0489)	(0.0577)	(0.0424)	(0.0487)	(0.0464)	(0.0419)
Mean of dependent variable	0.625	0.942	0.823	0.625	0.878	0.804	0.761	0.904	0.861
Observations	5,316	3,282	5,746	5,316	3,282	5,746	5,316	3,282	5,746
R^2	0.026	0.022	0.027	0.026	0.032	0.031	0.030	0.040	0.032
	On reservation only								
	Labor force participation			Full-time			Full- or part-time		
Panel B									
Receipt of cash transfer	0.157	0.127	0.0932	0.157	0.0303	0.0783	0.119	0.168	0.167
	(0.189)	(0.300)	(0.179)	(0.189)	(0.275)	(0.179)	(0.244)	(0.308)	(0.189)
Mean of dependent variable	0.642	0.922	0.782	0.642	0.787	0.747	0.734	0.819	0.807
Observations	943	475	1,000	943	475	1,000	943	475	1,000
R^2	0.085	0.056	0.064	0.085	0.067	0.068	0.093	0.069	0.073

Figure 4: The Effects of Casino Transfers on Parental Mental Health around the Time of Casino Opening



Appendix Table 10: Parental Mental Health and Casino Payments

	Ever treated by mental health professional, either parent		
	(1)	(2)	(3)
Panel A			
Receipt of cash transfer	−0.0761	−0.0559	
	(0.0458)	(0.0460)	
SurveyWave 1 × YoungestCohorts × AI			0.0705
			(0.0750)
SurveyWave 2 × YoungestCohorts × AI			0.0298
			(0.0569)
SurveyWave 3 × YoungestCohorts × AI			−0.0309
			(0.0433)
SurveyWave 4 × YoungestCohorts × AI			Omitted category
SurveyWave 5 × YoungestCohorts × AI			−0.0755
			(0.0553)
SurveyWave 6 × YoungestCohorts × AI			−0.162
			(0.0565)
SurveyWave 7 × YoungestCohorts × AI			−0.183
			(0.0775)
SurveyWave 8 × YoungestCohorts × AI			−0.213
			(0.0948)
Individual fixed effect?	N	Y	N
Mean of dependent variable	0.219	0.219	0.219
Observations	6,471	6,471	6,471
R^2	0.046	0.065	0.047
Number of individuals	1,417	1,417	1,417

6. Robustness Checks and Specification Checks

- This section presents sensitivity and robustness checks, and it explores the possibility of heterogeneous effects across predetermined characteristics
- In **Appendix Table 11** we provide the main analysis from **Table 3** by initial household poverty status
- In **Appendix Table 12** we separate out the behavioral and emotional disorder reports contained in the survey by whether they are reported by the parent alone, child alone or both combined
- In **Appendix Table 13** we explicitly test for differences in coefficients for children residing on or off the reservation
- Examining data from Walke (2000), we find that there has been a sharp reduction in federal funding for American Indians across the board since the 1980s and a slight drop in 1996 as well (see **Appendix Figure 5**)

Appendix Table 11: Transfer Effects by Initial Household Poverty Status

	Behavioral disorder symptoms	Emotional disorder symptoms	Conscientiousness	Agreeableness	Neuroticism
	(1)	(2)	(3)	(4)	(5)
Panel A. Not in poverty					
Receipt of cash transfer	−0.312	−0.218	0.276	0.355	0.164
	(0.129)	(0.132)	(0.176)	(0.204)	(0.197)
Initially in poverty	N	N	N	N	N
Mean of dependent variable	−0.0522	−0.0307	0.0733	0.0200	0.0330
Observations	3,836	3,836	3,669	3,564	3,661
R^2	0.032	0.033	0.052	0.077	0.052
Panel B. Initially in poverty					
Receipt of cash transfer	−0.171	−0.498	0.201	0.403	0.495
	(0.159)	(0.155)	(0.193)	(0.222)	(0.208)
Initially in poverty	Y	Y	Y	Y	Y
Mean of dependent variable	0.0706	0.0415	−0.102	−0.0283	−0.0458
Observations	2,838	2,838	2,640	2,520	2,637
R^2	0.040	0.036	0.067	0.077	0.052

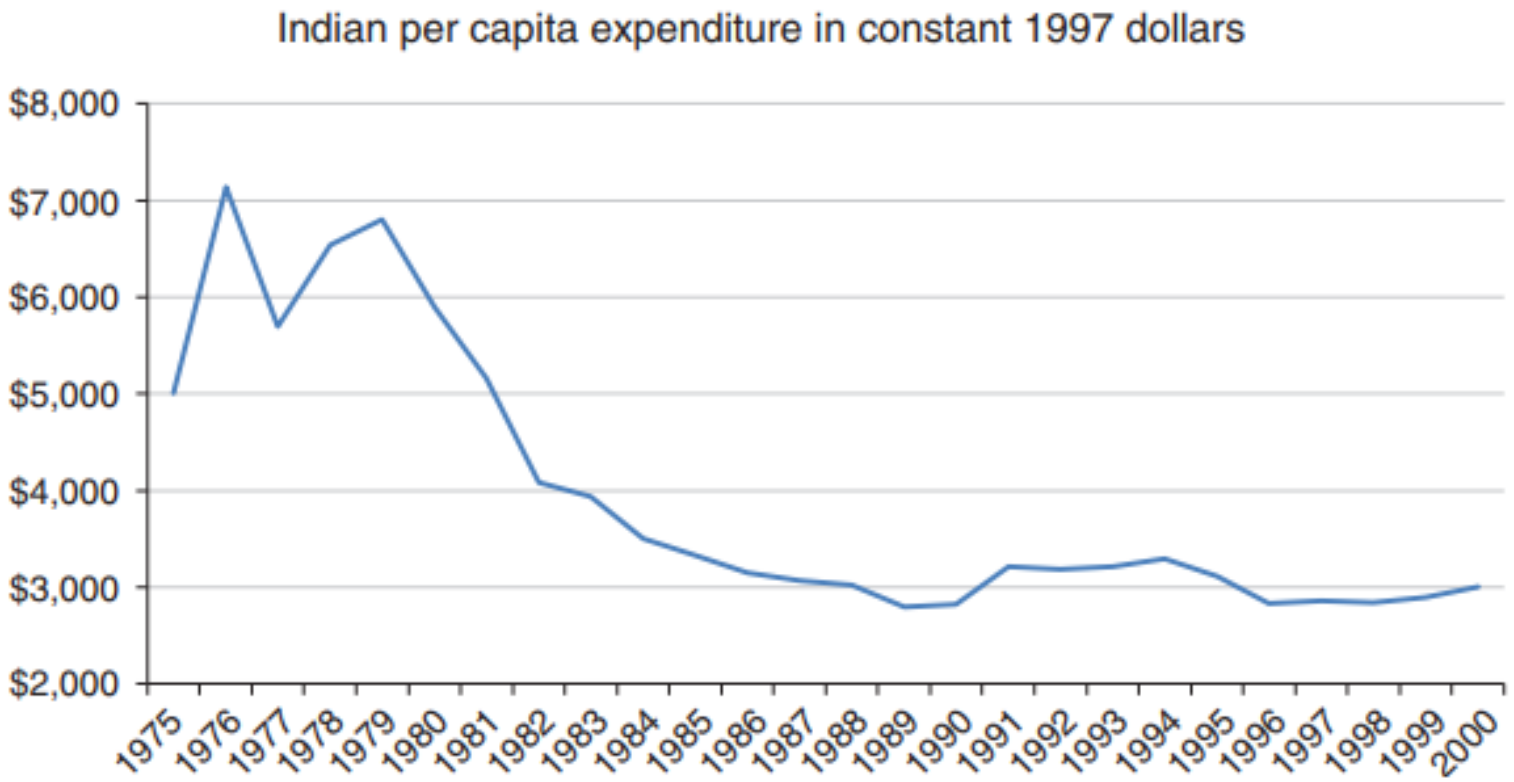
Appendix Table 12: Effects on Behavior and Emotional Disorders by Source of Reporting

	Behavioral disorder symptoms: both reports (1)	Emotional disorder symptoms: both reports (2)	Behavioral disorder symptoms: parent report alone (3)	Emotional disorder symptoms: parent report alone (4)	Behavioral disorder symptoms: child report alone (5)	Emotional disorder symptoms: child report alone (6)
Receipt of cash transfer	−0.233	−0.374	−0.234	−0.260	−0.160	−0.337
	(0.104)	(0.104)	(0.106)	(0.105)	(0.112)	(0.105)
Mean of dependent variable	0	0	0	0	0	0
Observations	6,674	6,674	6,499	6,674	6,410	6,674
R^2	0.025	0.027	0.023	0.023	0.033	0.021

Appendix Table 13: Main Regression Results Separated by On or Off Reservation Status

	Behavioral disorder symptoms		Emotional disorder symptoms		Conscientiousness		Agreeableness		Neuroticism	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Receipt of cash transfer	−0.381	−0.203	−0.199	−0.328	0.753	0.282	0.337	0.321	−0.289	0.356
	(0.397)	(0.106)	(0.268)	(0.182)	(0.444)	(0.187)	(0.511)	(0.227)	(0.288)	(0.189)
On reservation	Y	N	Y	N	Y	N	Y	N	Y	N
p-value for equality of coefficients	0.6595		0.6867		0.3201		0.9775		0.0581	
Observations	1,212	4,960	1,212	4,960	1,151	4,701	1,118	4,533	1,146	4,694
R^2	0.058	0.025	0.046	0.030	0.072	0.052	0.051	0.067	0.031	0.051

Appendix Figure 5: Bureau of Indian Affairs Expenditures Per Capita of the AI Population



7. Discussion and Conclusions

- Our main results indicate that an increase in unconditional household income reduces the prevalence of behavioral and emotional disorders and improves the personality traits of affected children

- In **Appendix Table B1**, we identify the association between the levels of age 16 disorders and personality traits and full-time employment and educational attainment of non-Indians at age 25

- In **Appendix Table B2** we decompose the differences in educational attainment and employment probabilities at age 25 across the different age cohorts in our sample by using the coefficient from the non-Indian group

- Our research adds to the literature on the effect of unconditional cash transfers to families on child personality traits and behaviors in a quasi-experimental setting

- One important caveat regarding our research is worth repeating

Appendix Table B1: Association between Long Run Outcomes (Age 25) for Non American Indians using Age 16 Levels of Disorders and Personality Traits

	Years of educational attainment (1)	Full time employed (2)
Panel A. Behavioral disorder symptoms at age 16		
	−0.475	−0.0734
	(0.0815)	(0.0165)
Panel B. Emotional disorder symptoms at age 16		
	−0.421	−0.0421
	(0.114)	(0.0189)
Panel C. Conscientiousness score at age 16		
	0.517	0.0481
	(0.0876)	(0.0169)
Panel D. Agreeableness score at age 16		
	0.263	0.0412
	(0.0753)	(0.0147)
Panel E. Neuroticism score at age 16		
	0.279	0.0504
	(0.0683)	(0.0112)

Appendix Table B2: Explaining Raw Differences in Outcomes by Changes in Age 16 Characteristics

	Education	Full-time
Net change (across cohort and AI status) at age 25	0.487	0.224
Panel A		
Change in conscientiousness for age cohort 1 (age 16 – age 12)	0.260	0.260
Coefficient on conscientiousness from non AI	0.517	0.048
Total effect of change:	0.134	0.013
Percent of observed difference explained by increase in conscientiousness	**0.276**	**0.056**
Panel B		
Change in emotional for age cohort 1 (age 16 – age 12)	−0.238	−0.238
Coefficient on emotional from non AI	−0.421	−0.042
Total effect of change:	0.100	0.010
Percent of observed difference explained by reduction in emotional	**0.206**	**0.045**