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Determinants of child labor in the modern United States: Evidence from agricultural workers and their children and concerns for ongoing public policy

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Abstract

Current legislative proposals consider amendments to child labor laws for U.S. agriculture. Similar amendments, however, have been unsuccessful previously. Using the National Agricultural Workers Survey, we show that child labor is still substantial in the modern U.S. despite some decreases over time, and argue that the lack of success of recent child labor policy initiatives has left some young workers vulnerable. We use the limited data that are available to examine determinants of farm and off-farm child labor in the U.S. and to consider correlations between child labor and participation in educational and welfare programs at the family level. As a majority of literature on child labor stems from international contexts, this research lessens that gap by presenting the U.S. case from the perspective of a key industry sector while informing ongoing discussion pertaining to possible revisions of child labor laws and providing support for continued and expanded data collection.

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1. Introduction

On October 17, 2013, the first day of business following the government shutdown, President Barack Obama in his remarks from the White House stated as part of his agenda that "we should pass a farm bill, one that American farmers and ranchers can depend on; one that protects vulnerable children and adults in times of need; one that gives rural communities opportunities to grow and the long-term certainty that they deserve." The theme of "vulnerable children and adults" in U.S. agriculture is not new. Instead, policy discussions regarding protection for agriculture are plentiful including those pertaining to the persistence of child labor.

In the United States, the Fair Labor Standards Act of 1938 (FLSA) and its amendments in 1966 discourage several forms of child labor (e.g., during school hours, in dangerous occupations) by restricting the age and hours of working children. Children of U.S. farmworkers, however, often accompany their parents to the field at very young ages and sometimes join the workforce as youth. The FLSA provides different rules for farm and off-farm jobs, and enforcement of employer sanctions in some industries such as agriculture is lax. For instance, the attached Hazardous Occupations Orders restrict children under age 18 in nonagricultural jobs, but only under age 16 in agricultural jobs, from performing hazardous work. Under current law, there are *no* age or hour restrictions for children on small (less than 11 employees) farms with parental permission outside of school hours. Children from 12-13 years can work on any size farm with parental permission. Those aged 14-15 do not need parental consent to work in the fields though constraints on hazardous work still apply. Finally, after age 16, youth laborers are unrestricted, even in hazardous agricultural occupations. Furthermore, children of all ages working on a farm owned by their family are exempt from restrictions altogether (U.S. Department of Labor). Legislation for child agricultural laborers therefore lags behind that of other industries and may relate to "traditional, shared ideas about the benefits of farm life and farm work for children" (Effland 2005). Concerns for child agricultural workers remain today including those related to occupational safety and to interference with education.

As recent as June 2013, legislation on amending child labor laws in agriculture has been proposed. The Children's Act of Responsible Employment (CARE Act of 2013) would raise the FLSA's minimum age in agriculture to 14 and minimum age for hazardous jobs to 18 and would assess new penalties for violations (*Rural Migration News* July 2013). Similar amendments also have been unsuccessful. Neither the April 2012 legislation from the Department of Labor, that would have restricted hazardous jobs, nor the 2009 version of the CARE Act, which would have amended the FLSA to apply the same hour and age restrictions for agricultural and nonagricultural child workers and increase employer penalties, reached a vote in Congress (Human Rights Watch (HRW) 2010; Keen 2012; Wood 2012). This is despite neither bill addressing the family farm exemption. According to *The New York Times*, "The new rules would have restricted having young workers handle pesticide, operate heavy machinery, cut timber and perform other agricultural tasks identified as hazardous to children" and were "intended to protect poor migrant child workers who do seasonal farm work for 'Big Agriculture'" (Wood 2012).

The goal of this research is to use the limited data that are available to examine determinants of farm and off-farm child labor in the U.S. and to consider relationships between child labor and propensities for families to participate in educational and welfare programs. HRW (2010) estimates that there are 300,000 to 400,000 children on U.S. farms as wage earners. The Department of Labor (2007, 2010) reports that approximately 160,000 children suffer occupational injuries annually, approximately a third of which result in emergency room

treatment, and the Centers for Disease Control's National Institute for Occupational Safety and Health (NIOSH) classifies agriculture specifically as the most dangerous industry for young workers (CDC 2003). Hansen and Donahoe (2003) further note that occupational hazards, migrancy, poverty, sub-standard living conditions, and language and cultural barriers lead to increased health risks. Children under these conditions may be even more vulnerable.

With comparably lax regulation and the difficulty of enforcement, child farm laborers start working at younger ages, for longer hours, and in more hazardous conditions than young workers in other occupations. Much research has been conducted on the health risks of both the general farmworker population (Murphy-Greene 2002; Hanson and Donahoe 2003) and child farmworkers (Fassa et al. 2000; Cooper et al. 2005; Gamlin and Hesketh 2007; Marlenga et al. 2007; HRW 2010), some by NGOs or in the medical literature (see Gamlin and Hesketh 2007 for an extensive list). These studies highlight child farmworkers' exposure to hazards from heavy machinery, tools, animals and weather, and their increased risk of pesticide intoxication, poisoning, and musculoskeletal issues from strenuous labor. Marlenga et al. (2007) provide estimates of reduced injury with stronger labor legislation, further supporting amendments.

In addition to the many health issues involved with agricultural work at a young age, child labor may be a substitute for regular schooling. Though some child workers may try to balance both school and work, many child farmworkers repeat years and miss class. The resultant median highest grade completed by U.S. child farmworkers is the 8^{th} (HRW 2010). Thus, child workers may be disadvantaged in building education-based human capital due to early participation in the workforce (Psacharopoulos 1997) which results in forgone earnings over the lifecycle (Emerson and Souza 2002). In related work, Baland and Robinson (2000) present a model where child labor has negative externalities that are not internalized and lead to inefficiencies in the presence of a tradeoff between child labor and education. This crowding out of education has been demonstrated empirically. Psacharopoulos (1997), for example, in an application for Bolivia and Venezuela, finds that child workers receive on average two fewer years of education all else equal. Similar patterns are documented in Ray (2000) for Pakistan.

More broadly, economic literature on child labor is vast though primarily pertaining to international contexts (e.g., Basu and Van 1998; Patrinos and Psacharopoulos 1997; Psacharopoulos 1997; Neilson and Jensen 1999; Baland and Robinson 2000; Ray 2000; Emerson and Souza 2003; Basu and Chau 2004; Levy 2005; Genicot 2005; Wahba 2006; DOL 2011). This literature covers child labor's relationship to living standards, credit markets, education, social norms, family characteristics, and fertility decisions in developing countries (for extensive reviews, see Basu and Tzannatos 2003 and Edmonds and Pavcnik 2005).

Lesser academic attention has been paid to the economics of child agricultural laborers in the U.S. Nonetheless, poverty in U.S. agricultural workers is double and school dropout rates almost triple that of the general population (HRW 2010). It can be argued therefore that the U.S. farmworker context is perhaps not too unlike that of the developing world. Thus, the literature, while drawn from different contexts, still lends both an empirical and theoretical basis for our study. Indeed, Fassa et al. (2000) confirm "very poor people, especially ethnic minorities and migrants, can face child labor conditions similar to those in developing countries" (p. 57).

Isolating dynamics of links between economic well-being and child labor in and outside of agriculture is helpful toward understanding possible channels of intergenerational transmissions of poverty and is important for strategic planning of public policy investments in education such as in the Head Start, Migrant Head Start, and adult continuing education programs and in cash and non-cash transfer programs in the U.S. We therefore contribute to the

literature by extension to the lesser recognized yet continuing case of child labor, which is immediately relevant to ongoing policy discussion pertaining to possible revisions to U.S. child labor laws. Evidence from a sample survey reveals decreases in U.S. child agricultural labor over time. Still, we show that child labor continues to be substantial, and that recent child labor policy decisions have left young workers vulnerable. We conclude by arguing that available data are insufficient, given their sample size and scope, for building fundamental understanding of child worker dynamics and that investment in supplements to existing data is warranted.

2. Evidence of Modern Day Child Labor

Primary data come from the U.S. Department of Labor's National Agricultural Workers Survey (NAWS). The NAWS is nationally, regionally, and annually representative of employed U.S. farmworkers.[1] Survey respondents have been sampled from work sites in three seasons per year since 1989. The data are cross-sectional and are pooled for analysis with sampling weights. The NAWS provides an opportunity to research child labor in the U.S. as it includes the most detailed information available on U.S. agricultural workers, their households, and the farm and nonfarm work activities of household members including children.

Of the 52,479 workers represented in the 1989-2009 sample, more than 72 percent are foreign born (of the weighted sample) and almost 59 percent of immigrant workers confirm being of illegal work status. Approximately 76 percent of workers report at least one child in their current household within the U.S. Approximately five percent report household children doing U.S. farmwork, and another two percent report household children doing other U.S. jobs. Despite low percentages, these numbers translate to thousands of children at the population level.

We compare means of demographic and work-related characteristics of farmworker respondents across categories defined by whether or not a worker reports having at least one child who is a laborer, and report *p*-values for differences in Table I. We restrict to respondents reporting at least one child in the U.S. We further divide reports of child laborers into categories based on whether the child was working on a farm or in off-farm employment in Table II.

Respondents indicating that they have at least one child who is working, are more likely to be female than those responding that they do not have child laborer children (46 percent in comparison to 37 percent). The child labor respondent group also tends to be older and to have more years of U.S. farm experience and tenure with their current employer (but fewer years of formal education) than those in the no child labor subsample. Further analysis of work-related characteristics reveals that those reporting no child labor have higher rates of being skilled workers and of working in fruit and nut crops, and lower rates of following the crop as a migrant.

A distinctive feature of the NAWS is that it includes detailed information on legal status from direct survey questions.[2] From this, we observe that unauthorized immigrant status is much less prevalent (21 percent compared to 33 percent) in the child labor category. The opposite is true for citizen workers, those with work authorization, and those who are U.S. born. California sees less prevalent child labor than other regions and the Midwest sees more.

[1] The NAWS is regionally representative for 12 agricultural regions by its sampling design. The public use dataset collapses geographic identifiers into six regions for confidentiality reasons.
[2] Respondents are given a pledge of confidentiality, and only approximately one percent of the overall sample declines to answer these questions.

Table I. Characteristics of Farm Worker Respondents, by Child Labor Reporting Categories

	No Child Labor		Child Labor		
	Mean	S.D.	Mean	S.D.	P-value
Continuous Variables:					
Age	34.86	8.82	43.38	7.03	0.00
Education (Years)	7.43	3.62	6.27	3.91	0.00
Farm Experience (Years)	12.05	8.2	15.16	9.64	0.00
Number of Kids (< 6) in Household	0.85	0.83	0.22	0.5	0.00
Number of Kids (6-13) in Household	0.99	1	1.04	1.01	0.26
Number of Kids (14-17) in Household	0.35	0.61	1	0.73	0.00
Tenure(Years)	5.64	5.46	6.54	6.43	0.01
Family Income Per Person (1000)	6.44	3.88	6.14	4.05	0.15
Binary Variables:					
Gender (Female=1)	0.37	0.48	0.46	0.5	0.00
Hispanic	0.86	0.34	0.83	0.37	0.10
Born in U.S.	0.18	0.39	0.22	0.41	0.09
Citizen	0.24	0.43	0.31	0.46	0.00
Green Card/Work Authorization	0.43	0.5	0.48	0.5	0.08
Unauthorized Worker	0.33	0.47	0.21	0.41	0.00
Speak English	0.34	0.47	0.32	0.47	0.50
Skilled Worker	0.26	0.44	0.21	0.41	0.01
Employed by Farm Labor Contractor	0.16	0.37	0.16	0.37	0.97
Field Crop	0.14	0.34	0.12	0.33	0.26
Fruits and Nuts	0.38	0.48	0.31	0.46	0.00
Horticulture	0.16	0.37	0.2	0.4	0.20
Vegetable	0.26	0.44	0.29	0.45	0.24
Other Crops	0.06	0.24	0.08	0.27	0.22
California	0.40	0.49	0.31	0.46	0.00
East	0.09	0.28	0.08	0.27	0.66
Southeast	0.09	0.28	0.13	0.33	0.20
Midwest	0.17	0.38	0.24	0.43	0.00
Southwest	0.1	0.29	0.1	0.29	0.98
Northwest	0.16	0.36	0.15	0.35	0.49
Spouse in Household	0.89	0.31	0.83	0.38	0.00
Follow the Crop	0.06	0.24	0.1	0.3	0.00
Have or Buying U.S. Land	0.04	0.2	0.11	0.31	0.00
Have or Buying U.S. House	0.29	0.45	0.48	0.5	0.00
Have or Buying U.S. Mobile Home/Car/Truck	0.79	0.41	0.81	0.39	0.19
Have or Buying U.S. Business	0.01	0.08	0.01	0.1	0.49
Observations	10,470		1,178		

Notes: The last column presents *p*-values of *t*-tests of equal means across the two categories.

Table II. Characteristics of Farm Worker Respondents, by Type of Child Labor Reported

	Farm Child Labor		Off-Farm Child Labor		
	Mean	S.D.	Mean	S.D.	P-value
Continuous Variables:					
Age	43.25	7.37	43.71	6.54	0.41
Education (Years)	5.57	3.6	6.65	4.14	0.02
Farm Experience (Years)	13.53	9.57	16.28	9.68	0.03
Number of Kids (< 6) in Household	0.27	0.54	0.15	0.41	0.01
Number of Kids (6-13) in Household	1.07	1.06	0.99	0.9	0.34
Number of Kids (14-17) in Household	1.03	0.74	0.93	0.75	0.34
Tenure (Years)	5.3	5.73	7.46	6.9	0.00
Family Income Per Person (1000)	5.12	3.63	7.14	4.11	0.00
Binary Variables:					
Gender (Female=1)	0.5	0.5	0.44	0.5	0.36
Hispanic	0.89	0.31	0.77	0.42	0.00
Born in U.S.	0.17	0.38	0.25	0.44	0.04
Citizen	0.24	0.43	0.35	0.48	0.01
Green Card/Work Authorization	0.49	0.5	0.52	0.5	0.70
Unauthorized Worker	0.27	0.44	0.13	0.34	0.00
Speak English	0.23	0.42	0.4	0.49	0.00
Skilled Worker	0.17	0.38	0.24	0.43	0.08
Employed by Farm Labor Contractor	0.18	0.38	0.14	0.34	0.22
Field Crop	0.12	0.32	0.11	0.32	0.93
Fruits and Nuts	0.34	0.47	0.28	0.45	0.17
Horticulture	0.16	0.36	0.3	0.46	0.05
Vegetable	0.33	0.47	0.23	0.42	0.02
Other Crops	0.06	0.24	0.09	0.28	0.25
California	0.23	0.42	0.37	0.48	0.00
East	0.06	0.24	0.09	0.29	0.29
Southeast	0.14	0.34	0.17	0.37	0.66
Midwest	0.3	0.46	0.16	0.37	0.00
Southwest	0.1	0.3	0.09	0.29	0.70
Northwest	0.18	0.38	0.12	0.32	0.06
Spouse in Household	0.81	0.39	0.86	0.35	0.19
Follow the Crop	0.16	0.37	0.04	0.2	0.00
Have or Buying U.S. Land	0.13	0.33	0.08	0.27	0.07
Have or Buying U.S. House	0.45	0.5	0.54	0.5	0.11
Have or Buying U.S. Mobile Home/Car/Truck	0.79	0.41	0.84	0.37	0.14
Have or Buying U.S. Business	0	0.03	0.02	0.13	0.06
Observations	598		647		

Notes: The last column presents *p*-values of *t*-tests of equal means across the two categories. There are 67 workers who have both on-farm and off-farm working children.

Those with no child laborers have higher rates of having a spouse present in the household and report larger numbers of small (less than six years old) children. The opposite is true for children 14 to 17. Purchases and intent to purchase U.S. housing or land is more prevalent in the child labor category than in the no child labor category suggesting that child labor may help sustain costly investment in household permanence in the U.S. Reported family income adjusted for a per person basis is higher for the no child labor category, though economic magnitude is similar (and the *p*-value for a difference in means test is 0.15).

Additional patterns can be drawn from the distinction between child farm labor and child off-farm labor in Table II. Most notably, the subsample of survey respondents indicating child farm labor are more likely to be Hispanic, unauthorized, working in vegetable crops, working in the Midwest or northwest, and to be following the crop as migrants than are those reporting child off-farm laborers in their families. The number of reported children less than six years old also is higher for the households in the child farm labor category, as is the ownership indicator for U.S. land. Household income per capita, on the other hand, is significantly lower for the households in the child farm labor category than for those reporting off-farm child labor. Respondents citing child off-farm labor are more likely to be citizen, U.S. born, English speakers, skilled, in California, in horticulture, and with higher levels of education, farm experience, and tenure with current employers than those with farm laborer children.

3. Determinants of Agricultural and Nonagricultural Child Labor

Much of the formal analysis frames the choice of child labor in a household optimization problem (Schultz 1960; Basu 1999; Basu and Van 1998). Likewise, empirical analyses tend to examine child, household, and community characteristics that determine a child's labor and education outcomes. The results of this empirical literature include evidence of the expected negative relationship of child labor to income but also, of associations to land or business ownership (Edmonds and Turk 2002; Bhalotra and Heady 2003). Empirical results also suggest that family characteristics play a large role and child labor can result in a dynastic trap and forgone earnings (Patrinos and Psacharopoulos 1997; Mordoch 2000; Emerson and Souza 2002, 2003). We use these insights to motivate our empirical models.

We model the determinants of child labor as logit multivariate regressions of the form:

$$log(Pchild\_worker_i/(1 - Pchild\_worker_i)) = X_i\beta + Z_i\gamma$$

where $Pchild\_worker_i$ is the probability of having at least one child laborer (under age 18) in the U.S. for worker i. The vector X_i includes nativity, legal status, family structure, English language ability, property ownership, family income per person, and other demographic and work-related characteristics such as gender, age, ethnicity, education, experience, tenure, skill level, crop, and task. The vector Z_i includes region indicators and region-specific time trends.

Marginal effects for the determinants of child work overall (inclusive of both on- and off-farm work) are presented in Table III. Being female is associated with a roughly two to four percentage point higher rate of child labor within the sample.[3] Evaluated at the means, a ten year increase in age is associated with a three to seven percent higher probability of child labor. We find negative coefficients for parental education that are statistically significant at conventional levels in our specifications that incorporate controls for ownership and income.[4] Many of the

[3] Bhalotra and Heady (2003) find that the marginal effect of a female household head is 0.39 for boys and 0.22 for girls in Pakistan in a Tobit model though household head's gender is not statistically related to child participation on the household farm in a similar regression for Ghana. Due to differing contexts, we do not view the magnitudes of our results as directly comparable to these, though the positive effects of female gender that we observe may be indication of some similar underlying mechanisms.

[4] Patrinos and Psacharopoulos (1997) find that an additional year of father's schooling in Peru is associated with a 0.37 percentage point decline in the probability that a child is employed (significant at 10 percent). Magnitude for the U.S. case is lower, though context is notably different.

regional categories are significant in the positive direction over the base category of California as a NAWS agricultural region. These results are generally robust across specifications adding additional explanatory variables.[5] We find that family structure matters in that the number of older children in a household is positively related to instances of child labor, and the number of younger children is negatively related. Patrinos and Psacharopoulos (1997) find that total family size is a positive determinant of child labor for Peru, a finding similar to that in literature on sibling complementarity and its prevalence in "moderately" poor households (Mordoch 2000; Emerson and Souza 2002). The magnitude of this pattern for the U.S. case, as evidenced by the suite of family composition variables which we enter, is small. The muted effect is suggestive of a relationship to availability and generosity differences of educational and welfare programs in the U.S. relative to elsewhere in the world, an idea which we return to in our conclusions.

In contrast, we find that having a spouse in the household is associated with a decline in the probability that a respondent has a child who is working though the relationship is not statistically significant. The negative coefficients, however, can be viewed as generally consistent with Basu and Van (1998)'s description of parent-child labor substitutability. DeGraff and Billsborrow (1993) further argue that single parent, especially single-mother, households are more likely to substitute income with child labor due to reduced labor time.

Finally, having or buying U.S. land or a house is associated with a two to four percent increase in the probability of household children working. The positive relationship with holding U.S. assets corresponds to Bhalorta and Heady's (2003) wealth paradox in which landholdings increase child labor. Additionally, this relationship could be a reflection of the omission of family farms from labor regulation. Overall, the results point to intergenerational dynamics in which vulnerable parental employment (and thus, vulnerable household income) leads to a higher propensity to have a child worker.

The determinants of child farm work versus off-farm work are contrasted in Table IV where the base category is set to include only those with no child laborers (i.e. those reporting only children in off-farm work are dropped from the analysis in the child farm work model (column (1)) and those reporting children in farm work are likewise dropped in the child off-farm work model (column (2)). The specifications in Table IV include the full suite of explanatory variables as in column (5) of Table III.

Basic demographic determinants of child farm versus off-farm labor are similar. Particularly, strong positive associations between propensities to have children who work and female gender and age are evident across both specifications. Other characteristics, however, reveal different patterns. Being Hispanic is positively associated only with the presence of child labor in farm settings. English language speaking ability is negatively associated with child labor on farms, possibly indicating substitution to school or off-farm employment when language is not a barrier. Parental education and skill-level also reveal negative correlations with child labor on farms. In contrast, following the crop is positively associated with child farm labor, consistent with difficulties keeping children in school when the family is mobile (Romanowski 2003; HRW 2010). For horticulture, where adult-only employment may be more likely, we find a positive relationship with child off-farm work.

[5] Results are robust to incorporating year fixed effects (and a single time trend variable) instead of the reported regional time trends.

Table III. Marginal Effects of Logit Model (Dependent Variable: Indicator of Child Labor)

	(1)	(2)	(3)	(4)	(5)
Gender (Female=1)	0.042**	0.020**	0.021**	0.017*	0.018*
	(5.927)	(2.803)	(2.869)	(2.247)	(2.453)
Age	0.007**	0.004**	0.004**	0.003**	0.003**
	(26.994)	(16.969)	(16.946)	(17.262)	(17.063)
Hispanic	0.007	0.011	0.010	0.012	0.010
	(0.518)	(1.138)	(1.046)	(1.346)	(1.052)
Born in U.S.	-0.002	0.003	0.003	0.004	0.004
	(-0.082)	(0.179)	(0.175)	(0.252)	(0.244)
Green Card/Work Authorization	-0.029*	-0.018	-0.018	-0.015	-0.017
	(-2.495)	(-1.706)	(-1.783)	(-1.625)	(-1.781)
Unauthorized Worker	-0.028	-0.010	-0.010	-0.005	-0.007
	(-1.915)	(-0.636)	(-0.641)	(-0.286)	(-0.427)
Education (Years)	-0.002	-0.002	-0.002	-0.002*	-0.002*
	(-1.951)	(-1.934)	(-1.914)	(-2.406)	(-2.153)
Speak English	-0.013	-0.005	-0.004	-0.005	-0.004
	(-0.913)	(-0.414)	(-0.406)	(-0.528)	(-0.408)
Farm Experience (Years)	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.321)	(-0.362)	(-0.326)	(-0.446)	(-0.455)
Skilled Worker	-0.011	-0.008	-0.007	-0.007	-0.007
	(-1.597)	(-1.370)	(-1.299)	(-1.447)	(-1.442)
Employed by Farm Labor Contractor	0.020	0.013	0.012	0.011	0.010
	(1.475)	(1.158)	(1.171)	(1.099)	(1.006)
Fruits and Nuts	-0.002	0.001	-0.001	-0.001	-0.002
	(-0.142)	(0.128)	(-0.084)	(-0.162)	(-0.257)
Horticulture	0.014	0.013	0.013	0.013	0.014
	(0.965)	(1.125)	(1.088)	(1.256)	(1.281)
Vegetable	0.002	0.004	0.002	0.001	0.000
	(0.129)	(0.300)	(0.121)	(0.050)	(0.005)
Other Crops	0.027	0.031	0.030	0.025	0.026
	(1.336)	(1.439)	(1.452)	(1.305)	(1.402)
East	0.034	0.024	0.020	0.028	0.024
	(1.687)	(1.637)	(1.427)	(1.924)	(1.714)
Southeast	0.088**	0.111**	0.102**	0.098**	0.094**
	(8.057)	(10.469)	(6.804)	(5.906)	(5.637)
Midwest	0.079**	0.055**	0.048**	0.038**	0.036**
	(5.720)	(5.094)	(3.974)	(3.064)	(2.972)
Southwest	0.017**	-0.000	-0.005	-0.012**	-0.015**
	(3.333)	(-0.092)	(-1.169)	(-3.200)	(-3.835)
Northwest	0.085**	0.073**	0.069**	0.063**	0.063**
	(6.629)	(7.327)	(7.039)	(6.176)	(6.057)
Number of Kids (< 6) in Household		-0.033**	-0.034**	-0.032**	-0.035**
		(-5.668)	(-5.634)	(-5.919)	(-6.444)
Number of Kids (6-13) in Household		0.002	0.002	0.002	-0.000
		(0.927)	(0.895)	(0.868)	(-0.103)
Number of Kids (14-17) in Household		0.036**	0.036**	0.035**	0.033**
		(7.418)	(7.347)	(7.293)	(7.247)
Spouse in Household		-0.015	-0.015	-0.023	-0.019
		(-1.052)	(-1.059)	(-1.912)	(-1.609)

Tenure (Years)			-0.000	-0.000	-0.000
			(-0.105)	(-0.219)	(-0.021)
Follow the Crop			0.023*	0.022*	0.021*
			(2.533)	(2.523)	(2.262)
Have or Buying U.S. Land				0.039*	0.039**
				(2.529)	(2.586)
Have or Buying U.S. House				0.019**	0.021**
				(3.385)	(3.597)
Have or Buying U.S. Mobile Home/Car/Truck				0.007	0.010
				(0.866)	(1.232)
Have or Buying U.S. Business				0.001	0.006
				(0.021)	(0.102)
Family Income Per Person (1000)					-0.002**
					(-6.058)
Time Trend East	-0.004**	-0.004**	-0.003**	-0.004**	-0.003**
	(-13.577)	(-20.253)	(-16.301)	(-15.650)	(-15.938)
Time Trend Southeast	-0.005**	-0.006**	-0.006**	-0.006**	-0.005**
	(-9.785)	(-9.121)	(-9.250)	(-11.129)	(-11.219)
Time Trend Midwest	-0.006**	-0.004**	-0.004**	-0.004**	-0.004**
	(-10.313)	(-8.578)	(-7.154)	(-8.352)	(-8.433)
Time Trend Southwest	-0.005**	-0.004**	-0.003**	-0.003**	-0.003**
	(-9.206)	(-8.195)	(-5.518)	(-5.943)	(-5.924)
Time Trend Northwest	-0.008**	-0.007**	-0.007**	-0.006**	-0.006**
	(-39.695)	(-21.697)	(-12.410)	(-14.143)	(-14.200)
Time Trend California	-0.004**	-0.003**	-0.003**	-0.003**	-0.003**
	(-10.690)	(-11.028)	(-7.899)	(-9.024)	(-8.950)
Observations	11,648	11,648	11,648	11,648	11,648

Notes: Robust z-statistics are in parentheses. Standard errors are clustered at regional level. Asterisks (** and *) indicate the 1% and 5% statistical significance level, respectively.

Table IV. Marginal Effects of Logit Model (Dependent Variable: Indicator of Farm Child Labor and Off-farm Child Labor)

	(1)	(2)
	Farm Child Labor	Off-farm Child Labor
Gender (Female=1)	0.011*	0.007*
	(2.229)	(2.449)
Age	0.001**	0.001**
	(10.421)	(11.142)
Hispanic	0.007*	-0.003
	(2.171)	(-0.253)
Born in U.S.	0.008	-0.003
	(1.349)	(-0.421)
Green Card/Work Authorization	-0.006	-0.005
	(-1.681)	(-0.713)
Unauthorized Worker	-0.001	-0.008
	(-0.113)	(-0.830)
Education (Years)	-0.001**	-0.001
	(-2.691)	(-1.264)
Speak English	-0.009**	0.007
	(-3.020)	(1.284)
Farm Experience (Years)	-0.000	-0.000
	(-0.718)	(-0.264)
Skilled Worker	-0.005*	-0.001
	(-1.971)	(-0.444)
Employed by Farm Labor Contractor	0.006	0.002**
	(0.930)	(2.583)
Fruits and Nuts	0.001	-0.003
	(0.288)	(-0.545)
Horticulture	-0.001	0.020**
	(-0.319)	(5.929)
Vegetable	-0.003	0.001
	(-0.880)	(0.137)
Other Crops	-0.002	0.024
	(-0.274)	(1.719)
East	0.044*	-0.012**
	(2.243)	(-3.554)
Southeast	0.040**	0.054**
	(3.862)	(6.071)
Midwest	0.025**	-0.006
	(3.446)	(-1.480)
Southwest	-0.005	-0.005
	(-1.850)	(-1.857)
Northwest	0.037**	0.015**
	(5.960)	(4.268)
Number of Kids (< 6) in Household	-0.012**	-0.023**
	(-3.800)	(-14.917)
Number of Kids (6-13) in Household	-0.000	-0.002*
	(-0.041)	(-2.433)
Number of Kids (14-17) in Household	0.015**	0.011**

	(4.903)	(3.602)
Spouse in Household	-0.007*	-0.001
	(-2.225)	(-0.223)
Tenure (Years)	-0.000	0.000
	(-0.719)	(0.278)
Follow the Crop	0.017**	-0.005
	(2.657)	(-0.803)
Have or Buying U.S. Land	0.021**	0.009
	(3.017)	(1.484)
Have or Buying U.S. House	0.009**	0.011**
	(3.499)	(2.747)
Have or Buying U.S. Mobile Home/Car/Truck	0.006	0.004
	(0.828)	(1.357)
Have or Buying U.S. Business	-0.016**	0.018
	(-3.131)	(0.464)
Family Income Per Person (1000)	-0.001**	-0.001**
	(-4.201)	(-3.899)
Time Trend East	-0.005**	0.001**
	(-24.573)	(2.797)
Time Trend Southeast	-0.002**	-0.002**
	(-7.883)	(-6.460)
Time Trend Midwest	-0.002**	-0.001**
	(-5.864)	(-3.564)
Time Trend Southwest	-0.002**	-0.001**
	(-9.630)	(-5.440)
Time Trend Northwest	-0.003**	-0.002**
	(-9.489)	(-8.962)
Time Trend California	-0.002**	-0.000
	(-11.922)	(-1.732)
Observations	11,068	11,117

Notes: Robust z-statistics are in parentheses. Standard errors are clustered at regional level. Asterisks (** and *) indicate the 1% and 5% statistical significance level, respectively. The base group includes the workers whose children are not involved in child labor.

Family structure variables are again significant predictors of both child farm and off-farm labor. Having young children in a household is associated with lower probabilities that a family has children working but higher probabilities are associated with older children. The presence of a resident spouse has a statistically significant negative correlation with child farm labor but not off-farm labor. Together, these results again suggest sibling complementarity (Mordoch 2000; Emerson and Souza 2002) and that parents who share responsibilities may be more likely to support education over farm work (Degraff and Bilsborrow 1993; Edmonds and Pavcnik 2005).

4. Trends in U.S. Child Labor

As illustrated in Figure 1, child labor in the U.S. is decreasing across years though remains positive. This is also evidenced by the negative regional time trend coefficients in the logit specifications, and is consistent with Basu (1999) who shows that child labor (as a percentage of economically active labor) is decreasing over time for several country aggregates, the highest rate of decrease occurring for Asia which may be related to fertility changes (Hazan and Berdugo

2002; Taylor 2012). Figure 1, however, is striking in that it reveals a pattern of relatively flat child off-farm labor rates alongside decreasing child farm labor rates.

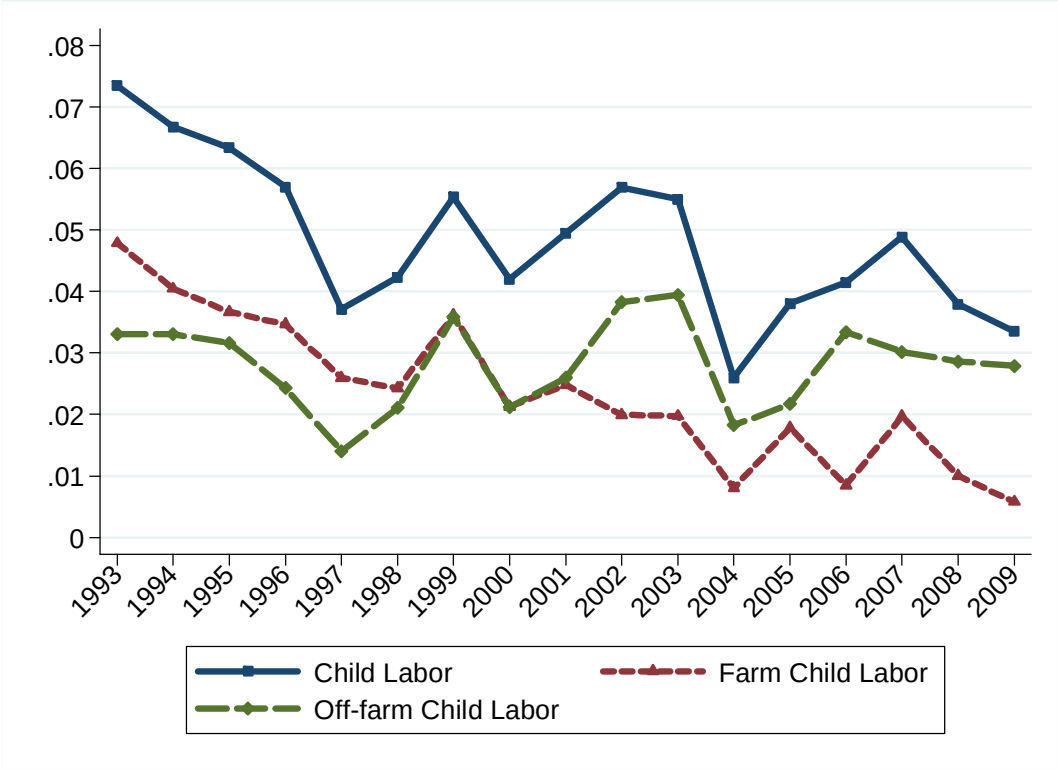

Figure 1. Weighted Proportion of Farm Worker Families with Child Labor

One possibility is that the decreasing trend in child workers is related to the dynamic of substitutions of child for adult labor discussed above. The NAWS data provide the ability to examine, at a descriptive level, whether or not this decreasing trend in child labor was accompanied by an increase in adult labor hours. To examine this hypothesis, we present the weighted average weekly working hours of families reporting child labor in Figure 2. The figure is suggestive of a moderately increasing trend in hours worked by parents in the earlier years of the sample, consistent with this explanation, though this is less clear toward the end of the series. Another possibility is that household fertility decisions are changing with a changing economic climate (Rosenzweig and Evenson 1977; Rosenzweig 1982; Hazan and Berdugo 2002). Taylor et al. (2012), for example, report increases in productivity and decreases in fertility recently in Mexico. This explanation, however, is not evident in the descriptive statistics that we detail of the NAWS. Figure 3 shows the weighted number of children less than 18 years old as reported by survey respondents over time. While those reporting child laborers on farms tend to report higher numbers of children than those reporting child workers in off-farm labor markets, the figure does not establish decreasing numbers of children over time. It is possible, however, that Taylor et al. (2012)'s fertility story will become evident in future data of this type.

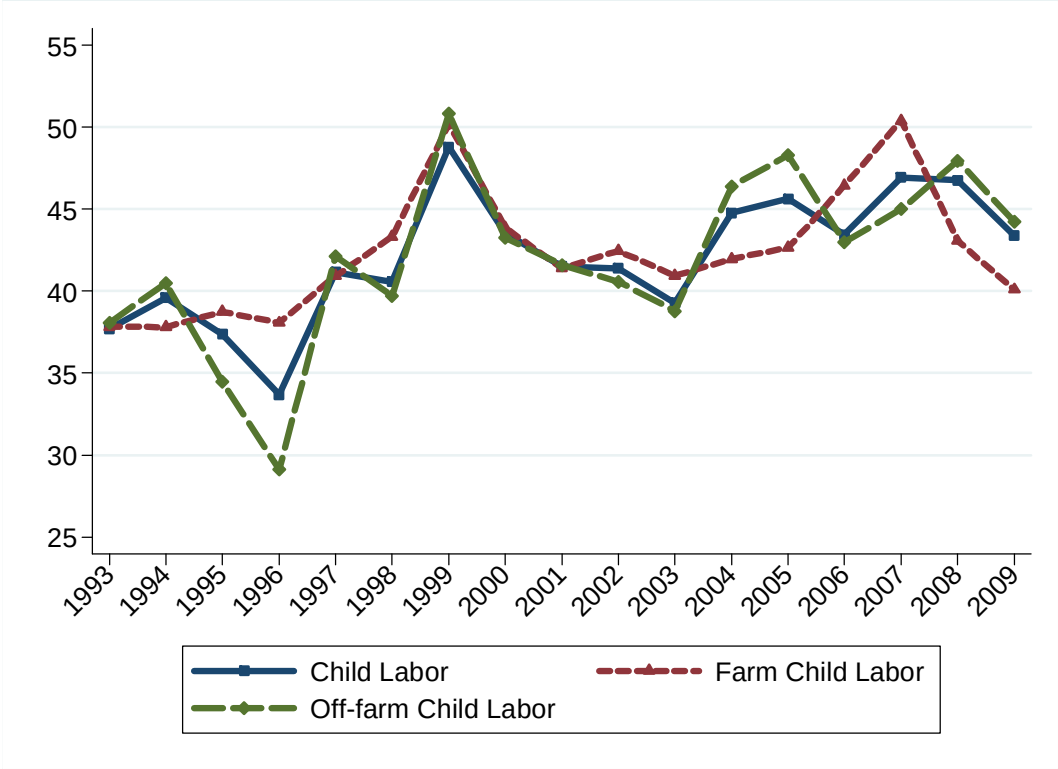

Figure 2. Weighted Average Weekly Working Hours of Families with Child Labor

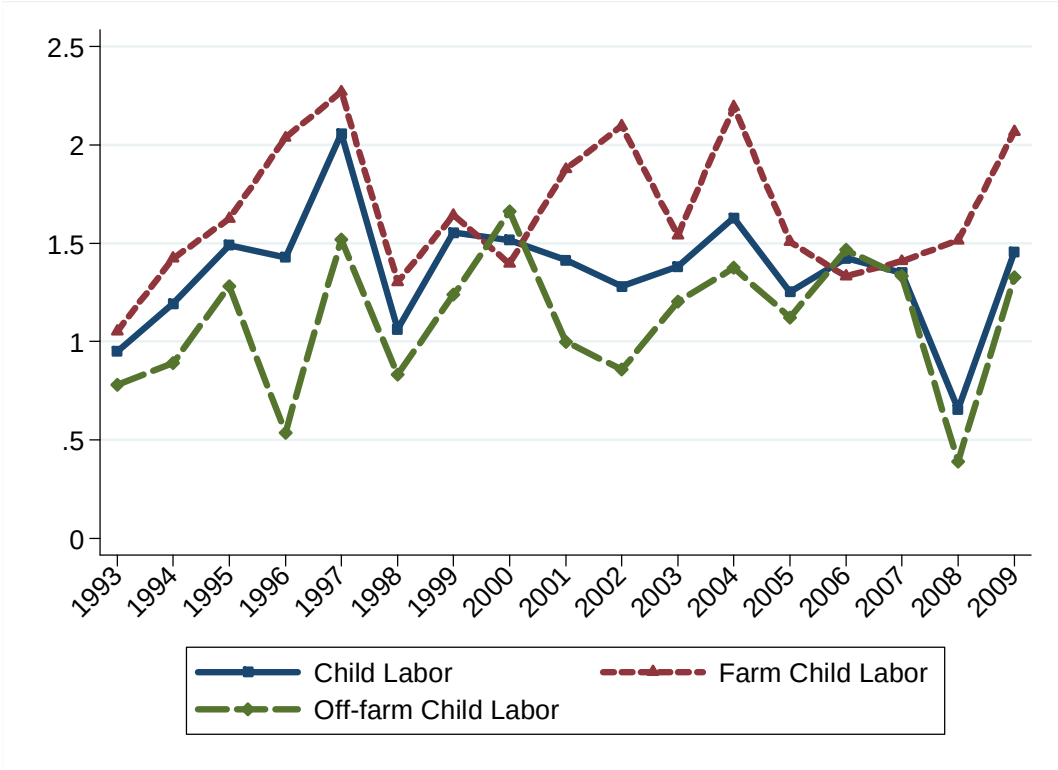

Figure 3. Weighted Number of Children Less Than 18 Years

5. Discussion and Conclusion

Greater understanding of the dynamics of child farm and nonfarm labor in the U.S. is of value to academic literature in labor economics as well as to practical policy discussion pertaining to human rights of children and of immigrants (a group comprising a large percentage of workers in industries in which child labor is frequent). We find that the propensity for a family to have child laborers is a function of demographic and work-related characteristics of the parent. The patterns identified are significant for optimal planning of public resource allocations targeting vulnerable children (inclusive of both cash and non-cash benefits) and for making educated predictions while minimizing uncertainty regarding effects of child labor law revisions.

A policy-relevant question beyond the determinants of child labor at the parental level is how the existence of child labor in the U.S. relates to the availability and generosities of educational and welfare programs. In contrast to some international contexts, the U.S. represents a special case in that many social programs such as the U.S. Department of Education's Migrant Education Program and Migrant Head Start, along with broad welfare programs, are in place to assist farmworkers. Within the international development literature, some studies document the role of conditional cash transfers in quelling the rate of child labor and poverty (Yap et al. 2001; Bourguigon et al. 2003; de Janvry et al. 2006). Research also exists within the early childhood development, medical, and education fields on the efficacy of these programs, the primacy of parental involvement, and agricultural workers' constraints to access, but research within economics is lacking (de Leon Siantz and Smith 1994; O'Brien 1995; Parker et al. 1995; Fuentes and Cantu 1996; Ezell et al. 2000).

Unfortunately, the public-use NAWS dataset cannot be disaggregated at the state and local levels relevant to public aid provision. We can, however, examine correlations between child labor and education and welfare participation more broadly, and as a descriptive exercise, document patterns relevant to policy debates. Participation rates for various educational and welfare programs are presented in Table V.[6] For some programs, unconditional participation rates are statistically higher for the child labor category suggesting that families who receive benefits are more likely to have children working. Programs for which significantly higher participation rates are seen for the no child labor category primarily relate to the presence of very young children (e.g., Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)). We also observe higher participation rates in some of the educational program categories (specifically in citizenship and adult basic education) among those with working children, consistent with work-school substitutions among families following the crop as the agricultural season progresses. Family structure importance is suggested by high household-level participation in some educational category groupings in the child work category, suggesting that adult education may be valuable to the family in the short term.

[6] Welfare program questions are asked in terms of whether or not anyone in a respondent's household has participated anytime within the last two years. Education questions are asked first for the respondent as an individual and secondly regarding the respondent's family (excluding the respondent). Individual questions are asked regarding participation at any point in the past whereas family questions are asked with reference to participation within the last two years. Participation data in the NAWS therefore suffer from measurement issues and varying reference points. We summarize available data but do not provide subsequent econometric analysis, thus leaving this for future work as data become available.

Table V. Welfare and Educational Program Participation by Child Labor Category

	No Child Labor			Child Labor			
	Obs.	Mean(%)	S.D.	Obs.	Mean(%)	S.D.	P-value
Panel A: Welfare Programs: *Respondent and Household Members:*							
General Assistance/Welfare	10461	1.79	13.27	1177	1.56	12.40	0.69
Food Stamps	10461	21.67	41.20	1177	22.80	41.97	0.59
WIC	10461	38.59	48.68	1177	15.55	36.25	0.00
TANF	7752	0.38	6.15	777	0.19	4.41	0.39
Disability Insurance	10461	1.88	13.57	1177	2.33	15.09	0.48
Unemployment Insurance	10461	33.62	47.24	1177	33.57	47.24	0.98
Social Security	10461	0.97	9.82	1177	1.97	13.90	0.06
Low Income Housing	10461	0.34	5.82	1177	0.04	2.10	0.25
Public Health Clinic	10461	1.73	13.02	1177	1.92	13.73	0.75
Medicaid	10461	2.31	15.01	1177	2.89	16.75	0.54
Panel B: Educational Programs *Respondent:*							
English/ESL	10464	18.01	38.43	1176	20.59	40.45	0.19
Citizenship	10464	3.62	18.68	1176	5.55	22.90	0.05
Literacy	10464	0.21	4.54	1176	0.47	6.82	0.18
GED/H.S. Equivalency	10464	6.28	24.27	1176	4.45	20.63	0.06
College/University	10464	3.15	17.46	1176	4.49	20.71	0.26
Job Training	10464	2.72	16.27	1176	3.10	17.34	0.60
Adult Basic Education	10464	0.79	8.83	1176	1.80	13.28	0.06
Even Start	10464	0.03	1.63	1176	0.00	0.00	0.12
Migration Education	10464	0.37	6.08	1176	0.72	8.44	0.30
Household Members:							
English/ESL/Adult Basic/Citizenship	10388	5.00	21.80	1175	10.54	30.73	0.07
Job Training	10386	1.79	13.25	1175	1.54	12.32	0.61
GED/H.S. Equivalency	10387	5.59	22.97	1175	11.21	31.56	0.00
Migration Education	10387	2.05	14.16	1175	4.32	20.33	0.02
Head Start	10387	8.93	28.51	1175	4.88	21.55	0.00
Migrant Head Start	9937	4.05	19.72	1104	4.48	20.71	0.69

Notes: The last column presents *p*-values of *t*-tests of equal means across the two groups. Observations vary due to introductions of new programs (e.g., TANF) and differences across survey questions asked over time.

Our observations therefore also are relevant to discussions of intergenerational transmission of poverty. As child labor can have a substitute relationship with regular schooling, child workers may be disadvantaged in terms of building education-based human capital due to participation in the workforce. Thus, child labor may be seen as both a consequence *and* a cause

of poverty in the rural U.S. Some literature focusing on the developing world has been devoted to how intergenerational aspects of child labor characterize child labor as a poverty trap in which parents' wages, debt, and personal experience as child laborers contribute to its continuation (Levy 1985; Emerson and Souza 2003; Basu and Chau 2004; Genicot 2005; Wahba 2006). Furthermore, literature from international contexts may have relevance to the weighing of public policy options. For Brazil, Bourguignon et al. (2003), for example, find that cash transfers to incentivize education over child labor decrease poverty. Whether additional cash transfers could receive support within the U.S. is a political question, though new labor regulation targeting child laborers, if properly enforced, may provide a more viable deterrent to negative outcomes.

The predominance of development literature highlights the relationship between poverty and child labor with household living standards negatively related to child labor, the responsiveness of child labor to the family economic environment, and the poor quality of local institutions leading to few options aside from work for children. The case of the U.S., interestingly, is that child labor exists in a developed country and in the presence of existing education and institutions (though availability and generosity may be uneven). Despite decreasing prevalence of child labor, concerns about injuries on farms (more frequent than off farms) and lost human capital still exist as evident in recent legislation and research in medical fields. While limited due to sample size and scope of currently available data, our paper highlights the importance of and the limits to understanding these issues. We argue that it is crucial to maintain funding for agricultural labor surveys and other data mechanisms that provide evidence regarding children and other vulnerable populations in rural communities and on U.S. farms, and that supplemental data on child characteristics in addition to parental ones are needed.

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