WORK AND MARRIAGE: CHILD LABOR, MARRIAGE MATCHES, AND BRIDE PRICES IN RURAL TANZANIA*

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Abstract

Labor market wages do not typically provide an accurate or representative measure of the economic returns to child labor in rural settings, especially for women. This paper is a first attempt to identify other outcomes that can shed light on the longer-term impact of child labor. In particular, we examine the quality of marriage matches as measured by per capita household wealth and bride prices. Using an instrumental variables strategy, we show that child labor in agricultural activities is significantly associated with better outcomes in terms of family wealth, particularly for physical assets, land, and bride prices. Although preliminary, our results suggest that agricultural work by children is being positively valued on the marriage market, whereas household child labor work is being penalized.

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This paper examines the link between child labor and the marriage market using data from the Kagera region of Tanzania. Both of these phenomena have received considerable, albeit separate, interest in the recent literature. Child labor has been extensively studied both for its causes and consequences (see Edmonds 2007 for a recent review). Recent research on the marriage market has focused on dowry and bride prices, examining why these institutions are observed and how they have evolved over time (Anderson 2004, Arunachalam and Logan 2006, Bottincini and Siow 2003, Becker 1981, Edlund 2001, Rao 1993, and Zhang and Chan 1999).

We are interested in the link between these phenomena for two reasons. First, the marriage market could offset or magnify previously documented long-term effects of child labor such as displaced education. Second, the economic returns to child labor are difficult to measure because wages are rarely observed in rural settings and among women. Marriage matches and bride prices provide an interesting alternative to consumption or estimated labor productivity.

We use five waves of data from the Kagera Health and Development Survey (1991-1994 and 2004) to examine whether the intensity of child labor participation among 7 to 15 year olds at baseline affects marriages and household outcomes by 2004, in particular household wealth (as measured by land value and by detailed asset holdings data) and, among girls, bride price (in Kagera, a bride price is paid by the groom's family to the bride's family). We use household crop shocks and rainfall variation to instrument for agricultural and household child labor hours. Our results indicate that agricultural child labor leads to significantly improved outcomes in terms of family wealth and bride prices. Household work is instead negatively (or insignificantly) associated with wealth outcomes and bride prices. This is particularly relevant for girls, for whom household work is more important both on average and in response to crop shocks.

I. Data and Identification Strategy

This study uses data from the Kagera Health and Development Survey (KHDS), a longitudinal socioeconomic survey covering the Kagera region of Tanzania (Beegle, De Weerdt, and Dercon 2006). The data were gathered in five waves. The first four waves were gathered from September 1991 to January 1994. These constitute our baseline data, in which we observe work patterns for children between the ages of 7 and 15. Child labor is defined as hours spent working in economic activities (such as tending or processing crops or looking after livestock) and in household work (including fetching water and firewood, preparing meals, and cleaning the house) in the previous week. Children in the sample work on average 17 hours per week, of which 10.5 hours are spent on household work (Table 1). More than 90 percent of children work at least one hour in one of the baseline waves. Girls work on average 2.5 hours more than boys; this difference is more pronounced among older girls. We also observe a range of household-level controls such as parents' education, land holding, and household wealth.

In 2004, a fifth round of data was gathered. This allows us to observe the adult outcomes of children who worked in rounds one to four: completed education, if they are married (since marriage is almost universal in Tanzania, this measures the likelihood of marrying younger), and for those who are married the wealth of the married household (measured through physical and durable assets and landholdings). Finally, for a subset of girls, we observe the bride price paid to their family.

Table 1: Summary Statistics

	Mean	SD
Baseline sample		
Agricultural hours worked in last 7 days	6.27	8.19
Household hours in last 7 days	10.50	8.99
Crop shock	0.34	0.47
Rainshock	0.02	0.48
Female	0.49	0.49
Age	10.91	2.60
Number of observations	4,649	
2004 sample		
Agricultural hours (predicted)	6.82	2.2
Household hours (predicted)	11.8	3.64
Female	.6	.48
Household size	4.3	2.16
Physical assets value (log)	11.84	1.65
Dwelling value (log)	8.83	4.08
Per capita Land value (log)	9.31	4.53
Livestock value (log)	5.09	4.62
Number of observations	572	
Log value of Bride Price, total	10.3	1.52
Log value of Bride Price, cash	8.91	3.41
Log value of Bride Price, in-kind	6.18	4.46
Number of observations	88	

Notes: Baseline sample is restricted to children in school at baseline or less than 10 years of age and not yet enrolled. It includes children who are measured up to 4 times in the baseline panel (1991-1994).

Since selection into child labor is likely to be based on observable and unobservable individual and household characteristics, we instrument for both agricultural and household child labor using household crop shocks, rainfall shocks, and these two interacted with baseline variables. Household crop shocks are measured as the proportion of crop accidentally lost to pests and fire during the baseline interview period. We construct the rainfall shock as total rainfall at the nearest weather station in the short and long rainy seasons preceding the interview,

standardized by its 25-year mean and standard deviation. Crop shocks reflect occasions of agricultural stress or crisis, which are moments when the incremental value of child labor may be particularly high. Likewise rainfall, depending on its intensity and the agricultural production function, could increase the marginal productivity of child labor. Table 1 shows that on average 34 percent of individuals experience a crop shock in the baseline. The mean of the rainfall shock is 0.02 (i.e., 2 percent of a standard deviation less rain than the weather-station specific norm).

Table 2 reports estimates from a first-stage regression of agricultural hours and household work hours on the instruments. For agricultural work, we find crop shocks associated with increased agricultural work among older boys and girls. For household work, we find a significant age gradient among girls, not among boys. Overall, this implies that the biggest increase in work hours is among older girls. Rainfall has a positive effect on agricultural and household work hours. Beegle, Dehejia, Gatti, and Krutikova (2007) discuss at length the plausibility of exogeneity and the exclusion restriction for these instruments.

II. Results

Using the same data as this paper and a similar instrumental variables strategy, Beegle, Dehejia, Gatti, and Krutikova (2007) show that child labor leads to a significant reduction in completed education and a significant increase in the probability of being a farmer and of being married 10 years later. In this paper, we build on our previous work by exploiting the distinction between agricultural and household work hours and by exploring the extent to which these two forms of child labor differentially affect marriage outcomes.

Table 2: First Stage Estimation of Child Labor Hours

	Household Hours	Agricultural Hours	Household Hours		Agricultural Hours	
			Females	Males	Females	Males
Any crop lost	3.850***	-2.627*	-5.616***	0.398	-4.499***	-2.911*
	(1.336)	(1.496)	(1.658)	(1.381)	(1.358)	(1.692)
Any crop lost × age	-0.321***	0.250*	0.556***	-0.011	0.400***	0.277*
	(0.118)	(0.134)	(0.154)	(0.124)	(0.137)	(0.151)
Age	3.165***	2.875***	2.404***	4.091***	3.125***	2.679***
	(0.474)	(0.463)	(0.684)	(0.599)	(0.604)	(0.674)
Female	2.982***	-1.095***				
	(0.356)	(0.311)				
Log per capita land value	0.058	0.400***	0.270	-0.071	0.297**	0.496***
	(0.132)	(0.098)	(0.181)	(0.132)	(0.123)	(0.127)
Any crop lost × female	-12.828***	-2.114				
	(1.713)	(1.688)				
Any crop lost × female × age	1.181***	0.177				
	(0.160)	(0.158)				
Rainfall deviation	0.539	0.467	0.277	0.755*	0.923*	0.114
	(0.400)	(0.463)	(0.610)	(0.430)	(0.486)	(0.598)
Number of observations	4,649	4,649	2,265	2,384	2,265	2,384

Table 3 reports the coefficients on agricultural and household child labor hours for a range of measures of wealth of the post-marriage household. Each regression includes (not reported) individual controls (age and gender), parental education (indicators for whether the father or the mother have between and 1 and 6, 7 years, or more than 8 years of education), per capita household controls measured at baseline (log per capita expenditure, log per capita assets, and log per capita land value), and district dummies.

Table 3: Effect of Child Labor on Marriage Outcomes

	All		Female		Male	
Dependent variable (in round 5)	Agricultural hours	Household hours	Agricultural hours	Household hours	Agricultural hours	Household hours
Household size	0.221	0.004	0.367***	-0.123	-0.049	0.108
	(0.145)	(0.092)	(0.187)	(0.137)	(0.212)	(0.167)
Physical assets value	0.505*	-0.267*	0.420*	-0.211***	0.496**	-0.264**
	(0.162)	(0.102)	(0.158)	(0.121)	(0.245)	(0.125)
Dwelling value	0.657***	-0.285	0.747***	-0.233	0.353	-0.068
	(0.345)	(0.208)	(0.445)	(0.320)	(0.571)	(0.466)
(log) per capita Land value	1.350*	-0.642*	1.346*	-0.425	0.649	-0.246
	(0.371)	(0.235)	(0.469)	(0.343)	(0.578)	(0.499)
Livestock value	0.638***	-0.421***	0.724	-0.481	0.224	0.123
	(0.370)	(0.221)	(0.487)	(0.345)	(0.576)	(0.441)
Number of observations	572		345		227	

Note: Note: *** indicates significance at 1%; ** at 5%; and, * at 10%. Each pair of cells for agricultural and household hours from from a separate regression for the 5 dependent variables and the 3 samples (all children, females, and males). Other omitted controls include age, female, categorical variables for mother and father education, wave 1 wealth variables (log per capita expenditure, log per capita assets, log per capita assets land), household size at baseline, and district dummies.

We consistently find that agricultural work hours are significantly associated with increased levels of per capita assets, including an indicator for owning a building, land, physical assets, and livestock. The impact of household work hours is negative and often significant for the same variables. Although we are unable to disentangle the extent to which greater (lower) household wealth reflects a more (less) advantageous marriage match rather than increased (decreased) productivity of the married couple, it is noteworthy that the married couples we study are young (ranging from 17 to 28 with a mean of 21), rendering the former interpretation more plausible. Many of the results for agricultural hours (dwelling value, log per capita land value, and livestock value, though the last effect is not significant) are driven by the female sample, although the one significant effect for boys (physical assets) is positive and significant.

For household hours, we find a robustly significant and negative effect for physical assets for both boys and girls. This suggests that economic child labor hours are rewarded in the marriage market while household work hours are being penalized.

Table 4 presents our results for bride prices for the sample of girls from whom data is available. Bride price is measured as total, cash and in-kind value. We employ the same two-stage procedure as before to identify the impact of agricultural and household hours worked as a child on bride price. As in Table 3, we find that agricultural hours are significantly associated with an increased bride price, while household work hours are negatively associated with bride price. Although our results corroborate the findings in Table 3, we should note the significant limitations of our current bride price data. In particular, information on bride price (which is a universal practice in Tanzania) is available only for 20 percent of the sample of married women. A selection regression indicates that the probability of a reported bride price is not significantly associated with household characteristics and, more importantly, with agricultural and household child labor hours (results available upon request). Nonetheless, these results must be taken with appropriate scepticsm -- underreporting could be an indication of the poor quality of the available data. In future work, we are preparing a resurvey of the sample of married women, aimed at collecting detailed information on marriage transition and bride prices.

Table 4: The Effect of Child Labor on Bride Price

	Log value of Bride Price		
	Total	Cash	In-kind
Mean agricultural child labor hours	0.444**	0.228	1.620**
	(0.201)	(0.656)	(0.811)
Mean household child labor hours	-0.367**	-0.331	-1.252**
	(0.169)	(0.333)	(0.522)
Number of observations	80	88	87

Note: *** indicates significance at 1%; ** at 5%; and, * at 10%. Independent variables are predicted agricultural hours and predicted household hours from a first stage regression as in Table 1. Other omitted controls include age, age squared, categorical variables for mother and father education, the year when the bride price was received, wave 1 wealth variables (log per capita expenditure, log per capita assets, log per capita assets land), household size at baseline, and district dummies. Column 1 includes controls for baseline height and weight. Standard errors are clustered at the household level.

III. Conclusion

Labor market wages do not typically provide an accurate or representative measure of the economic returns to child labor in rural settings, especially for women. This paper is a first attempt to identify other outcomes that can shed light on the longer-term impact of child labor. In particular, we examine the quality of marriage matches as measured by per capita household wealth and bride prices. Using an instrumental variables strategy, we show that child labor in agricultural activities is significantly associated with better outcomes in terms of family wealth, particularly for physical assets, land, and bride prices. Although preliminary, our results suggest that agricultural work by children is being positively valued on the marriage market, whereas household child labor work is being penalized, and underline the need for further work on this topic.

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