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Is schooling forever doomed with child labor around? An analysis using Philippine time use data

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Abstract

Using a rich survey data collected in the southern part of the Philippines, this paper aims to study the effect of child labor on the child's schooling outcomes. Results indicate that the efficient allocation of time can offset the impact of an increase in the child's work hours. If child labor cannot be prevented, the paper offers some directions on the type of public goods the government can provide.

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1. Introduction

Child labor is an enduring social issue and ever since it has attracted international awareness in 1979 (Ray, 2000), there is an influx of theoretical and empirical research on its effect on children. On the one hand, recent studies such as Bezerra, Kassouf and Arends-Kuenning (2009) and Beegle, Dehejia and Gatti (2004) provide evidence on the trade-off between child labor and human capital formation. Working at the early stage of life can expose children to injurious situation since they are less agile and have lower attention span. Even when work does not expose children to toxic materials or hazardous conditions and the work does not require heavy lifting, working can still impede significant human capital formation through its adverse effect on school attendance, progression and completion. Using these as basis, policies should be geared towards the eradication of any form of child labor. On the other hand, Emerson and Souza (2007) and Beegle *et al*. (2004) have shown that child labor may not be entirely bad in terms of its effect on future earnings. One, working may provide training and skills that can be valuable to the labor market in the future as in the case when skills acquired at work and at school are complementary. Tending stores, for example, can be a medium to enrich numeracy and enhance interpersonal skills. Two, the efficient allocation of children's time means that child labor may not necessarily affect the time spent at school and that there are ways for working and schooling to coexist without the one harming the other.

While the literature has tackled child labor in various fronts, the empirical evidence on child labor in the Philippines is relatively scant. This research therefore aims to provide evidence on the effect of child labor on Filipino children and it will do so within the context of time use and using a rich panel data collected in the Southern part of the Philippines. In particular, the research aims to study the effect of child labor on the child's schooling outcomes. This is an opportune time since based on the Asia Pacific Regional Millennium Development Goals (MDG) Report (2009), while Laos and Cambodia have been slow, the Philippines has been regressing in satisfying its commitment towards universal primary education. In 1990, the net enrolment ratio at the elementary level is around 84.6% and in 2011 is around 85.1%. The UNDP report on the Philippine MDG confirms that the cohort survival rate from years 2000-2005 at the primary level has exhibited erratic movement while the completion rate at the primary level is downtrend. In 2005, cohort survival is around 70% while the completion rate is around 68%. These indicate that significant efforts have to be directed towards attaining the 2015 MDG commitment on primary education. One effort is to understand whether child labor can be an avenue for such an end. Does child labor have an adverse effect on schooling? If it does, is there a way to offset this effect? These are some of the questions that the current research aims to address.

The Philippines has laws against the employment of children on certain industries as early as the 1920s. In its strictest sense, it is not considered child labor if the child is above 15 years old but below 18 years old and is employed in non-hazardous undertaking. However, the 2001 Survey of Children in the Philippines indicates that the law on adult supervision is not strictly enforced as indicated by the approximately 1.1 million unsupervised working children. The same survey also discloses that 1.5 million out of the 4 million working children have stopped attending school altogether. Returns to human capital investment are evidently forgone when children work regardless of the amount of hazards and supervision involved.

Results show that the time spent on working has an adverse effect on schooling outcomes. Even if this is the case, results show that there is a way to counter the effect of an increase in the work hours. This suggests the importance of time-use data when analyzing child

labor and emphasizes that the adverse effect of working can be offset by an efficient allocation of time. Incentives towards this end can help the country meet its MDG commitment on primary education.

2. Review of Existing Literature

Early literature analyzes the poverty and child labor paradigm following the luxury hypothesis formulated by Basu and Van (1998), which is either refuted (see for example, Bhalotra and Heady, 2003) or validated (see for example, Jensen and Nielsen, 1997; Patrinos and Psacharopoulos, 1997) through the absence or presence of a positive association between poverty level and children's school attendance.

Due to this conflicting evidence, the literature has recently turned to the role of child labor in the face of household shocks, which is closely related to the credit constrained scenario depicted by Baland and Robinson (2000) and Ranjan (2001). Works that relate child labor as a buffer to transitory shocks include Beegle, Dehejia and Gatti (2006) while works that establish the empirical link of income shocks, credit constraints and child labor include Edmonds (2006), Guarcello, Mealli and Rosati (2003).

In recent years, the collection of possible instruments in survey datasets have improved and have provided a new avenue in which child labor is analyzed. Using instrumental variable technique, some studies have established the causality between child labor and various outcomes concerning children. Community-level instruments for child labor include crop shocks and rainfall shocks (Beegle *et al*. 2006) in Tanzania and rice prices and community disasters (Beegle *et al*. 2004) in Viet Nam. Studies that analyze the effect of exogenous change in income on child labor include Edmonds (2005) for South African families eligible for the social pension program and Ravallion and Wodon (2000) using the food-for-school program in Bangladesh. Both papers found an increase in school attendance as a result of these positive exogenous shocks in income.

While research on child labor abound, there is very little work that analyze child labor in the Philippines to reflect the recent development in empirical methods. The current research uses the prices and wage data to come up with an instrument making it in line with Beegle *et al*. (2006) and Beegle *et al*. (2004). Unlike other studies, this paper uses children's time use data to ascertain the effect of each time use component and investigate whether reallocation of time away from other activities would be able to offset an increase in child labor. This inquiry is related with the empirical studies concerning the role of ability and household wealth on children's idleness such as those established by Bacolod and Ranjan (2008). The use of time allocation data is a good tool to better understand child labor because there are studies that provide evidence against the conventional notion that child labor displaces schooling. Ravallion and Wodon (2000) for example, have shown that as a response to enrolment incentives, child labor decreases and school attendance increases. However, the reduction in child labor incidence is just a proportion of the increase in the enrolment suggesting a less than one-to-one displacement. The authors alluded to the fact that the other child's time uses might have been reduced in order to keep on working and to accommodate the increase in the time spent in school.

3. Data and Empirical Strategy

3.1 Data Source

This paper uses the Cebu Longitudinal Health and Nutrition Survey (CLHNS) collected from the southern part of the Philippines[1]. This survey has been conceptualized to study infant feeding patterns of mothers who gave birth between May 1, 1983 to April 30, 1984. A portion of the original 3327 mothers have been resurveyed in 1991-1992, 1994-1995, 1998-1999, 2002-2003 and 2005-2006. There are time use and employment modules collected for household members 6 years old and above in recent survey waves.

3.2 Long-term Effect of Child Labor to Schooling Outcomes: Instrumental Variable Technique and the Validity of the Instrument

To analyze the impact of child labor on schooling outcomes, the model that we are interested in is $S = \alpha L + \beta X + \varepsilon$ where S is the schooling outcome for person *i*, L is an indicator if the child work and X is a vector of explanatory variables. Using OLS to estimate this equation is likely to yield results contaminated by between-household selection bias since there are unobservable factors why households send their children to work (Beegle *et al*. 2004). The within-household selection bias is mitigated since we will be able to proxy children's innate ability by their 1991 IQ test score. The 1991 test scores are likely to reflect the children's cognitive skills since the test is taken before the children have formally attended school so the scores are not confounded by historical academic inputs (Bacolod and Ranjan, 2008). Recent strategy to address the bias discussed above is the use of the IV. This is a two-stage strategy where the first-stage estimation treats child labor as endogenous and includes as explanatory variables instruments that can plausibly explain schooling outcomes only through child labor. The second stage uses the predicted child labor from stage one and estimates the outcome equation.

To study the long-term effect of child work on schooling, we follow recent studies (Beegle *et al*. 2006, 2004; and O'Donnell *et al*. 2005) and look into the effect of child work at period t on outcomes at period $t+n$. In particular, the following equation will be used for the second stage: $S_{it+n} = \alpha \hat{L}_{it} + \beta X_{it+n} + \varepsilon_{it+n}$ where S_{it+n} is the schooling outcome n years after the initial enrolment. $\hat{L}_{it}$ is the predicted child labor from the first-stage equation given by $L_{it} = aZ_{it} + bX_{it} + e_{it}$. L_{it} is the child labor indicator while Z_{it} is the instrument that affects schooling only through child labor.

Based on the literature, commodity prices and wage level of unskilled workers are plausible instruments. These data are collected by the CLHNS and we use the price of rice and the prevailing minimum wage rate for a household help in the community as instruments. To entertain the possibility of persistence of prices and wages overtime, we regressed their 1994 values against the 1998 data. If the instrument to be used is persistent overtime, then its effect on child labor would not be easy to identify. A longer time horizon would have been ideal to analyze persistence but the data on hand are available only for a short period of time. It is also

[1] Since the data are collected only in the southern part of the Philippines, the samples are not representative of the population. While this is the case, the trends observed from national surveys such as the Survey of Children (SOC) are largely manifested by the CLHNS dataset. For example, the 2001 SOC indicates that a "Filipino working child is mostly male and an elementary grader whose median age was between 10 to 17 years old". The 1998 CLHNS data indicate that 57% of the working samples are male and are around 15 to 16 years old.

confounded by the fact that even if a longer time frame is available, the initial survey year is most possibly not the beginning when the effect has started to become persistent. Due to these concerns, we first provide preliminary data-mining. From columns 1 and 2 of table 1, the 1994 minimum wage affects its 1998 level while no such effect can be observed for the rice prices. From column 3, the 1994 price level affects the prevailing minimum wage in 1998. The same can be said when the lagged value of the possible instruments (columns 5 and 6) are included as regressors. These evidence point to the persistence of the minimum wage and the rice prices overtime.

Within the context of child labor, using the minimum wage as a possible determinant of child labor is consistent with the generalist approach of the valuation of an unpaid care work. The minimum wage can be thought of as a replacement cost or the cost that a household would spend to get the job done if it were to hire someone to do the job (typically household help or domestic keeper). However, the variation in the minimum wage across communities may reflect the development at the local level while rice prices in more affluent communities are likely to be higher and these issues are likely to violate the exclusion restrictions required for an instrument to satisfy. This is the requirement that the instrument should affect schooling only through child labor. To circumvent these issues, we use the ratio of the minimum wage and the prevailing price level (WR) as a possible instrument. Taking the ratio of the two prices essentially deflates the minimum wage to represent the minimum purchasing power in real terms. It can also be thought of as a measure of standard of living. Column 7 of table 1 indicates that the lagged value of WR is not statistically significant and is therefore not persistent over the time period of the study.

Table 1: Test for the persistence of possible instruments

	1 Prevailing Minimum Wage Rate for Domestic Helper in 1998 (W)	2 Prevailing Rice Prices in 1998 (R)	3 Prevailing Minimum Wage Rate for Domestic Helper in 1998 (W)	4 Prevailing Rice Prices in 1998 (R)	5 Prevailing Minimum Wage Rate for Domestic Helper in 1998 (W)	6 Prevailing Rice Prices in 1998 (R)	7 W/R in 1998
Prevailing Rice Prices in 1994 (R)		0.08	22.06**		21.71*	0.06	
		(0.08)	(11.35)		(11.39)	(0.09)	
Prevailing Minimum Wage Rate for Domestic Helper in 1994 (W)	0.26*			0.00	0.23	0.00***	
	(0.16)			(0.00)	(0.16)	(0.00)	
W/R in 1994							-0.04
							(0.13)
R-squared	0.21	0.12	0.19	0.0912	0.20	0.17	0.13
Observations	134	142	134	135	132	135	131

Community level estimates include city/municipalities dummies as explanatory variable. Estimating method is OLS. The standard errors (in parentheses) are clustered at the barangay level. Barangay is the basic political unit in the Philippines and is roughly equivalent to a village.*/**/*** Significant at 1/5/10 per cent.

WR can affect schooling aside from the child labor channel. It can do so when households start the acquisition of assets and the improvement of housing facilities as a result of

improved purchasing power. High WR can lead to an increase in future demand for public and private schools. It may also entice migration due to the available opportunities in which people can improve their welfare. WR can also affect nutrition and hence, the children's school performance. When one of these happens, then WR is no longer a valid instrument. To investigate this, we analyze the effect of WR on some of the 1998 outcomes at the community, household and child-level. Results, shown in table 2, indicate that the 1994 WR is not a statistically significant determinant of all the 1998 outcomes considered. These support WR in terms of satisfying the exclusion restriction requirement.

WR can also be relevant to child labor. An increase in the purchasing power can have an income effect so that households will decrease the supply of child labor through an increase in leisure. On the other hand, it has the potential to increase the supply of child labor especially for the poor households. Since WR is collected in 1994 at the community level, the exogeneity requirement is easily satisfied because the outcomes to be investigated are at the child level after the time the child labor is observed.

3.3 Data Set-Up

To facilitate the empirical exercises, the time use and employment modules are used. While the data are available for years 1991, 1994, 1998, 2002 and 2005, the empirical strategy is to estimate the first-stage equation, $L_{it} = aZ_{it} + bX_{it} + e_{it}$, using $t = 1994$ and the second-stage using $t + n = 1998$. This sample selection is done since the children have started to attend school only in 1991 (around 93% of the 2,098 children are in school) and most of them are not yet working (around 99% have no work at the time of the survey). In 1994, 11% of the 2,021 children have reported positive hours of work. In 1998, the children should have already finished elementary but 46% of the 1,883 children are lagging behind the mandatory highest grade completed corresponding to their age.

Although the dynamics of child labor is certainly an interesting study, the time use data are collected only in 1994 and 1998. In addition, the 1998 survey have collected more information on child's time use and some activities listed are not easy to match with the more aggregated 1994 time use data. For example, the 1998 time data "sew/cross-stitched/crocheted" may be classified as household chore if the child has sewn but may be classified as leisure if the child has used the time to craft a needle artwork. To avoid error in measurement, only the aggregated 1994 time use data will be used. While this strategy does not capture the effect of working over the child's entire life cycle, the 1994 data are collected at the earliest stage of schooling and as such capture the critical period in the learning process since the lower primary school forms the building blocks (i.e. writing, reading and vocabulary-building) necessary to acquire higher skills (i.e. numeracy). It is also unlikely that young children are physically equipped to cope with the demands of work and the result of the study will be able to capture the more detrimental effect of child labor on schooling outcomes. We leave the dynamics of child labor for future analysis.

The sample is also limited to children who are attending school at the beginning of the survey. Inclusion of those who are not attending entails including the schooling outcome as explanatory variable in the first stage. This confounds the identification of the effect of child labor in the schooling outcome. Given these considerations, the final sample is limited to children who are attending school but not working in 1991.

Table 2: Test for exclusion restriction: establishing the effect of the 1994 Instrument on 1998 outcomes

	Community Data in 1998			Household Data in 1998					Child Data		
	Private Secondary[2]	Public Secondary[2]	Population Density[1]	Log of HH per capita income[1]	Car[2]	Lot[2]	Good Toilet Facility[2]	HH Rooms>2[2]	Height in 1998[1]	Weight in 1998[1]	IQ Test Score in 1994[1]
1994 WR	0.03	-0.02	0.01	0.01	0.01	0.01	0.00	0.01	0.00	-0.01	-0.01
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.00)
R^2	0.07	0.04	0.29	0.15	0.22	0.04	0.21	0.06	0.46	0.16	0.10
No. of Obs.	110	130	130	1210	1297	1297	1297	1297	1292	1292	1292

Community level estimates include city/municipalities dummies as explanatory variables and the 1998 WR. Household level estimates include age and grade completed of mother and father, city dummy and the 1998 WR as explanatory variables. Child level estimates include the household level explanatory variables plus child's age and gender dummy. Method of estimation: 1, regression; 2, probit. The standard errors (in parentheses) are clustered at the barangay level. Barangay is the basic political unit in the Philippines and is roughly equivalent to a village.

3.4 Construction of the Child Labor Indicators and Schooling Outcomes

There will be several indicators that will be used to analyze the schooling outcomes: school attendance, lag in the highest grade completed, once repetition of any grade three years after the initial enrolment, twice repetition of any grade three years after the initial enrolment, repeated elementary once, ever repetition of any grade at the primary level and the grade-age index after seven school years. Except for the grade-age index, the rest of the schooling indicators are dummy variables equal to 1 if outcomes above are satisfied and 0 otherwise. The grade-age index[2] is constructed using $GA = (grade/(age-7))*100$ where seven represents the age when children in the Philippines start attending school. The index is 0 when no grade has been completed while it is 100 when at the age of eight the child has finished grade one and the child has finished each school year after. This index, therefore, reflects how much the child has advanced up the school ladder.

Based on the 1994-1995 time use module, four categories of children's time allocation are formed. These are work, homework, housework and leisure. The work and homework are taken directly from the data and are defined as the number of hours on a regular school day that the child spend working for pay or on the farm/family business and the number of hours the child spend doing homework, respectively. The household chore is the number of hours the child spend helping with household chore and caring for the younger sibling while leisure is the number of hours the child spend playing, sleeping and watching television.

3.5 Trends

The mean of schooling outcomes, child's time use and child and parental characteristics are presented in table 3. The summary statistic is provided for four groups classified according to their working status in 1994 and 1998: group 1 for those who worked in both years, group 2 for those who worked in 1994 and did not work in 1998, group 3 for those who did not work in 1994 but worked in 1998 and group 4 for those who did not work in both years. There are more boys

[2] Previous use of this index can be found in Patrinos and Psacharopoulos (1996).

in groups 1 and 3 while the mean age for the same groups are relatively higher compared to groups 2 and 4. On average, more than half of the children have fathers or mothers who have elementary education although more children in group 4 are born from fathers or mothers with college education. The mean ages of both father and mother are more or less the same across the four working status.

Looking at the child's time use, the mean school, house work and leisure hours for children in group 1 is lower compared to the other groups. Mean leisure hours is higher for children who did not work in both years as well. It also appears that lagging behind the appropriate school grade among the sample is not restricted to those who worked. More children in group 2 lag behind while there are more children currently in school in group 3. The repetition incidence provides a different picture, on the other hand. There are more children in group 1 who once repeated any grade and who once repeated elementary after 1994. There are also more children in this group who ever repeated elementary. There are fewer children in group 4 who have been experienced the said schooling outcomes. There are more children in group 3 who have indicated to have twice repeated any grade after 1994. Looking at the community-level data, there are more children in group 1 whose households were affected by the typhoon in 1991 while children in group 2 live in communities that have either higher minimum wage or lower commodity prices.

3.6 Attrition Bias

Since the research will utilize panel data, a necessary preliminary data mining will be to check for attrition bias and correct for it when present. A common issue to the use of any longitudinal data is that the sample collected becomes smaller on succeeding resurvey, which can happen when portion of the original sample refused to participate, became unable to participate or can no longer be tracked down by the enumerators. This problem becomes serious when non-participants have systematic characteristics that are related to the outcome being investigated. In the context of the research, if children who have work are more likely to drop out of the succeeding survey, then their non-participation could lead to biased estimates. Bacolod and Ranjan (2008) have indicated that the attrition from the survey was mainly due to permanent migration out of Metro Cebu and child mortality. Nevertheless, we still look into the possibility of attrition bias. Following Miller and Hollist (2007), a probit regression is run on the participation dummy against the explanatory variables extracted from the 1991 survey. The explanatory variables included are household assets, parental attributes such as age and educational attainment dummies and dummies for geographical location. To rule out attrition bias, the indicators for schooling outcome and the explanatory variables above should not be statistically significant. Results[3] indicate that the schooling outcome and the explanatory variables mentioned above are not statistically significant predictors of attrition. T-tests are also conducted to test the equality of means of income, parental and child's attributes between the sample who dropped-out of the succeeding survey waves and those who did not. Results also indicate that all the p-values to test $H_0 = mean(0) - mean(1)$ are all greater than the 1/5/10% convention.

The trend is the same for the child's characteristics following the same set of groupings based on the earning status. The trend is also the same for the parental education except that the

[3]Available from the authors upon request.

magnitude is higher. Mean ages of both the father and mother are higher for group 2. The trends are the same as above concerning the various schooling and community-level indicators. Children in group 1 live in communities with higher minimum wage or lower commodity prices, however.

Table 3: Mean values of the some indicators, by working and earning status in 1994 and 1998

	Group 1 Working in 1994 and 1998	Group 2 Working in 1994 Non-Working in 1998	Group 3 Non-Working in 1994 Working in 1998	Group 4 Non-Working in Both Years	Group 1 Earning in 1994 and 1998	Group 2 Earning in 1994 Non-Earning in 1998	Group 3 Non-Earning in 1994 Earning in 1998	Group 4 Non-Earning in Both Years
Child's attributes								
Sex	0.57	0.41	0.62	0.48	0.68	0.44	0.71	0.48
Age	15.11	14.81	15.14	14.94	15.19	14.87	15.29	14.94
Parental attributes in 1998								
College, mother	0.09	0.09	0.10	0.13	0.03	0.05	0.07	0.13
High School level, mother	0.36	0.31	0.29	0.30	0.39	0.35	0.21	0.32
Elementary, mother	0.55	0.60	0.61	0.56	0.58	0.60	0.72	0.55
College, father	0.12	0.12	0.11	0.18	0.06	0.07	0.06	0.18
High School level, father	0.36	0.30	0.32	0.30	0.39	0.33	0.26	0.32
Elementary, father	0.52	0.58	0.56	0.51	0.55	0.60	0.68	0.50
Age, mother	41.26	41.03	42.08	41.86	40.84	42.16	41.99	41.84
Age, father	44.00	44.16	44.37	44.29	43.32	45.42	44.12	44.31
Others								
Minimum Wage/Price of Rice in 1994	45.18	47.23	45.13	46.82	52.02	44.41	43.36	46.79
Affected by Typhoon Rufing in 1991*	0.85	0.78	0.76	0.74	0.89	0.83	0.83	0.73
Time Use in 1994								
Work**	1.35	0.87	0.87	0.07	1.09	0.72	0.20	0.15
School work**	0.77	0.92	0.92	0.83	0.69	0.97	0.72	0.84
Housework **	0.87	1.24	1.24	1.14	1.45	1.31	1.47	1.14
Leisure**	11.25	11.82	11.82	12.22	12.28	12.07	12.61	12.21
Schooling outcomes in 1998								
Lag HGC	0.71	0.89	0.64	0.85	0.54	0.83	0.46	0.86
In school	0.50	0.41	0.57	0.40	0.68	0.46	0.73	0.39
Repeated Once	0.22	0.18	0.18	0.14	0.27	0.19	0.23	0.14
Repeated Twice	0.04	0.00	0.08	0.04	0.11	0.00	0.10	0.04
Repeated Elementary Once	0.12	0.09	0.10	0.06	0.19	0.13	0.14	0.06
Ever Repeated	0.15	0.09	0.14	0.07	0.27	0.13	0.19	0.07
Grade-Age Index	74.28	83.74	74.26	81.47	64.8	82.09	68.56	81.54

*This typhoon has caused considerable damage to most parts of Cebu. **In hours. HGC is highest grade completed. Sample is 1, 757.

4. Results and Discussion

The first-stage estimates on the 1994 time uses using simultaneous regression are shown in table 4. Results indicate that WR is statistically significant in the work and leisure estimates. This remains true even when the proxy for cognitive skills[4] and incomes are included as regressors.[5] This provides further evidence on the relevance of WR as instrument.

Table 5 presents the second-stage estimates for various child's schooling outcomes. The long-run effect of a one hour increase in the time spent by the child working during school days decreases the probability of being in school by 36% and increases the probability of lagging a school year by 65%. The other indicators of schooling outcomes show results consistent to the negative effect of child work on schooling. A one hour increase in child work decreases the probability of repeating once three years after the initial enrolment by 29% and the probability of repeating elementary once after the third school year by 17% and lowers the grade-age index after seven school years by 11%. Attending school aids the accumulation of skills and knowledge in satisfying the requirements to advance to the next grade level. Since the schedules of work and school are likely to coincide, a working child is likely to fail in terms of attendance requirements. Even if the work is intermittent and still allows the child to attend school, shifting attention from work to school may not be easy for children to catch-up on missed lessons, activities and assignments. This may hamper the child's ability, even for the better able child, to pass the periodic assessments that may eventually cause him/her to earn a failing mark at the end of the school year or drop-out of the school altogether.

Table 4: First-stage estimates: marginal effects of 1994 WR on various 1994 child time uses using simultaneous regressions

	Work	Homework	Housework	Leisure	Work	Homework	Housework	Leisure
1994 WR	0.18**	-0.10	0.03	0.43**	0.20***	-0.10	0.02	0.42**
	(0.08)	(0.07)	(0.14)	(0.21)	(0.08)	(0.07)	(0.14)	(0.21)
Observations	1087				1081			
R-squared	0.02	0.09	0.11	0.07	0.03	0.10	0.13	0.08
With 1991 test score	No				Yes			
With (log) per capita income	Yes				Yes			
Sample Year	1994				1994			

Dependent variables are hours on a regular school day. Other explanatory variables include child attributes such as age, sex and test scores; parental characteristics such as age and dummies for educational attainment; city and 1991 typhoon dummies.
*/**/***Significant at the 10/5/1 per cent level.

From table 5, homework and leisure are not statistically significant. Housework during a regular school day has a positive and significant effect on a number of schooling outcomes. It increases the probability of being in school by 15%, decreases the probability of repeating

[4] Standardized score based on the IQ test.

[5] This is the final first-stage specification. The estimation strategy is two-stage since the time use component is simultaneously estimated and cannot be accomplished in the standard IVREG command in Stata. However, if we do not recognize the fact that the time allocation are simultaneously determined, the Sargan statistics for the overidentification test from the IVREG indicates a p-value of 0.18 and we fail to reject the null hypothesis that the instruments are uncorrelated with the error term and that the excluded instruments are correctly excluded from the estimated equation.

Table 5: Second-stage estimates: marginal effects of 1994 time uses on various 1998 schooling outcomes

	In School	Lag HGC	Repeated Once	Repeated Twice	Repeated Elem. Once	Ever Repeated	GA
Work	-0.36**	0.65***	0.29**	0.08	0.17**	0.22**	-0.11*
	(0.19)	(0.37)	(0.13)	(0.06)	(0.08)	(0.1)	(0.23)
Homework	0.07	0.06	0.16	-0.05	0.05	0.03	-0.07
	(0.11)	(0.24)	(0.14)	(0.05)	(0.06)	(0.07)	(0.05)
Housework	0.15**	-0.11	-0.05	-0.01	-0.06**	-0.07**	0.05**
	(0.07)	(0.1)	(0.05)	(0.02)	(0.03)	(0.03)	(0.08)
Leisure	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Pseudo R^2	0.16	0.22	0.1	0.19	0.16	0.17	[0.29]
Data	1998 schooling outcomes and explanatory variables, 1994 child's time use						
Estimator	Probit	Probit	Probit	Probit	Probit	Probit	OLS
	Simulation exercise						
1 SD change in *work*, holding all other time uses and explanatory variables constant	-0.03	0.06	0.03	0.01	0.02	0.02	-0.09
Needed change in the SD of *school work* to offset the effect of a 1 SD increase in work	0.18	0.38	0.06	-0.06	0.12	0.26	0.17
Needed change in the SD of *housework* to offset the effect of a 1 SD increase in work	0.12	-0.30	-0.30	-0.41	-0.15	-0.16	0.33
Needed change in the SD of *leisure* to offset the effect of a 1 SD increase in work	31.97	-17.98	-14.49				-47.95

The child time uses are predicted from the first-stage estimation using the 1994 data. HGC is highest grade completed while GA is the grade-age index. Each schooling outcome is estimated using the 1998 data. Other explanatory variables include child attributes such as age, sex and test scores; parental characteristics such as age and dummies for educational attainment; city and 1991 typhoon dummies and community variables such as the distance of the barangay hall to the town proper, presence of public and private elementary schools in the community and presence of public and private secondary schools.. The standard errors (in parentheses) are clustered at the barangay level. Number of observations is 1438. */**/***Significant at the 10/5/1 per cent level. SD for work, homework, housework and leisure is 0.09, 0.30, 0.57 and 5.55, respectively.

elementary after the third school year by 6%, decreases the probability of ever repeating a grade at the primary level within the seven-year school years and increases the grade-age index by 5%. At first glance, the housework results appear to contradict a priori expectation since one would typically imagine that a higher time spent on housework will be harmful to child's schooling[6].

[6] The effect of housework on the children' school attendance is ambivalent. Evidence from Amin, Quayes and Rives (2006), for example, has indicated that housework does not keep boys out of school. The same study finds that younger rural girls' school attendance is negatively affected by housework, which is consistent with that of Levison and Moe (1998) who find that household work deters schooling for unmarried Peruvian girls aged 10 through 19. On the other hand, Arends-Kuenning and

This needs not to be the case since this is also the time when the child can interact with siblings that facilitate learning in the process. At the same time, performing housework nurtures values that may be considered complementary to the discipline and structure imposed inside the classroom.

The lower panel of table 5 shows the negative effect on the schooling outcomes of a one standard deviation increase in work. It can be seen that it is possible to offset this effect by increasing the time spent in homework. For example, the decrease in the probability of the child being in school as a result of the one standard deviation increase in the time spent working can be offset by a 0.18 standard deviation increase in the time spent on homework. This trade-off between work and homework appears to be robust across the schooling outcomes considered, with the exception of twice repetition. The needed increase in the homework time is higher when the objective is to offset the effect of an increase in work on the probability of lagging behind the appropriate grade for the child's age and on the probability of ever repeating a grade in the primary level within the seven years since the child's enrolment in 1991. These indicators are more reflective of the child's educational performance since these show not only the state of being in school but also the state of the child's progression in school. The effect of an increase in work can also be offset by a decrease in the time spent in household chores. To counter the 6% increase in the probability of lagging behind the appropriate grade-age combination resulting from the one standard deviation increase in the time spent working, the time spent on household chore should decrease by 0.30 standard deviation. To counter the same effect, the time spent on leisure should decrease by around 18 standard deviation away from the mean. It can be seen that the changes in the leisure component is higher than the other time uses.

5. Conclusion

This paper has analyzed child labor in the Southern Philippines and its effect on children's schooling outcomes. Results indicate that working three years after the initial enrolment has an adverse effect on schooling. However results using the time use data indicate that there is a way to counter the effect of an increase in the work hours. This suggests that the efficient time allocation of children may allow children to work without harming the child's school progression. While anti-poverty programs such as the conditional cash transfer program provide incentives to encourage schooling, its impact on child labor is still an empirical exercise. Some studies already indicated that incentives along this line do not result to a one-to-one displacement between work and school, however. Our results suggest that if child labor cannot be prevented, then the government can step in by helping households with working children through the provision of educational infrastructure (i.e. tutorial services) at affordable costs so that parents will reallocate some of the children's leisure time to quality school work instead.

Amin (2004) find that girls in rural Bangladesh communities did not change their housework hours even in the presence of a school incentive program.

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