Why Children Work, Attend School, or Stay Idle:

The Roles of Ability and Household Wealth[1]

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ABSTRACT

This paper o ers a theoretical and empirical analysis of child labor, schooling, and idleness (neither work nor school), with particular emphasis on the roles of child ability and household wealth in determining these decisions. We show theoretically that 'idleness' may be chosen optimally by low income households whose child is of low ability. Using a rich dataset from the Philippines, we find that while other factors–including mother's labor supply, the presence of a family business, and access to good school quality–contribute to these decisions, child ability and household wealth are the most important determinants of child idleness and the use of child labor. An implication of our findings is that any policy aiming to reduce child labor and increase child schooling should also target improvements in child ability and cognitive development through investments in the nutrition and health of poor children .

JEL Codes: I20, J13, J22, O15

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1 Introduction

Despite the continued economic progress among developing countries over the last several decades, the phenomenon of child labor still remains widespread. According to a recent ILO report, one in six of the world's children between the ages of 5 and 17 work–and the proportion is higher in the poorer parts of Asia and Africa. Given the moral outrage on the issue of child labor and the increasing willingness of governments and international organizations to enact and fund policy measures to reduce child labor and encourage child schooling, it is imperative to understand the determinants of children's activities to make informed policy decisions.

There is a rapidly growing theoretical and empirical literature on child labor following the works of Grootaert and Kanbur (1995) and Basu and Van (1998).[2] The recent literature has shown how the inability of the child or child's parents to access credit markets can lead to ine cient educational attainment not only within a generation but even across generations (Baland and Robinson (2000), Ranjan (1999, 2001), Basu (1999)). Child labor can be a "dynastic trap" because a child who acquired less education due to work will grow up to also be poor as an adult. In turn, as a poor adult parent, this person would send his or her children to work.[3]

While much of the child labor literature tends to highlight the importance of household wealth due to missing credit or insurance markets, it has ignored the role of child-specific attributes such as ability and motivation and their potential interaction with household wealth in determining child labor and schooling decisions, which is the focus of our paper. Our work is therefore relevant among recent studies seeking to establish the empirical link between income shocks, measures of access to credit, and child labor supply (among these are Beegle, Dehejia, and Gatti (2006) and Edmonds (2006))–and adds to this the issue of child ability. We thus begin by developing a model of household decision-making that highlights how household wealth and di erences in child endowment jointly determine parents' decisions on children's activities. The predictions of our theoretical model form the basis for our empirical investigation using data from the Philippines.

One contribution of our paper is to distinguish between the roles of child ability, household wealth, and school quality in children's activities. There is little empirical research that distinguishes between these factors in part due to lack of data. The survey we employ, the Cebu Longitudinal Health and Nutrition Survey (CLHNS), contains a particularly rich set of information. In addition to information on children's schooling attendance and work, data collected include children's performance on an IQ test (our measure of ability), household expenditures and assets, and characteristics of schools in the area to generate measures of school quality.

[2] See Brown et al. (2003) and Basu and Tzannatos (2003) for recent surveys of literature on child labor.

[3] See Emerson and Souza (2003) for the empirical support of intergenerational persistence of child labor.

Another contribution of our paper is in considering 'idleness' explicitly as one of the child activities along with schooling, work, and work while in school. Most of the theoretical and empirical literature on child labor fails to distinguish between alternative non-work activities, implicitly treating schooling as the only alternative to work (e.g. survey article by Brown et. al. 2003). Recent studies, such as Rosati and Tzannatos (2002), Deb and Rosati (2002), have begun to note that a considerable fraction of children are actually neither in school nor engaged in outside work. This category is increasingly being referred to as 'idleness'. Using data from six countries, Biggeri et al (2003) show that the phenomenon of 'idle' children is not all apparent; even after household chores, chronic illness, and job search are explicitly accounted for, a substantial number of children neither working nor attending school remain. Similarly, Jean Dreze points out in the PROBE Team (1999) report from India that children not in school were mostly playing hopscotch and not working.

At first blush it may seem odd that utility maximizing households will choose 'idleness' over work or schooling for their children. We show, however, that in the presence of a positive utility from leisure and a direct cost of education, 'idleness' may be chosen optimally by poor households whose child is of low ability.[4], [5] While previous studies on 'idleness' are consistent with our approach, our focus is di erent. We are concerned with how household wealth and child ability interact to determine children's activities, including the corner solution of 'idleness' (no school/no work). An implication of our theoretical model is that banning child labor, a popular policy prescription, may not only increase the pool of idle children by moving some children who were working full time to the 'idle' category, it could actually reduce the amount of schooling, by sending some of the children who would otherwise both work and attend school to the 'idle' category. Given a positive direct cost of schooling, some parents may not be able to a ord schooling if their children are not allowed to work part-time. Thus, if increasing child schooling is the objective of policy, then failure to take the 'idleness' option into account may result in erroneous policy conclusions.

Empirically, we find that separately accounting for 'idle' children is important. 'Idle' children are substantively di erent from those who work, those who attend school and work, and those who attend school full-time. In addition to household wealth, child ability is an important determinant of children's activities. Even in poor households, high ability children are more likely to be in school relative to low ability children. In addition, households with moderate levels of income may let their low-ability children remain 'idle' rather than send them to work. We also find that children are more likely to be in school than

[4] Biggeri et al.(2003) provide a model where parents do not derive any utility from child leisure, however, 'idleness' obtains due to two fixed costs: a fixed cost of attending schooling and a fixed cost of working.

[5] In an evaluation of the food for education programme in Bangladesh, Ravallion and Woodon (2000) also present a model where parents allocate children's time between schooling, work and leisure. However, they focus on the interior solution where the time devoted to all three activities is positive. In their empirical work they find that the program increased schooling by much more than it decreased child labor, thus providing evidence for a third child activity, leisure. Their empirical findings are consistent with our approach.

remain 'idle' if they have access to schools with basic facilities–in particular, schools with electricity.[6] These results are empirically robust to several sensitivity and specification tests. Finally, the importance of ability in determining child activities is further supported using within household variation in a sibling di erences framework.

To sum up, the key insight of our paper is that child ability plays an important role in determining child activities in general, and the choice between schooling and no schooling in particular. Our findings provide a window into the phenomenon of 'idle' children. Furthermore, the existence of 'idleness' as a separate activity from child labor and schooling implies that there is room for bringing children into school without reducing child labor, which is consistent with the empirical evidence from South Africa (Edmonds (2006)) and Bangladesh (Ravallion and Woodon (2000)).[7]

Finally, even though we have treated child ability as exogenous in our theoretical and empirical work, it may well be that factors such as prenatal care, adequate nutrition in early childhood, access to health care, and overall child health contribute to the cognitive development of children.[8] Thus, any policy aiming to reduce child labor and increase child schooling should also target improvements in child ability and cognitive development through investments in the nutrition and health of poor children.

The organization of this paper is as follows. Section 2 develops our theoretical model and illustrates the policy implications of ignoring idleness. Section 3 discusses the data and proceeds with a descriptive analysis. Section 4 discusses the econometric specification we estimate and main empirical findings, while Section 5 subjects our interpretation of what we find in the data to a variety of tests and sensitivity analyses. Finally, Section 6 concludes with implications of our results for policy and future research.

2 The Model

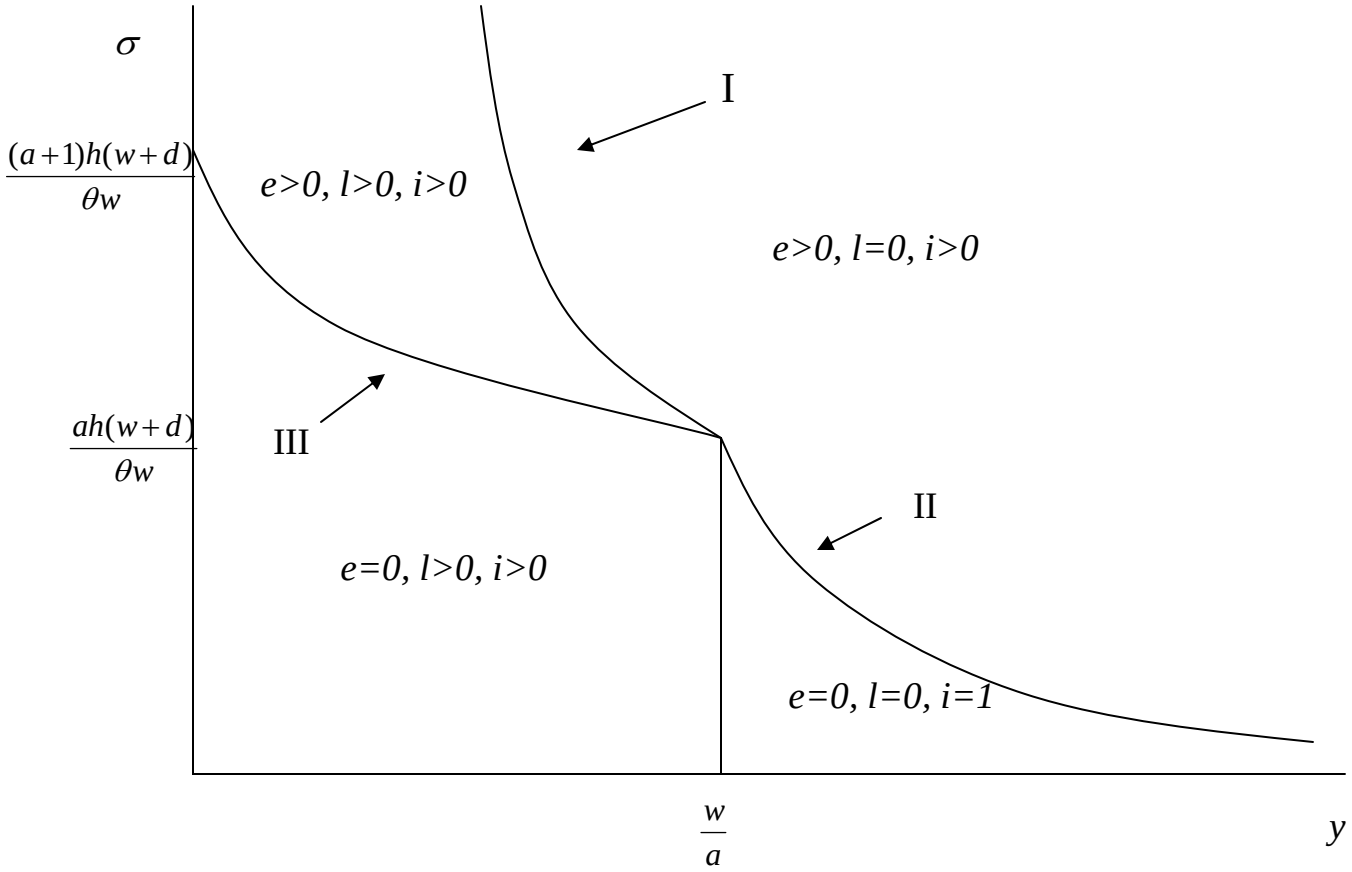
Let each household consist of one parent and one child. Assume that the income of the parent is y. Each child has 1 unit of time which has to be divided between work, l, education, e, and leisure, i. The parent has to decide how much time to allocate to these three activities. The child earns a wage of w per unit of time worked. The amount of human capital that a child accumulates upon going to school depends on the ability, σ, of the child. If a child with ability σ devotes a

[6] Children in families with a family business and/or a mother who works are also more likely to work while attending school at the same time.

[7] Schady and Araujo (2006) provide evidence to the contrary from Ecuador where a cash transfer program increased school enrollment while significantly decreasing child work.

[8] In an investigation of the nutrition-learning link using the same data from Cebu, Glewwe, Jacoby, and King (2001) found that better nourished children had higher academic achievement scores (based on the school curriculum), in part because they entered school earlier and had greater learning productivity per year of schooling. They estimate that a dollar invested in an early childhood nutrition program returns at least three dollars worth of gains in academic achievement.

Figure 1: partitioning of parameter space



I: $y = \frac{w^2 + 2wd}{a(w+d)+w} + \frac{h(w-ad)(w+d)}{\theta\sigma(a(w+d)+w)}$; II: $\sigma = \frac{dh}{\theta y} + \frac{ah}{\theta}$; III: $\sigma = \frac{(1+a)(w+d)h}{\theta(y+w)}$

Figure 2: Implications of banning child labor

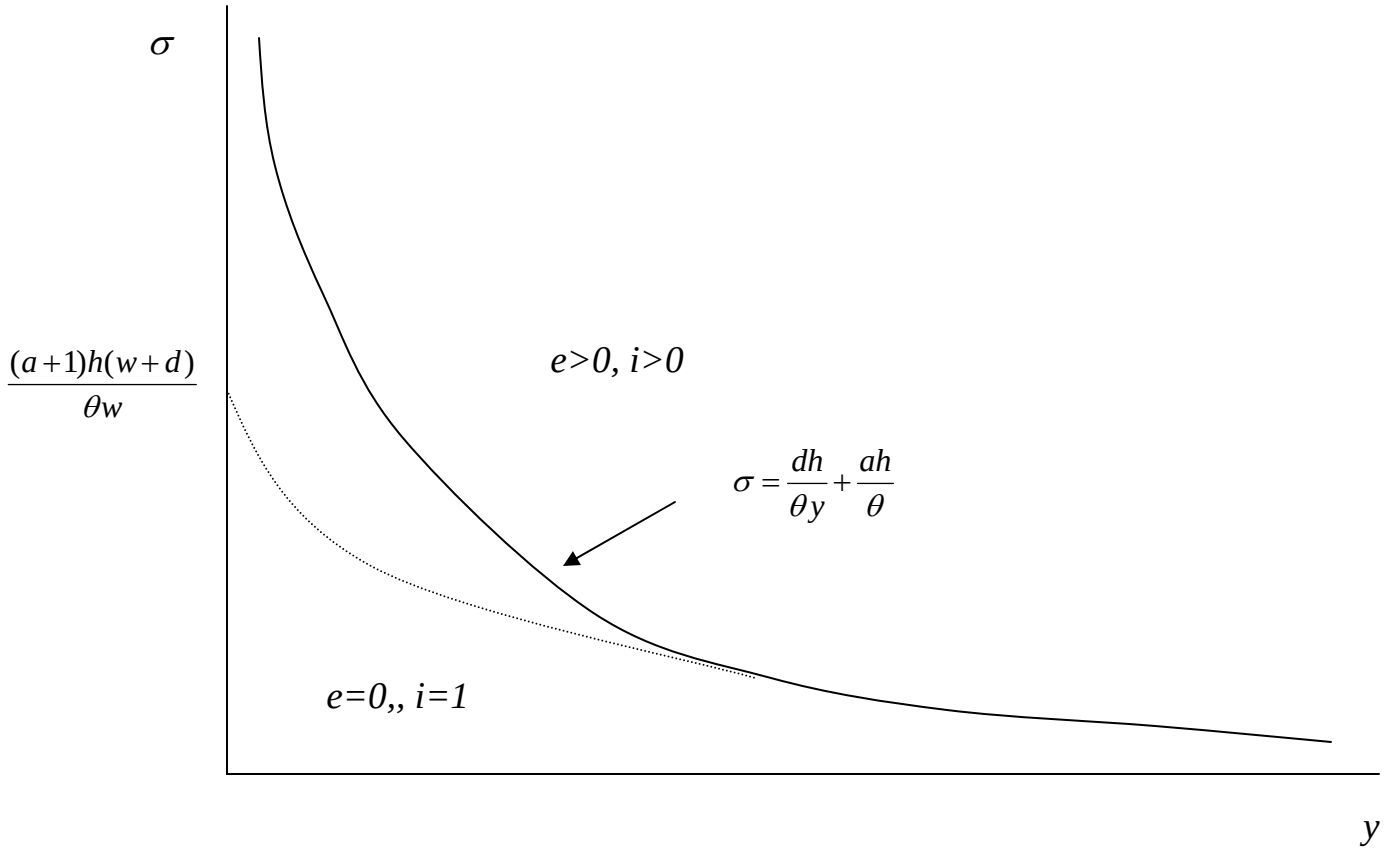
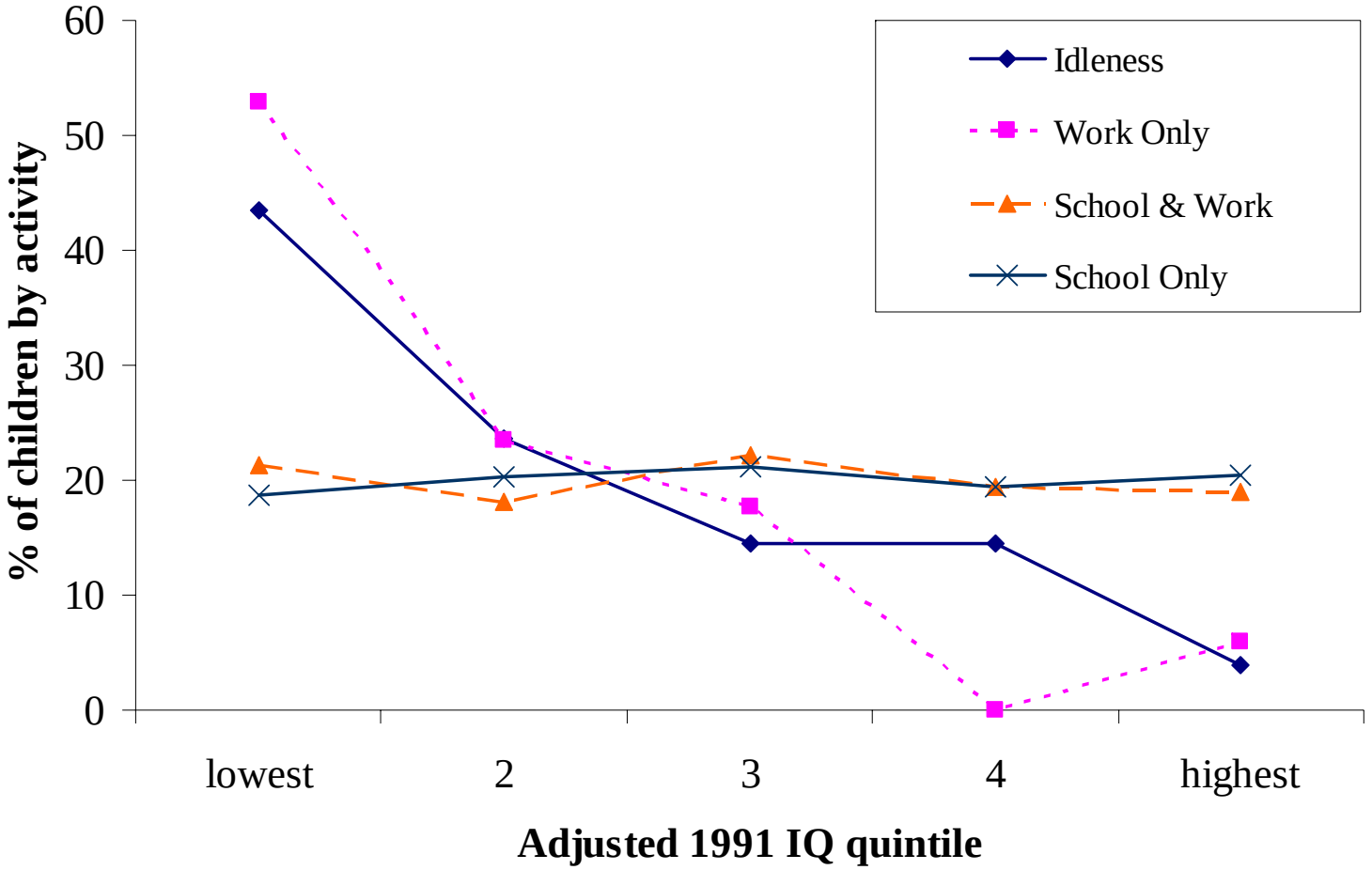
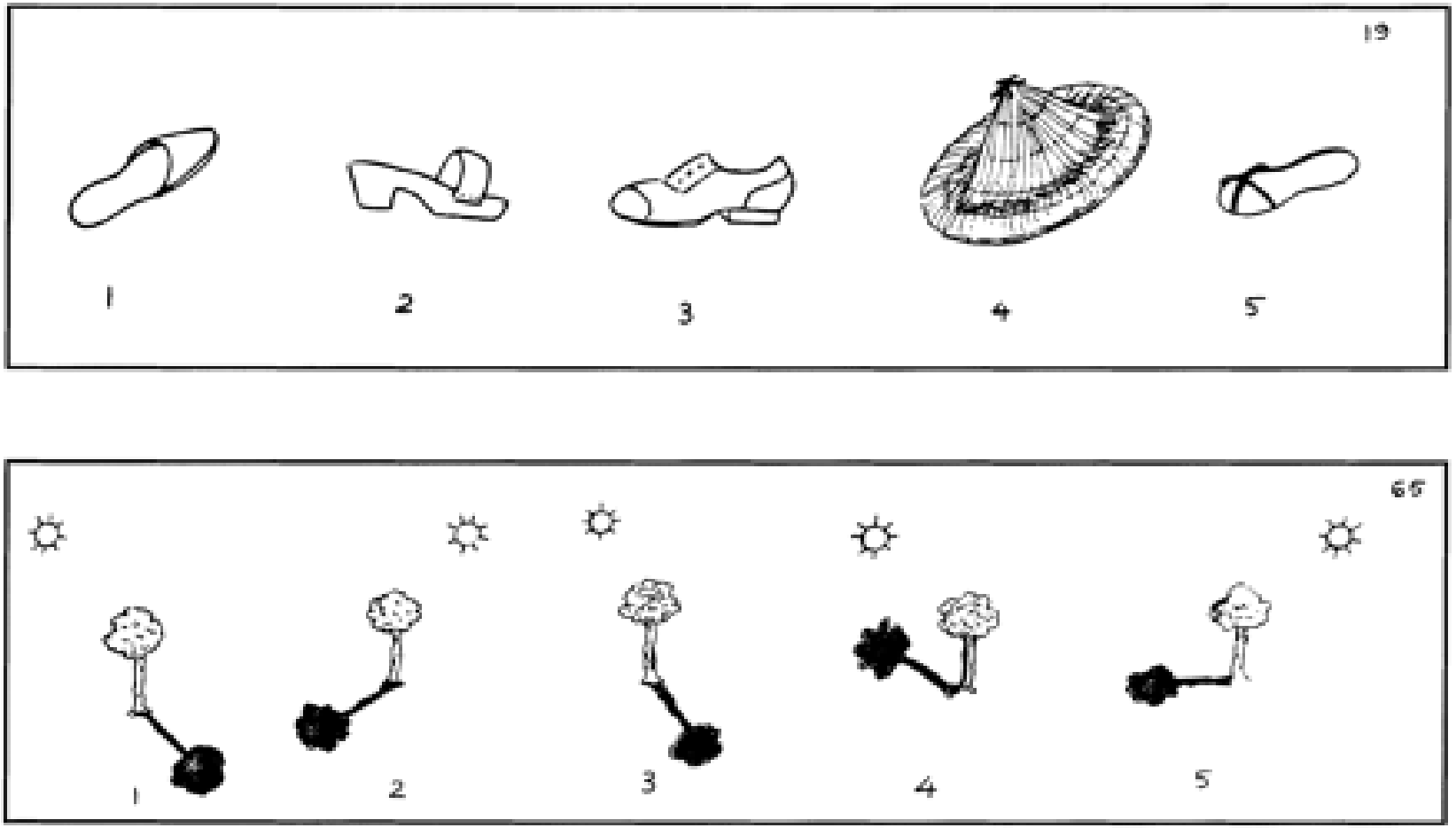


Figure 3. IQ distribution, by activity



Source: CLHNS. Percentages add up to one within activity. IQ is regression-adjusted for current or last grade.

Figure 4. Sample questions from the Phillippines Non-Verbal Intelligence (IQ) Test.



Note: Test questions were asked in series of 100 cards that increase in difficulty. Above are cards number 19 and 65. Children were asked: Which one of the 5 items is different? Pictures from Mendez & Adair (1999).

TABLE 1. Descriptive Statistics of Key Variables, by Child Activity

	Not Enrolled in School		Enrolled In School	
	No Work	Working	Working	No Work
No. of children	95 (4.3%)	21 (1%)	228 (10.4%)	1848 (84.3%)
Age in 1994	10.28 (0.45)	10.33 (0.48)	10.30 (0.46)	10.27 (0.44)
Male	0.68	0.62	0.46	0.52
Grade Level[1]	2.66 (1.19)	2.60 (1.1)	4.11 (1.07)	4.18 (0.92)
Ever Repeated Grade	0.48	0.45	0.22	0.23
Delayed Enrollment	0.40	0.43	0.28	0.23
1991 IQ	41.39 (13.45)	39.82 (12.32)	51.30 (12.35)	52.15 (12.09)
Adjusted 1991 IQ[2]	43.86 (8.96)	43.58 (8.08)	49.77 (7.69)	50.35 (7.76)
1994 IQ	55.59 (11.35)	53.70 (12.09)	69.24 (11.31)	69.73 (11.22)
Adjusted 1994 IQ[2]	45.88 (9.65)	44.56 (9.54)	50.28 (9.10)	50.41 (9.56)
FatherED	4.94 (3.28)	4.47 (3.22)	7.48 (3.70)	7.88 (3.99)
MotherED	4.75 (3.10)	4.26 (2.23)	7.31 (3.75)	7.65 (3.89)
MomWork	0.73 (0.45)	0.95 (0.23)	0.91 (0.29)	0.70 (0.46)
Log PCE[3]	6.33 (1.46)	5.77 (1.54)	7.25 (1.33)	7.41 (1.36)
House Index[4]	-0.50 (0.51)	-0.43 (0.65)	-0.10 (0.78)	0.04 (0.88)
Assets Index[5]	-0.59 (0.48)	-0.76 (0.30)	-0.00 (0.92)	0.04 (0.96)
FamBus[6]	0.41 (0.49)	0.52 (0.51)	0.70 (0.46)	0.41 (0.49)
Characteristics of school nearest to household:				
Distance (meters)	559.8 (383.7)	702.4 (379.1)	437.2 (344.9)	437.8 (375)
Facilities Index[7]	7.46 (1.86)	7.18 (1.55)	7.85 (1.56)	7.92 (1.62)
Resource Index[8]	4.0 (2.19)	3.88 (2.45)	4.27 (1.89)	4.54 (1.85)
Has electricity	0.63	0.47	0.80	0.82
NEAT[9]	135.8 (84.1)	110.8 (88.9)	157.5 (65.5)	158.6 (67.4)

Notes: Unless otherwise noted, figures report cell means and standard errors in parentheses. Figures are conditional on non-missing entries. Data on schools refer to the 1994-95 school year.

[1] For children currently not in school, this refers to the grade level when they were last enrolled.
[2] This is the residual from a regression of IQ on current or last enrolled grade at the time of the test, re-centered with mean 50 and standard deviation 10.
[3] Annualized total household expenditures divided by total number of household members.
[4] From factor analysis of 11 indicators of housing value and quality: whether the household owns the house, owns the house's lot, the value of the house, rental fee if the house is rented, estimate of rent if they were renting own house, number of rooms, bathrooms, whether the house is connected to the electricity grid, whether neighboring homes are also connected, whether the house is constructed of cement or wood with galvanized roof, and whether neighboring homes' are of cement or wood with galvanized roof.
[5] From factor analysis of presence or quantity of: bicycle, motorcycle, tricycle, jeepney, bus, car, boat, other vehicle, poultry, pigs, goat, carabao, other animals, sala set, china cabinet, iron, closet/armoire/chest, beds, furniture, television, recorder, refrigerator, air-conditioner, electric fan, telephone, other appliances.
[6] Indicates the presence of a family business, not necessarily whether the child works for it.
[7] Sum of 10 indicators: main construction materials of school is concrete; school has electricity; has piped water supply; students have access to flush toilet (vs. latrine, open pit, or none); if no classes meet in rooms separated by temporary partition; no multiple grade classrooms; no lack of classrooms; classes do not need to be moved if it rains; if 100% of classrooms have useable blackboard; if there is a library.
[8] The resource index is out of 8 indicators: if school has a staff room; has file cabinets for records; has a telephone; has typewriter; if teachers have access to a computer; teachers are provided chalk; teachers provided pens, pencils, crayons; and are provided with paper.
[9] The National Elementary Assessment Test (NEAT) is a test administered to sixth grade pupils in all Philippine public and private elementary schools. This figure refers to the school-average NEAT score in the school nearest to the child's residence.

TABLE 2. (Self-Reported) Primary Reason Why Not In School, By Child Labor

	Idleness	Work Only	Total
No Interest	35 (36.8%)	7 (33.3%)	36.21%
Illness	19 (20.0%)	2 (9.5%)	18.10%
Financial Problems	8 (8.4%)	5 (23.8%)	11.21%
Gambling	9 (9.5%)	1 (4.8%)	8.62%
Scared of teacher	6 (6.3%)	1 (4.8%)	6.03%
Babysitting	3 (3.2%)	2 (9.5%)	4.31%
Late for registration	4 (4.2%)	0	3.45%
Works Fam Bus	1 (1.0%)	2 (9.5%)	2.59%
Knows nobody	1 (1.0%)	0	0.86%
School too far	1 (1.0%)	0	0.86%
Did not respond	8 (8.4%)	1 (4.8%)	7.76%

TABLE 3. Distribution of children by activity across IQ, PCE percentiles

1991 Adjusted IQ			
Upper Third	Idle: 0.02 Work: 0 Schl & Work: 0.10 Schl: 0.88	Idle: 0.02 Work: 0 Schl & Work: 0.12 Schl: 0.85	Idle: 0.01 Work: 0 Schl & Work: 0.10 Schl: 0.89
Middle	Idle: 0.05 Work: 0 Schl & Work: 0.12 Schl: 0.82	Idle: 0.01 Work: 0.02 Schl & Work: 0.11 Schl: 0.87	Idle: 0 Work: 0 Schl & Work: 0.10 Schl: 0.89
Bottom Third	Idle: 0.10 Work: 0.02 Schl & Work: 0.12 Schl: 0.76	Idle: 0.06 Work: 0.01 Schl & Work: 0.09 Schl: 0.84	Idle: 0.03 Work: 0.01 Schl & Work: 0.08 Schl: 0.89
	Bottom Third	*Middle*	*Upper Third* PCE

Source: CLHNS. Percentages add up to one within each cell.

TABLE 4. Household Wealth, IQ, Mother's Labor Supply, and School Quality as Determinants of Child Activity: Coefficients from Multinomial Logit Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Idle	Work Only	School & Work	Idle	Work Only	School & Work	Idle	Work Only	School & Work
LogPCE	-0.4138	-0.6539	-0.08	-0.2829	-0.5857	-0.1403	-0.2742	-0.5519	-0.1424
	[0.0797]***	[0.1445]***	[0.0539]	[0.0899]***	[0.1784]***	[0.0634]**	[0.0909]***	[0.1837]***	[0.0634]**
LogIQ91	-3.9341	-3.5873	-0.2918	-3.4234	-2.8624	-0.35	-3.4261	-2.5626	-0.3312
	[0.6417]***	[1.3060]***	[0.4569]	[0.6717]***	[1.3409]**	[0.4824]	[0.6900]***	[1.4272]*	[0.4854]
female				-1.2634	-19.8444	0.2104	-1.3266	-20.4937	0.2086
				[0.4499]***	[0.4921]***	[0.3455]	[0.4521]***	[0.4968]***	[0.3462]
FatherED				-0.0982	-0.0895	-0.0031	-0.0942	-0.0596	-0.0051
				[0.0430]**	[0.0890]	[0.0249]	[0.0439]**	[0.0903]	[0.0252]
MotherED				-0.1055	-0.1096	0.006	-0.0981	-0.1235	0.0037
				[0.0445]**	[0.1007]	[0.0256]	[0.0453]**	[0.1045]	[0.0258]
momwork				-0.1223	1.2609	0.9917	-0.1626	1.1273	0.9819
				[0.3159]	[1.0753]	[0.3267]***	[0.3188]	[1.0804]	[0.3274]***
momwork*female				0.7953	19.6154	0.0193	0.865	20.3693	0.0279
				[0.5310]	[0.0000]	[0.3804]	[0.5337]	[0.0000]	[0.3811]
FamBus				0.1378	0.4907	1.0369	0.1317	0.4527	1.0417
				[0.2391]	[0.4728]	[0.1601]***	[0.2420]	[0.4830]	[0.1605]***
LogDist							0.1435	0.6207	-0.0593
							[0.1702]	[0.3941]	[0.0993]
NEAT							0.0045	-1.30E-03	0.00E+00
							[0.0025]	[0.0048]	[0.0013]
electricity							-0.5686	-0.5615	-0.0327
							[0.3039]*	[0.5908]	[0.2152]
Constant	14.8167	13.5095	-0.3569	13.4808	10.4064	-1.1838	12.2113	5.7659	-0.8409
	[2.4022]***	[4.8803]***	[1.7226]	[2.5288]***	[5.0607]**	[1.8369]	[2.7706]***	[5.8052]	[1.9359]
No of Observations	2192			2192			2192		
Log-Likelihood	-1155.2			-1081.92			-1071.66		

Notes: * indicates statistically significant at 10%; ** at 5%; *** at 1%. Marginal effects (evaluated at the mean of variables) and associated standard errors reported in brackets are in percentage points. Baseline category is full-time schooling. Other regressors not reported in the table are dummy indicators for missing variables.

TABLE 5. Sibling Differences in IQ and Activities

Panel A. Mean differences in standardized IQ across sibling pairs, by activity

	Younger Sibling (j)'s Activity				
Index Child (i)'s Activity	Idle	Work Only	School & Work	School Only	Total
Idle	-0.13	0.12	0.04	**-0.86**	-0.48
	(.97)	(.48)	(1.68)	(.97)	(1.09)
	14	*2*	*5*	*23*	*44*
Work Only	-0.08		0.36	-0.58	-0.15
	(1.03)		(.39)	(.82)	(.78)
	2		*3*	*4*	*9*
School & Work	0.56	0.19	-0.07	0.05	0.03
	(2.01)	(.4)	(.91)	(.97)	(.97)
	3	*3*	*32*	*89*	*127*
School Only	**0.44**	0.59	-0.02	**0**	0.02
	(1.02)	(.77)	(.87)	(.92)	(.92)
	34	*5*	*64*	*889*	*992*
Total	0.27	0.38	-0.02	-0.02	0
	(1.07)	(.61)	(.91)	(.93)	(.94)
	53	*10*	*104*	*1005*	*1172*

Note: First entry in each cell is average difference in standardized IQ scores across siblings in that cell: IQ94(i)-IQ94(j). The second entry in parentheses is its associated standard error. The third entry in italics is the number of sibling pairs in that cell.

Panel B. Multinomial Logit Coefficients: Sibling Differences

Variables	child *i* any school; child *j* work only or idle	child *i* work only or idle; child *j* any school
IQ(i)- IQ(j)	0.4819	-0.7571
	(0.1673)***	(0.1922)***
both i, j female	-1.0057	-0.261
	(0.5257)*	(0.496)
i male; j female	-1.29	-0.1254
	(0.5711)**	(0.443)
i female; j male	0.4343	-0.5428
	(0.352)	(0.52)
age(i)- age(j)	0.2226	0.3922
	(0.163)	(0.1802)**
Constant	-3.6027	-4.4026
	(0.4908)***	(0.5678)***
No. of pairs	1172	1172

Notes: Multinomial logit coefficients. Standard errors are in parentheses. * indicates statistically significant at 10%; ** at 5%; *** at 1%. Baseline category is both children pursue the same activity. Child i refers to the older index child and j the younger sibling of school age.

Appendix Table 1. Changes in Predicted Probabilities for Child Activity

	Idle	Work Only	School & Work	School Only
LogPCE				
Min->Max	-0.1121	-0.0047	-0.1390	0.2558
-+1/2	-0.0053	-0.0001	-0.0109	0.0163
-+sd/2	-0.0074	-0.0001	-0.0151	0.0227
MargEfct	-0.0053	-0.0001	-0.0109	0.0163
LogIQ91				
Min->Max	-0.9970	-0.0002	0.0740	0.9232
-+1/2	-0.1001	-0.0003	-0.0165	0.1170
-+sd/2	-0.0774	-0.0003	-0.0149	0.0925
MargEfct	-0.0693	-0.0003	-0.0202	0.0898
female				
0->1	-0.0034	-0.6450	0.0699	0.5784
FatherED				
Min->Max	-0.0312	-0.0001	-0.0048	0.0361
-+1/2	-0.0019	0.0000	-0.0002	0.0022
-+sd/2	-0.0088	0.0000	-0.0011	0.0099
MargEfct	-0.0019	0.0000	-0.0002	0.0022
MotherED				
Min->Max	-0.0336	-0.0002	0.0086	0.0252
-+1/2	-0.0020	0.0000	0.0005	0.0015
-+sd/2	-0.0086	-0.0001	0.0020	0.0067
MargEfct	-0.0020	0.0000	0.0005	0.0015

	Idle	Work Only	School & Work	School Only
momwork				
0->1	-0.0051	0.0001	0.0703	-0.0653
momwork*female				
0->1	-0.0154	0.9899	-0.0865	-0.8879
FamBus				
0->1	0.0006	0.0000	0.0894	-0.0901
LogDist				
Min->Max	0.0251	0.0009	-0.0480	0.0220
-+1/2	0.0030	0.0001	-0.0050	0.0019
-+sd/2	0.0039	0.0001	-0.0065	0.0025
MargEfct	0.0030	0.0001	-0.0050	0.0019
NEAT				
Min->Max	0.0315	0.0000	-0.0017	-0.0298
-+1/2	0.0001	0.0000	0.0000	-0.0001
-+sd/2	0.0064	0.0000	-0.0003	-0.0060
MargEfct	0.0001	0.0000	0.0000	-0.0001
electricity				
0->1	-0.0136	-0.0001	-0.0014	0.0151

Notes: Predicted probabilities are calculated from last 3 cols of full multinomial logit model in Table 4. Changes in predicted probabilities is the difference in the predicted value as the independent variable changes while all others are held constant at their means. Independent variables go from its minimum to its maximum (Min→Max), from -0.5 units of its mean to +0.5 of the mean (-+1/2), ±0.5 standard deviation to the mean (-+sd/2), and from 0 to 1 in the case of dummy variables (0→1).