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The Joint Estimation of Filipino Child's Participation in Schooling and Employment and New Stylized Facts on the Philippine Child Labor Situation

Cesar C. Rufino
De La Salle University, Manila, Philippines
cesar.rufino@dlsu.edu.ph

This study utilized the recently available public use raw data file of the 2011 round of the Annual Poverty Indicator Survey (APIS) to establish the latest stylized facts on the Philippine child labor situation. Public use file of the 2008 APIS was also used to generate comparative descriptives. It is also an attempt to jointly estimate the schooling and employment choices of Filipino children via the multinomial logit model that used the four different permutations of schooling and employment as the mutually exclusive and exhaustive categories of choice. A value added feature of the study is the use of survey design consistent procedures in establishing the descriptives as well as the estimates of the main empirical model. Tabulated summaries of the results reveal some alarming developments in the child labor situation of the country. The outcome of the econometric modeling confirms the empirical relevance of certain covariates discussed in the literature concerning schooling/work choice formation of Filipino children.

JEL Classifications: C4, D1, I3, J2, O1

Keywords: Child labor, Multinomial Logit Model, Design Consistent Estimation, Relative Risk Ratio

INTRODUCTION

Child labor, because of its tremendous welfare implications has developed into an issue of grave concern among economists, sociologists, politicians, international agencies, NGOs, and the general public. Vivid imageries of children engaged in, at times back-breaking, human labor are often seen in the internet and media of wide circulation, escalating the awareness of the general public on mostly third world children's plight. This public interest seems to be motivated by a concern about child labor as a human rights issue and its implication for long-term growth and development through its interaction with education (Edmonds, 2007). The most common policy response of governments and multilateral agencies to the problem is legislation and/or labor conventions, protocols, and roadmaps that would effectively enforce a ban on child labor. The public meanwhile employs certain forms of consumer boycott of products produced by child laborers. However, since it is well recognized that the multi-faceted phenomenon of child labor is intricately rooted from, and interwoven with, the equally multi-dimensional problem of poverty, most of these interventions are often ineffective—mainly due to vested interests and hidden protectionism (Basu, 1998, 1999), resulting in further aggravation of either child labor, or poverty, or both.

Concurrent with this rise in public awareness is a proliferation of theoretical and empirical literature on why children who are supposed to be engaged in full time schooling are instead working. Outstanding theoretical publications such as those of Basu and Van (1998), Baland and Robinson (2000), and Ravallion and Wodon (2000) have spurred such a large number of empirical studies, tackling the different dimensions of child labor across time and settings.

The need for a formal and objective inquiry into the causes and consequences of child labor has driven the economics profession far afield to study this issue. As a result, over the last two decades, there has been an upsurge of studies on the economics of child labor, both theoretical and empirical. A good number of these studies feature the Philippines as a case in point (e.g. Gunn & Ostos, 1992; Sakellariou, 2000; Sakellariou & Lall, 2000; Del Rosario & Bonga, 2000; Lim, 2002; Alonzo & Edillon, 2002; Esguerra, 2002; Edralin, 2002; Villamil, 2002; Aldaba, Alzona, & Tamangan, 2004; Bacolod & Ranjan, 2008; Dacuycuy & Dacuycuy, 2013). Most of these researches focus on the empirical determination of the relevant factors that explain why Filipino children are engaged in at times dehumanizing employment in various settings.

Although child labor is undesirable, there is a wide disagreement among researchers on how to address the problem. But in the pursuit of solutions, almost everyone agrees on the need to identify the factors that contribute to the continued existence of the problem, and focus on monitoring these factors through periodic sample surveys in order to craft policies that can effectively curb the phenomenon.

This research aims to use the most recently available public use raw data file of the APIS 2011 in a simultaneous microeconometric estimation of the different schooling and employment outcomes (or choices) of (or for) Filipino children. The objective of the study is to provide new insights on the child labor situation of the country and to offer new evidence on the continued empirical relevance of the findings of extant literature, in addition to supplying additional empirics on the linkage of child labor to poverty, the child's demographics, community and guardians' characteristics, and other socioeconomic indicators of child labor.

BRIEF LITERATURE REVIEW AND METHODOLOGY

The recent applied and theoretical literature on child labor has different strands. Models differ not only in their initial assumptions but also in the variables that are deemed to be of importance in explaining the phenomenon. A great majority of these studies supply empirical evidence on the role of poverty in the proliferation of child labor. Many of these works are based on what Basu and Van (1998) called the Luxury Axiom, that is, a family will send a child to work only if the family's non-child-labor income drops below some threshold. Children's age, gender, and marital status are also expected to affect their work and schooling choices. Beyond a certain age, the older the child, the more likely he or she works (Connelly, DeGraff, & Levison, 1996). Girls differ from boys as they are expected to substitute time at school for time doing household chores or child care activities, especially if the child has marital responsibilities (Levison, Moe, & Knaul, 2001). Manacorda (2006) on the other hand, found that children are less likely to work when they have older siblings and vice versa, that is, more likely to work if they have younger siblings to support (Villamil, 2002).

Some economists stress the importance of the interaction between adults´ labor market conditions and child labor (Basu & Van, 1998; Basu, 1999; Rosenzweig & Evenson, 1977) while other theoretical works include social norms and household preferences in the analysis (Birdsall, 1991; López-Calva, 1999). Dynamic models have also shown the use of child labor as a consumption smoothing device (Jacobi & Skoufias, 1997). Still others feature the involvement of the credit market in explaining the phenomenon (Ranjan, 2001; Dehejia & Gatti, 2002). Some studies document a positive correlation between family size and child labor (Patrinos & Psacharopoulos, 1997; Togunde & Richardson, 2006), and this is generally viewed as suggestive of resource and credit constraints on child time allocation as noted by Laitner (1997), Parsons and Goldin (1989), Jacoby and Skoufias (1997), Knodel and Wongsith (1991), Patrinos and Psacharopoulos (1997), and Dacuycuy and Dacuycuy, (2013). Works by Parikh and Sadoulet (2005) and Edmonds and Turk (2004) pointed out that children work more in households with more self employment activities, with higher correlation noted between child works and family's self employment as the household gets involved more on microcredit programs (Wydick, 1999).

The insights from the above studies will provide the basis in choosing the variables in APIS 2011 to be used as regressors of the causal model to be implemented in the present study. These variables will give the metrics that may capture the empirical validity of the ideas of these authors.

There are two main econometric models used in the empirical literature to identify the extent of the co-variation of the aforementioned factors with child labor. Which model to use depends on the underlying process followed by the decision maker. Decision-making may be sequential, that is, the household head first decides whether to send the child to school and, after a choice is made, the head decides whether to send him/ her to work. On the other hand, the head may choose among the four categorical school/work options that a child may engage in (i.e., school and no work, work and school, no work and no school, work and no school). Multinomial logit and multinomial probit models are well suited for the latter case (e.g., Liu, 1998; Deb & Rosati, 2001) whereas ordered logit or sequential probit models are appropriate for the former case (see Sakellariou & Lall, 2000; and Villamil, 2002). Also in the later case, it is assumed that there is a natural ordering of the options available to the child on the basis of his or her welfare. Other studies collapse the four outcomes into binary outcomes (study or no study, work or no work) and proceed to use either the binary logit or probit models (e.g. Patrinos & Psacharopoulos, 1997; Ray, 1998; Aldaba et al., 2004).

EMPIRICAL STRATEGY

This study is concerned with the determination of the explanatory factors on the decision of the children (or the decision of their parents/guardians) in entering the different study/work states available to them. It is posited that these choices are determined by three global attributes: (1) child's demographic characteristics, (2) household's socio-economic circumstances including age specific household composition and household head demographics, and (3) locational attributes of the household.

Notationally, we can use the following vectors to denote these global attributes:

$\mathrm{X} =$ vector of demographic characteristics of the child

$\Upsilon =$ vector of household's socio-economic characteristics

$\mathrm{Z} =$ vector of locational characteristics of the household

Generally speaking, two major decisions are to be made by, or for the child: whether or not he or she attends school and/or works. If we let W^* be the net benefit attained by the family in sending the child to work, and S^* be the latent variable which corresponds to the net benefit the family gained in sending the child to school, we can formulate the following latent variable models for the schooling/work outcomes for the child:

$$W_i^* = \delta_1 + \mathrm{X}_{1i}\beta_1 + \Upsilon_{1i}\lambda_1 + \mathrm{Z}_{1i}\varphi_1 + u_{1i} \qquad (1)$$

$$S_i^* = \delta_2 + \mathrm{X}_{2i}\beta_2 + \Upsilon_{2i}\lambda_2 + \mathrm{Z}_{2i}\varphi_2 + u_{2i} \qquad (2)$$

The latent variables W_i^* and S_i^* together with the random errors u_{1i} and u_{2i} are unobserved, with the error assumed independently and identically distributed (iid) with mean 0 and variance 1. What we actually observe are the following dummy variables:

$$W_i = 1 \text{ if the } i\text{th child works } (W_i^* > 0), \; 0 \text{ otherwise} \qquad (3)$$

$$S_i = 1 \text{ if the } i\text{th child studies } (S_i^* > 0), \; 0 \text{ otherwise} \qquad (4)$$

Setting up (1) and (2) for joint estimation, the following latent variable model in matrix notation emerges:

$$Y_i^* = C_i\theta + u_i \qquad (5)$$

where

$$Y_i^* = \begin{bmatrix} W_i^* \\ S_i^* \end{bmatrix} \quad C_i = \begin{bmatrix} 1\,\mathrm{X}_{1i} & \Upsilon_{1i} & \mathrm{Z}_{1i} & 0 \\ 0\;\;1 & \mathrm{X}_{2i} & \Upsilon_{2i} & \mathrm{Z}_{2i} \end{bmatrix}$$

$$\theta' = \begin{bmatrix} \delta_1\,\beta_1 & \lambda_1 & \varphi_1 & 0 \\ 0\;\delta_2 & \beta_2 & \lambda_2 & \varphi_2 \end{bmatrix} \text{ and } \quad u_i = \begin{bmatrix} u_{1i} \\ u_{2i} \end{bmatrix}$$

The latent variable model (5) can be estimated in the context of a *multinomial logit model* (see Greene, 2012, pp. 763-766) when (5) is converted into an observable form using the dummy variables (3) and (4) and the probabilities of the four mutually exclusive and exhaustive states:

$$W_i^* \le 0, S_i^* > 0 \text{ (child does not work } (W_i = 0)\text{, attends school } (S_i = 1)) \qquad (6)$$

$$W_i^* > 0, S_i^* > 0 \text{ (child works } (W_i = 1)\text{, attends school } (S_i = 1)) \qquad (7)$$

$$W_i^* \le 0, S_i^* \le 0 \text{ (child neither works } (W_i = 0) \text{ nor attends school } (S_i = 0)) \qquad (8)$$

$$W_i^* > 0, S_i^* \le 0 \text{ (child works } (W_i = 1)\text{, does not attend school } (S_i = 0)) \qquad (9)$$

By letting $Y_i = j$ ($j = 0$ for state (6), $j = 1$ for state (7), $j=2$ for state (8), and $j=3$ for state (9) for the *i*th child and using the *Gumbel* cdf as the link function, the following probabilities can be derived:

$$\Pr[Y_i = j] = \frac{\exp(C_i\,\theta_{(j)})}{1+\exp(C_i\,\theta_{(j)})} \tag{10}$$

for j = 1, 2, 3

$$\Pr[Y_i = 0] = \frac{1}{1+\exp(C_i\,\theta_{(j)})} \tag{11}$$

The vector of regression coefficients $\theta_{(j)}$ corresponds to the choice outcome *j* whose elements are estimated using *maximum likelihood procedure*, will provide the set of probabilities for the different school-work outcomes chosen by or for the child, given the specific global attributes of the child. These probabilities should sum up to unity as we assume that the outcomes are mutually exclusive and exhaustive, hence only three *multinomial logit equations* for three of the choices will be estimated, while the other one will serve as the *reference choice category*. In this study, the outcome *j* = 0 (child exclusively attends school) is the reference or base outcome.

Interpreting the estimated coefficients of the resulting equations may be daunting due to the non-linear nature of the model, but when we take the ratio of (10) and (11), we can come up with an intuitively appealing composite ratio called the *Relative Risk Ratio* (RRR) of the *j*th choice relative to the reference outcome (*j* = 0)

$$RRR_j = \frac{\Pr[Y_i = j]}{\Pr[Y_i = 0]} = \exp(C_i\theta_{(j)}) \tag{12}$$

which is interpreted, in *ceteris paribus* context per explanatory variable, as the risk of staying in category *j* relative to (or rather than moving to) the reference category, for one unit change in the corresponding variable. If the coefficient is negative, the RRR is a positive fraction, since it is the anti-logarithm of the coefficient. Alternatively, since the exponentiated coefficient of the relevant explanatory variable (*ceteris paribus*) is the RRR, it may be interpreted as the impact of a unit increase in the relevant regressor on the "odds ratio" of the *j*th state with reference to the base state (that's why RRR is sometimes referred to as OR or odds ratio). For example, if the RRR for the "family size" variable in outcome *j* = 3 (work only) is significant with magnitude of 4.0, may be interpreted as the risk for the child to remain a full time worker (rather than a full time student) is four times (i.e. 4 times as likely), per additional family member, *ceteris paribus*. If the regressor is a dummy variable, for example the gender dummy (sex=1 for boys, 0 otherwise), an RRR of 2 for the same equation may read as: the odds for boys to be working full time instead of studying full time is twice larger than that of girls, *ceteris paribus* (Hosmer & Lemeshow, 2000). Such interpretations are valid under the assumption of *independence from irrelevant alternatives (IIA)*.

The deterministic model (12) can be converted into an empirically testable econometric model, each for choices *j* = 1, 2, and 3 augmented respectively by a stochastic disturbance term u_{ij} with well-defined statistical properties. These models are the following multinomial logit equations, each of which is associated with the log odds ratio of the three schooling-work outcomes (study and work, no work-no study, and work only) respectively as the dependent variables, with *j* = 0 (study only) as the base outcome, that is,

$$\log\left[\frac{p_{ij}}{p_{i0}}\right] = C_i\theta_{(j)} + u_{ij} \tag{13}$$

with $p_{ij} = \Pr[Y_i = j]$ which is the conditional probability of child i to choose option (or outcome) j = 1, 2, 3, given the global attributes in vector C_i associated with child i.

INCORPORATING THE SAMPLING DESIGN OF THE SURVEY: LET'S DO IT RIGHT!

It has been one of the goals of this study to compute descriptive statistics and parameter estimates of the models, as well as the stylized facts of the target population with full consideration of the complex design of the survey. This is made clear at the onset since I would like to distinguish this study from most statistical investigations that employ large-scale survey data. More often than not, statistical inferences in most of these researches are done with the assumption that the data collection is undertaken using simple random sampling (SRS) without replacement, with the elements of the target population having equal chance of being included in the sample. Although computationally convenient, this procedure is theoretically flawed when complex design was used in the survey (Deaton, 1997; Korn & Graubard, 1999).

The APIS, being a nationwide survey, employs a multi-staged stratified random sampling design aimed at economizing on the sample size (and cost of survey operation) without sacrificing the precision of the sample representation. As a consequence, each population element has different probabilities of inclusion in the sample. As such, there is a need to take into consideration the use of sampling weights (sometimes called raising factors) which represent the inverse of the selection probabilities for each sample element (Cochran, 1977). These sampling weights are needed to correct for differential representation and the effect of the sampling design on the estimates and their respective standard errors (Deaton, 1997; Rufino, 2013). This will ensure the unbiasedness and consistency of the estimates, resulting in better inference, in addition to the mitigation of the effects of heteroscedasticity.

DATA AND DESCRIPTIVE STATISTICS

The primary basis of establishing poverty statistics for the country is the Family Income and Expenditure Survey (FIES). This nationwide survey is conducted by the National Statistics Office once every three years involving about 42,000 households all over the Philippines. During times when the FIES is not conducted, the APIS is carried out to provide readily available non-income indicators of poverty which can be used as inputs to the development of an integrated poverty indicator and monitoring system in the country (Ericta & Luis, 2009). It presents a socio-economic profile of Filipino families and other information relating to their living conditions.

Survey items incorporated in any APIS round are agreed upon by a working group consisting of all stakeholders in poverty research and poverty monitoring in a series of consultative meetings. The final questionnaire is subsequently finalized and pre-tested in the field. The APIS 2011 round, conducted in July 2011 involved a total of 43,833 households of which 42,063 were successfully interviewed. This translated to a response rate of 96% at the national level. The sampling design used ensures reliability of estimates to at least the regional level. The database of the present study is the merged file of the households and individual persons' files which resulted in an over-all total of 193,097 observations, of which only 59,079 observations belong to the 5 to 17 years old age group which will be the focus of analysis. Design based inference, both descriptive analysis and econometric modeling, will be implemented using this nationwide sample of children.

DESIGN CONSISTENT SAMPLE DESCRIPTIVES

As presented in the empirical strategy section, the different explanatory variables of child labor/schooling decisions are divided into three global characteristic vectors (X, Υ, and Z). The relevant variables included in the APIS 2011 are grouped into these vectors with descriptive statistics presented in Table 1. The statistics shown are computed using design consistent estimation formulas via the sampling weights of each of the 59,079 observations. The weighted means of the dummy variables, in effect are the estimates of the population proportions (or probabilities) associated with these attributes, for example, the table shows that the proportion of Filipino children who are boys is estimated at 50.80%, with 95% confidence interval of 50.38% to 51.22% inclusive; 79.97% of Filipino children are sons or daughters of the household heads, with 95% confidence interval of 79.63% to 80.31% inclusive. For the quantitative variables like age, family size, per capita income, per capita expenditure, and so forth, the means may be considered as the design consistent estimates of the population means for these variables. Hence we can say, without loss of generality that the typical Filipino child is about 11.13 years old, who belongs to a household with about 6.15 members, whose head is about 46.5 years old, and so forth. Using Table 1, we can in effect construct a profile of a typical Filipino child in a valid inferential manner.

Table 1.
Design Consistent Stylized Facts, Children 5 to 17 Years Old, Philippines 2011

Vector X – Child's Characteristics						
No.	**Variable Name**	**Variable label/ Description**	**Weighted Mean**	**St. Error**	**95% Conf. Int. LL**	**UL**
1	age	Age of the Child	11.1278	0.0156	11.0972	11.1584
2	age2	Age squared	137.0965	0.3487	136.413	137.78
3	sex	Gender (1=Boy, 0=Girl)	0.508	0.0021	0.5038	0.5122
4	study	Dummy (1=Child studies, 0=Otherwise)	0.8016	0.0017	0.7982	0.805
5	work	Dummy (1=Child works, 0=Otherwise)	0.0697	0.0011	0.0676	0.0718
6	child_hhh	Dummy (1=Child of HHH, 0=Otherwise)	0.7997	0.0017	0.7963	0.8031
7	child_married	Dummy (1=Child is married, 0=Otherwise)	0.0037	0.0003	0.0032	0.0042
Vector Y – Household's Characteristics						
8	fsize	Family Size	6.1482	0.0094	6.1298	6.1666
9	chld_6_12	Dummy (1=HH has 6-12 yr child, 0=Otherwise)	0.8258	0.0016	0.8226	0.829
10	chld_6_11	Dummy (1=HH has 6-11 yr child, 0=Otherwise)	0.7712	0.0018	0.7677	0.7747
11	chld_13_16	Dummy (1=HH has 13-16 yr child, 0=Otherwise)	0.6281	0.0021	0.624	0.6322
12	chld_12_15	Dummy (1=HH has 12-15 yr child, 0=Otherwise)	0.6499	0.002	0.6458	0.6539
13	chld_18_up	Dummy (1=HH has 18 & up yr child, 0=Otherwise)	0.9991	0.0001	0.9988	0.9993

14	educ_6_12	Dummy (1=HH has 6-12 yr studying, 0=Otherwise)	0.7339	0.0019	0.7302	0.7377
15	educ_6_11	Dummy (1=HH has 6-11 yr studying, 0=Otherwise)	0.7029	0.002	0.699	0.7067
16	educ_13_16	Dummy (1=HH has 13-16 yr studying, 0=Otherwise)	0.4243	0.0021	0.4201	0.4284
17	educ_12_15	Dummy (1=HH has 12-15 yr studying, 0=Otherwise)	0.422	0.0021	0.4179	0.4262
18	totexpc	HH expenditure per capita	17,761	101	17,563	17,960
19	totincpc	HH income per capita	16,279	86	16,110	16,448
20	hhmsch	Number of HH members studying	2.4657	0.0065	2.4531	2.4784
21	hhmelem	Number of HH members studying in elementary	1.4324	0.0049	1.4227	1.442
22	hhmhs	Number of HH members studying in high school	0.6918	0.0035	0.6849	0.6987
23	hhmcol	Number of HH members studying in college	0.1199	0.0017	0.1167	0.1231
24	hhh_sex	Dummy (1=HHH is Male, 0=HHH is Female)	0.8372	0.0016	0.8341	0.8404
25	hhh_age	Age of HHH	46.5008	0.0501	46.4026	46.5991
26	hhh_single	Dummy (1=HHH is single, 0=otherwise)	0.012	0.0005	0.0111	0.013
27	hhh_married	Dummy (1=HHH is married, 0=otherwise)	0.8601	0.0015	0.8571	0.863
28	hhh_loweduc	Dummy (1=HHH is elem grad or less, 0=otherwise)	0.4319	0.0021	0.4277	0.436
29	hhh_higheduc	Dummy (1=HHH is at least HS grad, 0=otherwise)	0.1844	0.0017	0.1812	0.1877
30	hhh_selfempl	Dummy (1=HHH is self employed, 0=otherwise)	0.3481	0.002	0.3442	0.3521
31	electricity	Dummy (1=HH has electricity, 0=otherwise)	0.8425	0.0015	0.8396	0.8455
32	avail_loan	Dummy (1=HH has availed of loan w/in 3 mo., 0=otherwise)	0.3096	0.002	0.3057	0.3135
33	poor	Dummy (1=HH belongs to 1st quintile of pc income, 0=otherwise)	0.3396	0.002	0.3357	0.3435
		Study/Work Outcomes				
34	outcome0	Dummy (1=child studies only, 0=otherwise)	0.7726	0.0018	0.7691	0.7761
35	outcome1	Dummy (1=child studies and works, 0=otherwise)	0.029	0.0007	0.0277	0.0303
36	outcome2	Dummy (1=child does not study, neither works, 0=otherwise)	0.1577	0.0016	0.1546	0.1608
37	outcome3	(1=child works only, 0=otherwise)	0.0407	0.0008	0.0391	0.0423

		Vector Z – Locational Variables				
38	urban	Dummy (1=HH is situated in Urban area, 0=otherwise)	0.4479	0.0021	0.4436	0.4521
39	reg1	Dummy (1=HH is situated in Ilocos Region, 0=otherwise)	0.0528	0.001	0.0509	0.0547
40	reg2	Dummy (1=HH is situated in Cag. Valley Region, 0=otherwise)	0.0357	0.0007	0.0343	0.037
41	reg3	Dummy (1=HH is situated in Central Luzon Region, 0=otherwise)	0.1028	0.0015	0.1	0.1057
42	reg5	Dummy (1=HH is situated in Bicol Region, 0=otherwise)	0.0672	0.001	0.0652	0.0693
43	reg6	Dummy (1=HH is situated in Western Region, 0=otherwise)	0.0833	0.0013	0.0808	0.0858
44	reg7	Dummy (1=HH is situated in Central Visayas Region, 0=otherwise)	0.074	0.0012	0.0717	0.0763
45	reg8	Dummy (1=HH is situated in Eastern Visayas Region, 0=otherwise)	0.0523	0.0009	0.0506	0.054
46	reg9	Dummy (1=HH is situated in Zamboanga Region, 0=otherwise)	0.0426	0.0008	0.041	0.0442
47	reg10	Dummy (1=HH is situated in North Mindanao Region, 0=otherwise)	0.0458	0.0009	0.044	0.0475
48	reg11	Dummy (1=HH is situated in Davao Region, 0=otherwise)	0.0439	0.0008	0.0424	0.0454
49	reg12	Dummy (1=HH is situated in Soccsksargen Region, 0=otherwise)	0.0471	0.0008	0.0455	0.0487
50	reg13	Dummy (1=HH is situated in Metro Manila, 0=otherwise)	0.1036	0.0014	0.101	0.1063
51	reg14	Dummy (1=HH is situated in CAR, 0=otherwise)	0.0182	0.0004	0.0174	0.0189
52	reg15	Dummy (1=HH is situated in ARMM, 0=otherwise)	0.0458	0.0007	0.0444	0.0473
53	reg16	Dummy (1=HH is situated in CARAGA, 0=otherwise)	0.0292	0.0006	0.0281	0.0303
54	reg41	Dummy (1=HH is situated in Calabarzon, 0=otherwise)	0.1178	0.0015	0.1148	0.1208
55	reg42	Dummy (1=HH is situated in MIMAROPA, 0=otherwise)	0.0379	0.0007	0.0365	0.0393

Also from Table 1, we can infer the estimated proportions (or probabilities) of Filipino children being in any of the four mutually exclusive and exhaustive study/work outcomes: 77.36% are full time students (study only), 2.90% are part-time workers (study and work), 15.77% are idle (no study, no work), and 4.07% are full time workers (work only). Gender differences of these estimates are pictorially shown in Figure 5. The only basis of whether the child is studying or working in this study is the survey respondent's answer to item 10 (currently attending school?) and item 15 (did work or had a job during the last six months period?).

DESIGN CONSISTENT ESTIMATES OF TOTALS AND PERCENTAGES

As earlier mentioned, the sampling design of APIS 2011 ensures reliable regional estimates of the parameters of the different variables. Presented in Table 2 and Table 3 are the regional estimates of the total and percentage of children who opted for the different study-work outcomes. Table 2 shows the regional totals and Table 3 presents the regional percentages. It can be seen in Table 2 that the estimated total number of children belonging to the 5 to 17 years age bracket is 29,513,512 which is lower than I

Table 2.
Total Number of Children by Region and by Study-Work Outcomes, 2011 Design Consistent Estimates

Region	Outcome				Totals
	Study Only	Study & Work	No study No work	Work Only	
Ilocos	1,264,647	13,355	226,098	54,480	1,558,580
Cagayan Valley	787,380	62,373	136,217	66,315	1,052,286
Central Luzon	2,302,288	17,407	635,441	79,882	3,035,018
Bicol	1,615,129	72,567	198,560	97,740	1,983,996
Western Visayas	1,930,465	85,506	336,925	105,042	2,457,938
Central Visayas	1,652,147	97,805	330,300	103,684	2,183,935
Eastern Visayas	1,259,752	51,146	141,082	91,130	1,543,110
Zamboanga Peninsula	1,032,265	36,350	113,589	75,280	1,257,484
Northern Mindanao	985,611	132,462	148,795	83,552	1,350,420
Davao	1,014,177	27,261	196,307	58,287	1,296,032
Soccsksargen	1,053,123	64,169	193,328	79,811	1,390,431
Metro Manila	2,319,129	10,573	696,890	31,552	3,058,143
CAR	392,853	23,862	95,995	23,243	535,953
ARMM	1,041,613	20,835	240,105	49,866	1,352,420
CARAGA	643,875	68,330	94,785	54,872	861,861
CALABARZON	2,601,668	26,290	765,384	84,143	3,477,484
MIMAROPA	905,644	45,638	105,312	61,908	1,118,501
Philippines	22,801,764	855,928	4,655,113	1,200,787	29,513,592

estimated figure of 29,568,043 using the 2008 APIS. In Table 3, it can be seen that the top 3 regions with children on this age group in 2011 are Calabarzon (11.78%), Metro Manila (10.36%) and Central Luzon (10.28%).

With respect to the age structure of the children, as well as their poverty status, vis-à-vis their study/work choices, design consistent estimates are also generated and presented in Table 4 and Table 5 respectively. It is suggested by Table 4 that the existence of an inverted U curve for the age of children when plotted against the Study only option, and a monotonically increasing geometric curve for the Work only option. A lot of insights can be gleaned when the figures presented in Table 4 are graphed per study-work outcome (or options). These insights are obvious in Figures 1 to 4. Figure 5 highlights the gender difference among the study/work options taken by Filipino children. It shows that male children are more likely to take options that involve working (study and work, and work only), whereas female children tend to specialize in full time study. Figure 6 represents the different options by urbanity variable which shows that more rural children are exclusively

Table 3.
Weighted Percentage of Children by Region and by Study-Work Outcomes, Philippines 2011

Region	Outcome				Totals
	Study Only	Study & Work	No study No work	Work Only	
Ilocos	81.14	0.86	14.51	3.50	5.28
Cagayan Valley	74.83	5.93	12.94	6.30	3.57
Central Luzon	75.86	0.57	20.94	2.63	10.28
Bicol	81.41	3.66	10.01	4.93	6.72
Western Visayas	78.54	3.48	13.71	4.27	8.33
Central Visayas	75.65	4.48	15.12	4.75	7.4
Eastern Visayas	81.64	3.31	9.14	5.91	5.23
Zamboanga Peninsula	82.09	2.89	9.03	5.99	4.26
Northern Mindanao	72.99	9.81	11.02	6.19	4.58
Davao	78.25	2.10	15.15	4.50	4.39
Soccsksargen	75.74	4.62	13.90	5.74	4.71
Metro Manila	75.83	0.35	22.79	1.03	10.36
CAR	73.30	4.45	17.91	4.34	1.82
ARMM	77.02	1.54	17.75	3.69	4.58
CARAGA	74.71	7.93	11.00	6.37	2.92
CALABARZON	74.81	0.76	22.01	2.42	11.78
MIMAROPA	80.97	4.08	9.42	5.53	3.79
Philippines	77.26	2.90	15.77	4.07	100.00%

Table 4.
Design Consistent Total and Percentage of Children by Outcome and by Age of Child, Philippines, 2011

Age of Child	Study/Work Outcome				Total
	Study Only	Study & Work	Neither Study Nor Work	Work Only	
5	1,330,206	1,733	690,505	1,018	2,023,463
	65.74	0.09	34.12	0.05	100.00
6	1,759,824	5,023	297,362	1,376	2,063,585
	85.28	0.24	14.41	0.07	100.00
7	2,113,828	13,933	99,932	2,572	2,230,265
	94.78	0.62	4.48	0.12	100.00
8	2,306,511	27,114	64,859	4,613	2,403,096
	95.98	1.13	2.70	0.19	100.00
9	2,148,975	33,715	47,617	6,851	2,237,158
	96.06	1.51	2.13	0.31	100.00
10	2,370,466	55,514	57,172	8,328	2,491,480
	95.14	2.23	2.29	0.33	100.00
11	2,163,517	64,225	55,672	11,846	2,295,260
	94.26	2.80	2.43	0.52	100.00
12	2,225,858	81,459	87,305	22,324	2,416,946
	92.09	3.37	3.61	0.92	100.00
13	2,066,409	124,112	115,532	65,961	2,372,015
	87.12	5.23	4.87	2.78	100.00
14	1,877,235	108,012	169,707	116,839	2,271,794
	82.63	4.75	7.47	5.14	100.00
15	1,748,837	168,074	185,641	215,246	2,317,797
	75.45	7.25	8.01	9.29	100.00
16	1,411,891	155,659	339,078	353,331	2,259,959
	62.47	6.89	15.00	15.63	100.00
17	1,086,660	135,715	451,392	511,458	2,185,225
	49.73	6.21	20.66	23.41	100.00
Total	24,610,217	974,286	2,661,776	1,321,764	29,568,043
	83.23	3.30	9.00	4.47	100.00

Table 5.
Design Consistent Total and Percentage of Children by Outcome and by Age of Child, Philippines, 2008

Age of Child	Study/Work Outcome				Total
	Study Only	Study & Work	Neither Study Nor Work	Work Only	
5	1,458,564	2,621	461,814	725	1,923,725
	75.82	0.14	24.01	0.04	100.00
6	1,710,055	5,201	303,942	384	2,019,583
	84.67	0.26	15.05	0.02	100.00
7	1,977,849	12,065	205,702	1,607	2,197,223
	90.02	0.55	9.36	0.07	100.00
8	2,070,317	24,962	185,402	886	2,281,567
	90.74	1.09	8.13	0.04	100.00
9	2,043,821	33,948	170,878	1,466	2,250,113
	90.83	1.51	7.59	0.07	100.00
10	2,203,194	45,617	191,568	2,477	2,442,857
	90.19	1.87	7.84	0.10	100.00
11	2,216,539	57,193	204,307	6,389	2,484,427
	89.22	2.30	8.22	0.26	100.00
12	1,954,143	73,344	266,845	19,001	2,313,333
	84.47	3.17	11.54	0.82	100.00
13	1,949,935	98,581	368,785	45,840	2,463,141
	79.16	4.00	14.97	1.86	100.00
14	1,775,279	110,565	409,058	87,678	2,382,580
	74.51	4.64	17.17	3.68	100.00
15	1,581,938	150,297	416,244	173,852	2,322,331
	68.12	6.47	17.92	7.49	100.00
16	1,128,323	135,188	655,946	365,028	2,284,485
	49.39	5.92	28.71	15.98	100.00
17	731,807	106,346	814,622	495,454	2,148,229
	34.07	4.95	37.92	23.06	100.00
Total	22,801,764	855,928	4,655,113	1,200,787	29,513,592
	77.26	2.90	15.77	4.07	100.00

working while more urban children are idle (no school, no work) by more than 2:1 ratio. Meantime, more rural children than urban study exclusively (79.08% vs. 75.02%).

To provide baseline statistics for the 2011 results to compare with, I used the merged individual and household files of the 2008 public use raw data of APIS to come up with Table 5. When compared with Table 4, a rather alarming development was noted—the percentage of children attending school on a full time basis dropped from 83.23% in 2008 to only 77.26% in 2011, and the percentage if idle children (not working and not attending school) increased, from 9.0% in 2008 to 15.77% in 2011. However, child labor, measured by the percentage of children engaged in the labor market full time declined from 4.47% in 2008 to 4.07% in 2011. More distressing results provided by both APIS rounds may be seen in the two tables, and this concerns the plight of our 16 and 17 years old children. In 2008, 15.63% of 16 years old kids and 23.41% of our 17 years old children are full time workers. In 2011, the corresponding figures are almost the same—15.98% of 16 year olds and 23.06% of the 17 years olds are exclusively working. These figures imply that almost 4 out of every 10 full time[1] Filipino child laborers are either 16 or 17 years old.

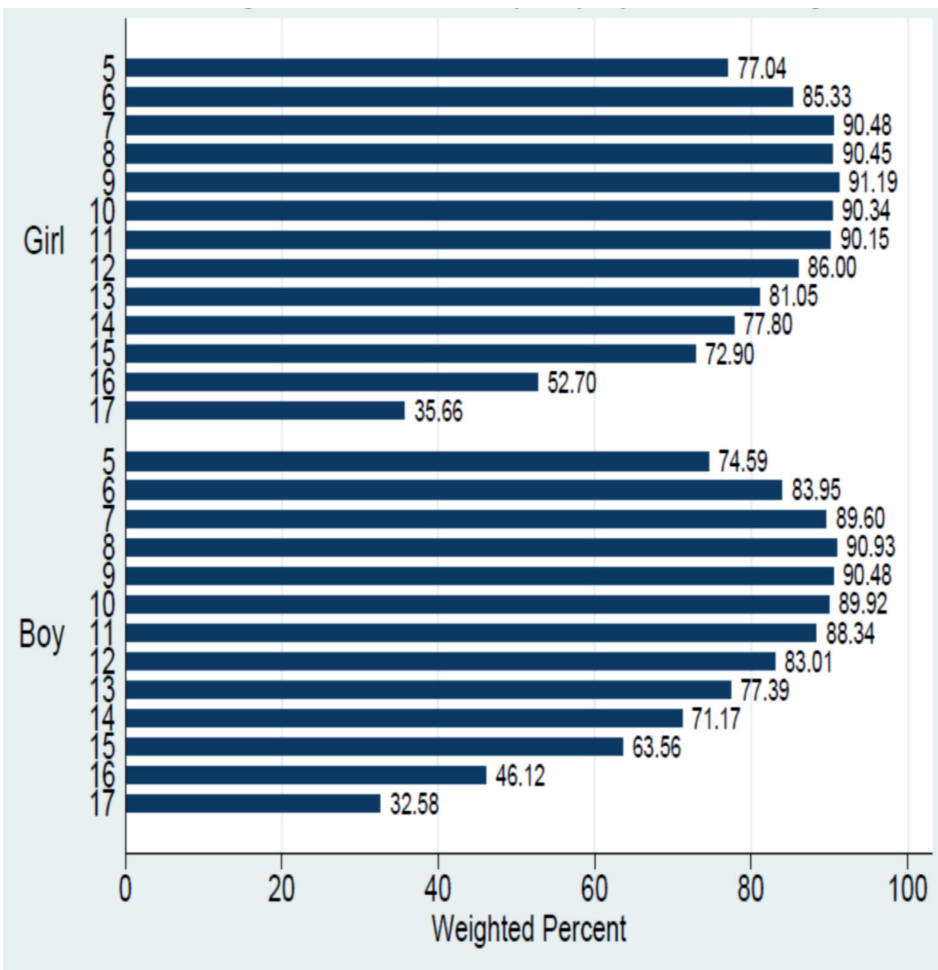

Figure 1.
Outcome: Study Only, by Gender and Age

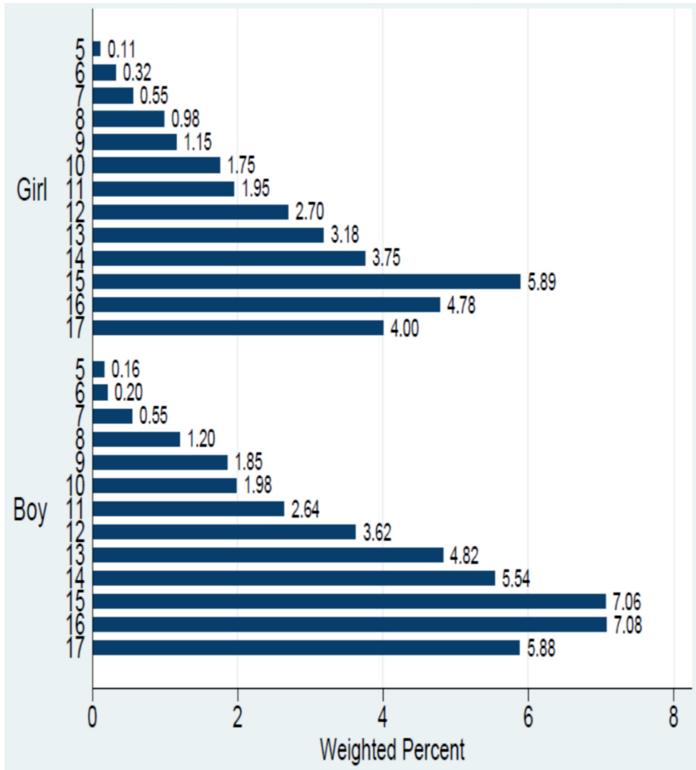

Figure 2.
Outcome: Study & Work, by Gender and Age

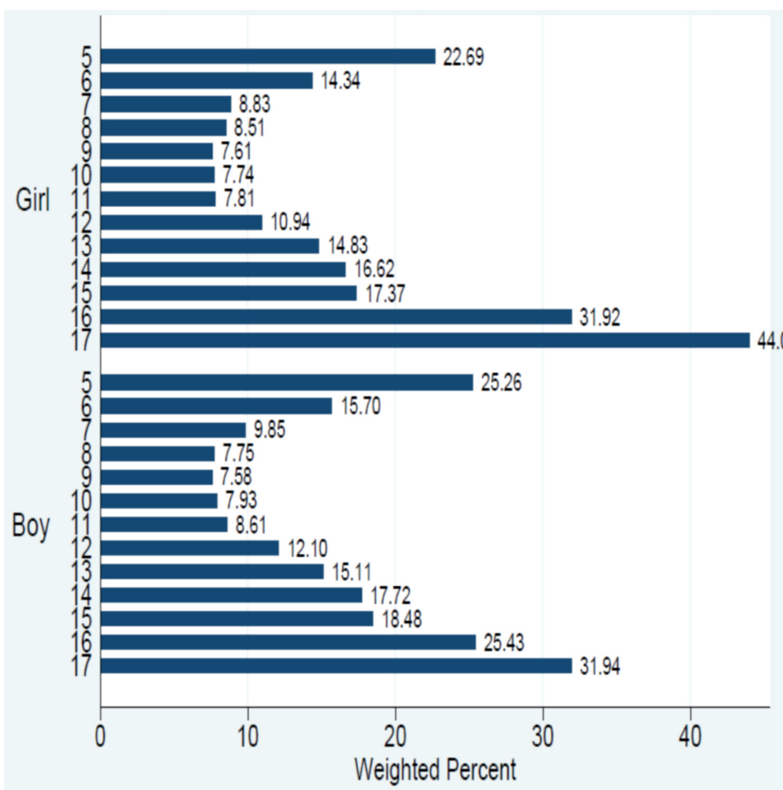

Figure 3.
Outcome: No Study No Work, by Gender and Age

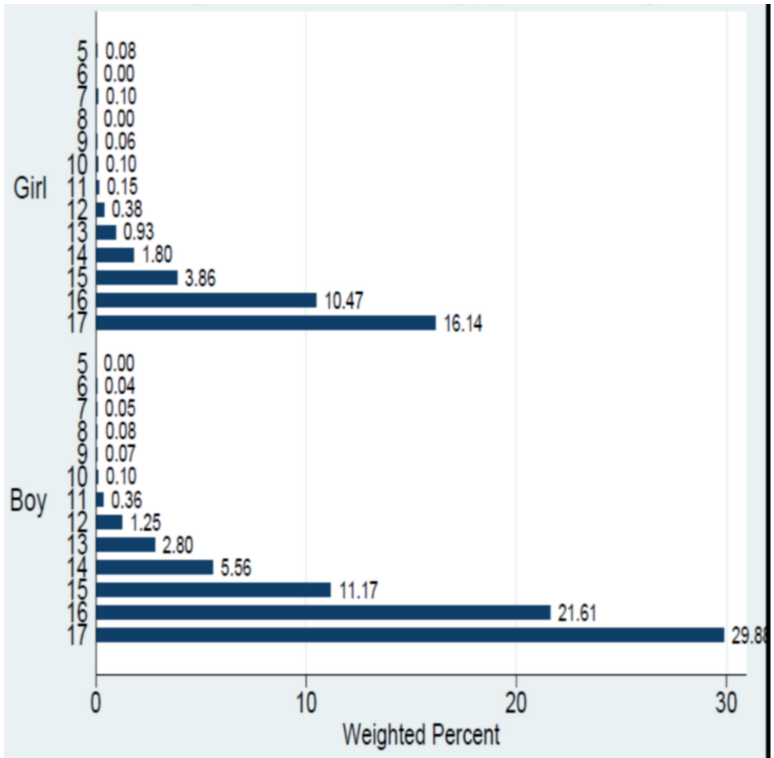

Figure 4.
Outcome: Work Only, by Gender and Age

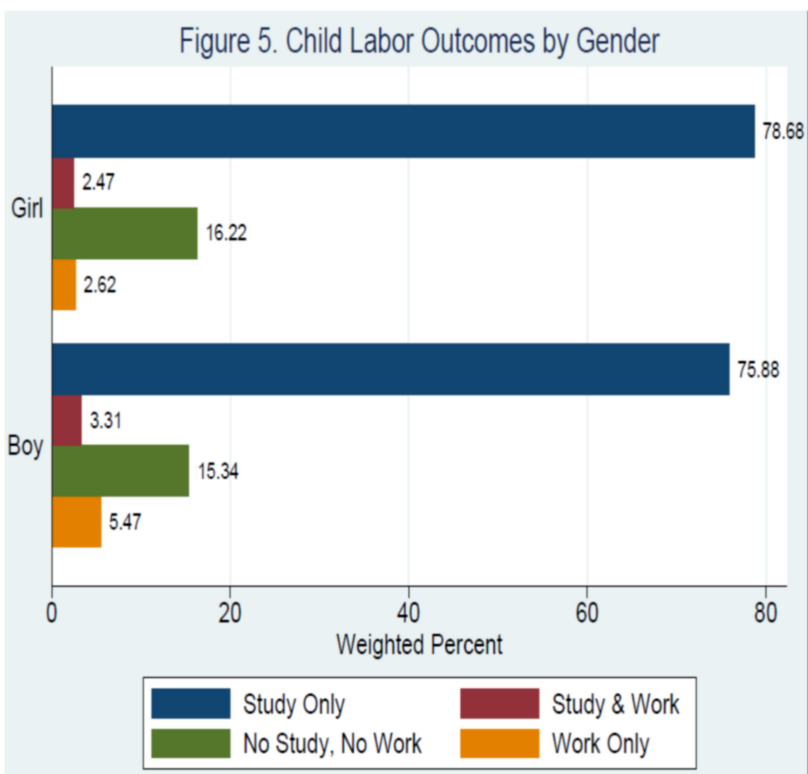

Figure 5.
Outcome: Child Labor Outcomes by Gender

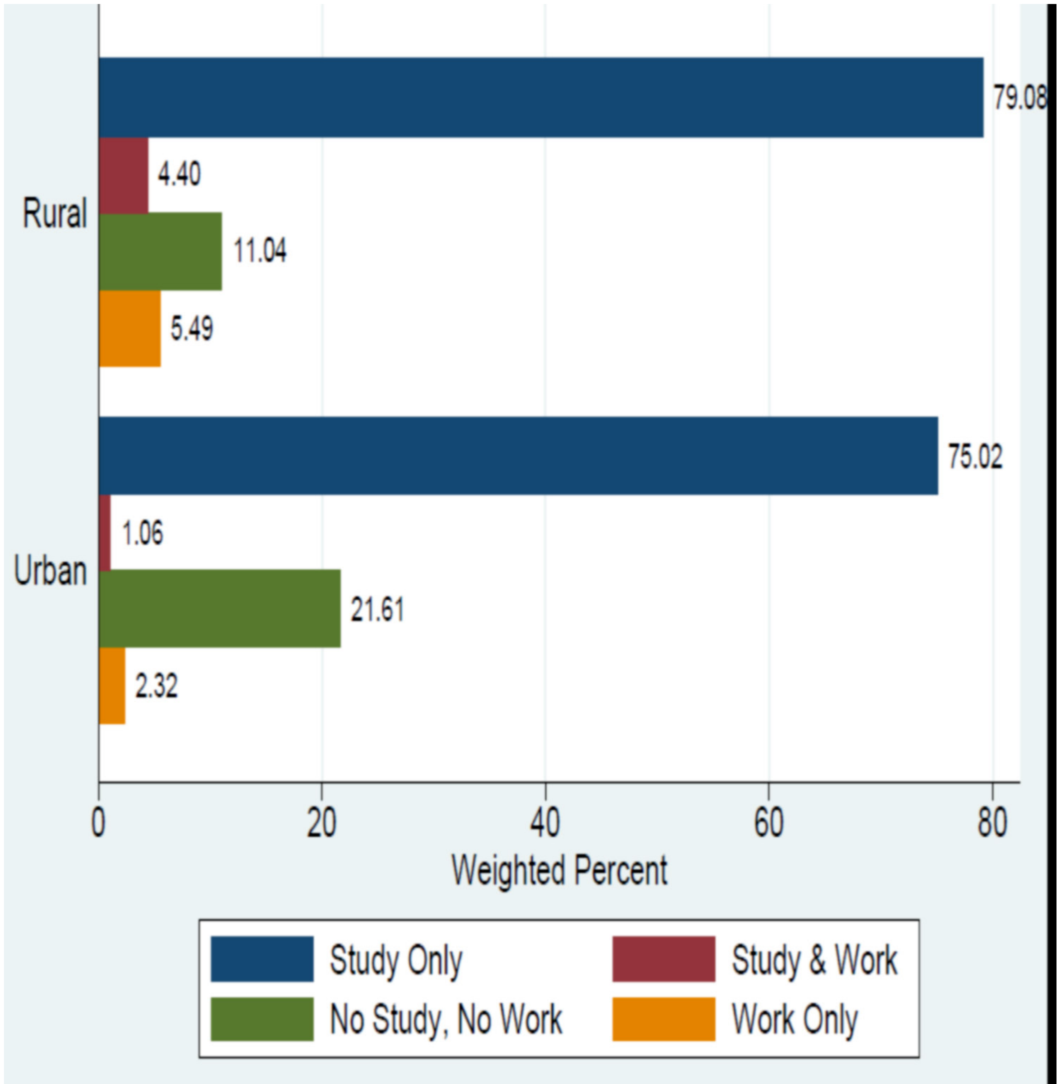

Figure 6.
Outcome: Child Labor Outcomes by Urbanity

RESULTS OF THE MULTINOMIAL LOGIT MODEL ESTIMATION

When the empirical strategy presented in section 3 is implemented using the merged files of households and individual children, new insights can be gleaned about the continued relevance of the different correlates of child labor and child schooling. The results of the sampling design consistent implementation of maximum likelihood estimation of the multinomial logit model discussed in section 3 are summarized in Table 6.

Table 6.
Joint Estimation of the Schooling-Work Outcomes of Filipino Children Using Sampling Design Based Implementation of the Multinomial Logit Model

SVY: Multinomial logit regression						
Age Group: 5 - 17 Years Old						
Base Outcome: Study Only (j = 0)	F(117, 59159) = 116.43 (p<0.000000)					
Study & Work (j =1)	**Coefficient**	**St. Error**	**RRR**	**St. Error**	**t-value**	**p-value**
Age of Household Head (HHH)***	0.315263	0.067222	1.370620	0.092136	4.69	0.0000
Age Squared	0.001022	0.002768	1.001022	0.002771	0.37	0.7120
Child's Sex***	0.452000	0.053275	1.571451	0.083719	8.48	0.0000
Child of HHH	0.142475	0.101935	1.153124	0.117544	1.40	0.1620
Child is Married	-0.445428	0.816465	0.640550	0.522987	-0.55	0.5850
Family Size	-0.024644	0.019824	0.975658	0.019341	-1.24	0.2140
Child is 6 to 12 Years Old	0.142085	0.147237	1.152674	0.169716	0.97	0.3350
No. of 6 to 12 yo in School*	-0.311966	0.149252	0.732007	0.109254	-2.09	0.0370
Total HH Expenditure Per Capita	-0.000003	0.000005	0.999997	0.000005	-0.55	0.5830
No. of HH Mem. In School*	-0.106914	0.049892	0.898603	0.044833	-2.14	0.0320
No. of HH Mem. In Elem.***	0.223865	0.055325	1.250902	0.069207	4.05	0.0000
No. of HH Mem. In HS***	0.230444	0.054683	1.259159	0.068854	4.21	0.0000
Sex of HHH	-0.153018	0.111516	0.858115	0.095693	-1.37	0.1700
Age of HHH	-0.002137	0.003258	0.997865	0.003251	-0.66	0.5120
HHH is Married	-0.096492	0.112332	0.908017	0.101999	-0.86	0.3900
HHH has Low Educ.***	0.249571	0.061716	1.283475	0.079211	4.04	0.0000
HHH has High Educ***	-0.486382	0.117101	0.614847	0.071999	-4.15	0.0000
HHH is Working***	1.034382	0.169316	2.813367	0.476348	6.11	0.0000
HHH is Self Employed***	0.606808	0.056325	1.834567	0.103331	10.77	0.0000
HH has Electricity***	-0.543846	0.062812	0.580511	0.036463	-8.66	0.0000
Poor HH***	0.252910	0.066694	1.287768	0.085886	3.79	0.0000
Urban HH***	-0.729406	0.076666	0.482195	0.036968	-9.51	0.0000
Ilocos***	-1.061134	0.226528	0.346063	0.078393	-4.68	0.0000
Cagayan Valley ***	0.956311	0.142059	2.602081	0.369649	6.73	0.0000
Central Luzon ***	-1.212582	0.228909	0.297428	0.068084	-5.30	0.0000
Bicol	-0.054362	0.142294	0.947089	0.134765	-0.38	0.7020
Western Visayas	0.116358	0.139640	1.123398	0.156871	0.83	0.4050
Central Visayas***	0.413002	0.136186	1.511348	0.205824	3.03	0.0020
Eastern Visayas	-0.182832	0.146665	0.832908	0.122158	-1.25	0.2130
Zamboanga Peninsula*	-0.332948	0.158758	0.716808	0.113799	-2.10	0.0360
Northern Mindanao ***	1.313838	0.131659	3.720426	0.489829	9.98	0.0000
Davao**	-0.460014	0.172239	0.631275	0.108730	-2.67	0.0080
Soccsksargen*	0.345660	0.139885	1.412922	0.197646	2.47	0.0130
Metro Manila***	-1.113229	0.255431	0.328496	0.083908	-4.36	0.0000
CAR***	0.357838	0.149313	1.430234	0.213552	2.40	0.0170
ARMM***	-1.315171	0.181112	0.268428	0.048616	-7.26	0.0000
CARAGA***	0.994434	0.132994	2.703193	0.359509	7.48	0.0000
CALABARZON***	-0.977812	0.191973	0.376133	0.072207	-5.09	0.0000
_cons***	-8.136198	0.492218	0.000293	0.000144	-16.53	0.0000

(* p<0.05, ** p<0.01, *** p<0.005)

SVY: Multinomial logit regression

Age Group: 5 - 17 Years Old

Base Outcome:
Study Only (j = 0)

Outcome: No Study, No Work (j = 2)	**Coefficient**	**St. Error**	**RRR**	**St. Error**	**t-value**	**p-value**
Age of Household Head (HHH)***	-1.607708	0.039043	0.200346	0.007822	-41.18	0.0000
Age Squared***	0.084520	0.001776	1.088195	0.001933	47.58	0.0000
Child's Sex***	0.100376	0.033669	1.105586	0.037224	2.98	0.0030
Child of HHH***	0.331861	0.054071	1.393559	0.075351	6.14	0.0000
Child is Married***	2.406629	0.428397	11.096490	4.753702	5.62	0.0000
Family Size***	0.434005	0.010181	1.543426	0.015714	42.63	0.0000
Child is 6 to 12 Years Old***	2.809570	0.065333	16.602770	1.084716	43.00	0.0000
No. of 6 to 12 yo in School***	-2.601705	0.069288	0.074147	0.005138	-37.55	0.0000
Total HH Expenditure Per Cap***	0.000016	0.000002	1.000016	0.000002	7.89	0.0000
No. of HH Mem. In School***	-2.280845	0.056540	0.102198	0.005778	-40.34	0.0000
No. of HH Mem. In Elem.***	1.337682	0.059417	3.810201	0.226392	22.51	0.0000
No. of HH Mem. In HS	-0.000620	0.063368	0.999380	0.063329	-0.01	0.9920
Sex of HHH***	-0.342527	0.060322	0.709974	0.042827	-5.68	0.0000
Age of HHH***	-0.014632	0.001857	0.985474	0.001830	-7.88	0.0000
HHH is Married	-0.026740	0.066107	0.973615	0.064363	-0.40	0.6860
HHH has Low Educ.*	-0.105432	0.043193	0.899936	0.038871	-2.44	0.0150
HHH has High Educ***	0.327792	0.050476	1.387901	0.070055	6.49	0.0000
HHH is Working	-0.076541	0.056842	0.926315	0.052653	-1.35	0.1780
HHH is Self Employed	0.005878	0.039917	1.005895	0.040152	0.15	0.8830
HH has Electricity	-0.104270	0.054482	0.900982	0.049088	-1.91	0.0560
Poor HH***	0.426049	0.047823	1.531196	0.073226	8.91	0.0000
Urban HH***	0.160856	0.040425	1.174515	0.047480	3.98	0.0000
Ilocos	-0.044462	0.112314	0.956512	0.107430	-0.40	0.6920
Cagayan Valley	-0.039116	0.116745	0.961640	0.112267	-0.34	0.7380
Central Luzon	0.072877	0.100606	1.075598	0.108211	0.72	0.4690
Bicol	-0.140043	0.112468	0.869321	0.097770	-1.25	0.2130
Western Visayas	0.076156	0.107076	1.079131	0.115549	0.71	0.4770
Central Visayas	-0.012508	0.105765	0.987570	0.104450	-0.12	0.9060
Eastern Visayas	-0.182233	0.116347	0.833407	0.096964	-1.57	0.1170
Zamboanga Peninsula	-0.157652	0.120052	0.854147	0.102542	-1.31	0.1890
Northern Mindanao *	-0.257440	0.120113	0.773028	0.092851	-2.14	0.0320
Davao	-0.096962	0.107784	0.907590	0.097824	-0.90	0.3680
Soccsksargen	0.015995	0.110170	1.016124	0.111946	0.15	0.8850
Metro Manila	-0.184017	0.103116	0.831922	0.085785	-1.78	0.0740
CAR	0.083078	0.116943	1.086626	0.127074	0.71	0.4770
ARMM***	0.659260	0.104568	1.933362	0.202168	6.30	0.0000
CARAGA	-0.031768	0.118689	0.968731	0.114977	-0.27	0.7890
CALABARZON	0.127175	0.099963	1.135615	0.113520	1.27	0.2030
_cons***	4.353495	0.235863	77.749730	18.338260	18.46	0.0000

(* p<0.05, ** p<0.01, *** p<0.005)

Outcome: Work Only (j = 3)	Coefficient	St. Error	RRR	St. Error	t-value	p-value
Age of Household Head (HHH)	0.343117	0.264249	1.409333	0.372415	1.30	0.1940
Age Squared***	0.030099	0.009123	1.030556	0.009402	3.30	0.0010
Child's Sex***	1.062317	0.060155	2.893065	0.174033	17.66	0.0000
Child of HHH***	0.270569	0.092614	1.310711	0.121390	2.92	0.0030
Child is Married***	1.787166	0.440802	5.972503	2.632693	4.05	0.0000
Family Size***	0.400063	0.015838	1.491919	0.023628	25.26	0.0000
Child is 6 to 12 Years Old***	2.306882	0.127497	10.043070	1.280463	18.09	0.0000
No. of 6 to 12 yo in School***	-1.648150	0.134073	0.192406	0.025796	-12.29	0.0000
Total HH Expenditure Per Cap***	-0.000038	0.000006	0.999962	0.000006	-6.45	0.0000
No. of HH Mem. In School***	-1.882495	0.068489	0.152210	0.010425	-27.49	0.0000
No. of HH Mem. In Elem.***	1.009127	0.074544	2.743205	0.204488	13.54	0.0000
No. of HH Mem. In HS ***	-0.536073	0.077635	0.585041	0.045419	-6.91	0.0000
Sex of HHH	-0.108590	0.113032	0.897098	0.101401	-0.96	0.3370
Age of HHH***	-0.026475	0.003129	0.973872	0.003047	-8.46	0.0000
HHH is Married***	-0.441800	0.108349	0.642878	0.069655	-4.08	0.0000
HHH has Low Educ.***	0.467608	0.068405	1.596171	0.109187	6.84	0.0000
HHH has High Educ***	-0.530461	0.123529	0.588334	0.072677	-4.29	0.0000
HHH is Working***	0.469855	0.124671	1.599763	0.199444	3.77	0.0000
HHH is Self Employed***	0.224487	0.061247	1.251680	0.076661	3.67	0.0000
HH has Electricity***	-0.508426	0.072619	0.601442	0.043676	-7.00	0.0000
Poor HH***	0.283822	0.072471	1.328196	0.096255	3.92	0.0000
Urban HH***	-0.387191	0.068078	0.678962	0.046223	-5.69	0.0000
Ilocos	-0.218612	0.170786	0.803634	0.137249	-1.28	0.2010
Cagayan Valley	0.315270	0.164225	1.370629	0.225092	1.92	0.0550
Central Luzon ***	-0.605047	0.160599	0.546049	0.087695	-3.77	0.0000
Bicol	-0.287287	0.157632	0.750296	0.118271	-1.82	0.0680
Western Visayas	-0.179192	0.155233	0.835946	0.129766	-1.15	0.2480
Central Visayas	-0.208629	0.153461	0.811696	0.124564	-1.36	0.1740
Eastern Visayas	-0.155381	0.156018	0.856089	0.133565	-1.00	0.3190
Zamboanga Peninsula	-0.077622	0.164698	0.925314	0.152397	-0.47	0.6370
Northern Mindanao	0.231486	0.166106	1.260471	0.209371	1.39	0.1630
Davao	-0.583221	0.163504	0.558098	0.091252	-3.57	0.0000
Soccsksargen	-0.093220	0.152389	0.910993	0.138826	-0.61	0.5410
Metro Manila***	-0.916630	0.213433	0.399864	0.085344	-4.29	0.0000
CAR	0.010190	0.181169	1.010242	0.183025	0.06	0.9550
ARMM***	-0.554154	0.157087	0.574558	0.090256	-3.53	0.0000
CARAGA	0.277619	0.160937	1.319984	0.212434	1.73	0.0850
CALABARZON***	-0.493274	0.160086	0.610624	0.097752	-3.08	0.0020
Constant***	-12.468450	1.906302	0.000004	0.000007	-6.54	0.0000

(* p<0.05, ** p<0.01, *** p<0.005)

The tabulated summary of the estimated model presents three equations.

Both the estimated coefficients and relative risk ratios (RRR) together with their standard errors are presented in the table. For all equations, most of the explanatory variables are deemed significant at the highest conventional level ($\alpha = 0.001$). It is important to note that the p-values for the coefficients and the RRRs are identical inasmuch as the RRR is just the exponentiated value of the coefficient (i.e., RRR=exp (coefficient)). These estimates will give us valuable insights on the latest state of child labor and its correlates in the Philippines.

The following are some of the interesting results implied by the estimated equations. All statements are *ceteris paribus* and with reference to the base option of studying full time (j = 0):

In all equations, the coefficients of the gender dummy is significantly positive implying that boys are more likely than girls to specialize in working full time, combining work with study, or be idle (neither working nor studying). But among these outcomes, boys are highly likely than girls to be working full-time, as evidenced by the odds ratio or RRR of 2.8931 (which means that boys are almost 3 times more likely than girls to choose the work only option over study only option, *ceteris paribus*).

Older children are more likely to combine schooling with work than younger children, whereas younger children are more likely to take the option of being idle (neither studying[2] nor working). Married children are highly likely to be either full time workers or being idle. Married children are about 6 times more likely to be a full time worker than unmarried children, and are about 11 times more likely to be idle (just at home) than unmarried children. The former is intuitively appealing in the case of male children and the latter in the case of female children, as male supports, while female cares, for their children.

When family size increases by one additional member, the odds of children working full time and those who are just staying at home increase. For those combining school and work, family size does not matter. Marginal increase in per capita household expenditure tends to decrease the likelihood of children to become fulltime workers (j = 3), but increases the odds of becoming idle children (j = 2).

The presence of young children (6 to 12 years old) in the households appears to be a very important factor for idle children (with RRR = 16.6) not to study full time, or for those working full time to remain in that state (with RRR = 10.04) than studying full time. This result validates the "taking care of younger sibling" (Mancorda, 2006) and the "supporting younger sibling" (Villamil, 2002) suggestions, respectively. Complementary to these findings are the highly significant and positive coefficients and greater than 1 RRRs in all equations for the "number of household members in elementary school" variable.

The estimated coefficients and odds ratios (RRRs) for the basic demographics of household head (age, sex, and marital status) in all equations are not supportive of the "strong authority" expectation for Filipino household heads with regards to the education and labor market entry of their children. However, household heads' educational attainment appears to have strong bearing on these decisions. Lower educated heads are more likely to exert parental/guardian authority on children working fulltime to continue working fulltime, while higher educated heads of idle (no work, no study) children are more likely to persuade their wards to remain idle, rather than study full time, perhaps to take care of younger siblings or help in the family enterprise.

Adequate supply of electricity in the household discourages children to work either full time (j = 3) or part time (j = 1). This result is intuitive since electricity connection is a signal of the family's capability to send children to school.

The linkage of poverty and child labor (as it interacts with education) is adequately supported by the results of the study. All coefficients of the dummy variable "poor" in all equations are positive and extremely significant ($p < 0.001$) with odds ratios higher than unity in all study/work outcomes. This implies that children of poor households tend to specialize more on any of the three study/work outcomes than be full time students *ceteris paribus*, in a way validating the Basu and Van (1998) Luxury Axiom.

Household's engagement in self employment activities may render children to be highly likely to combine work with study. The odds ratio of 1.8346 implies that these children are 1.8346 times more likely to be working part time than children of households which are not engaged in self-employment enterprises. For equation $j = 2$ (idle children), the odds ratio is significant at RRR=1.2517. These results are in support of the Edmonds and Turk (2004) findings.

Urbanization increases the likelihood of children becoming idle ($j = 2$), but decreases the probability of combining work with study ($j = 1$), with RRR of 1.1745 and 0.4822 respectively. Urbanity of the place of residence of the child however has nothing to do in his/her choice of working full time ($j = 3$).

The equations reveal the presence of significant regional effect on the likelihood of children to be in the different study/work outcomes. But this locational effect appears to be stronger in study and work outcome ($j = 1$) with 13 regional coefficients significant, than work only outcome ($j = 3$) which has 5 significant coefficients, and no work-no study outcome ($j = 2$) with only 2 significant regional dummy variable coefficients.

SUMMARY AND CONCLUSIONS

Education has always been viewed as a pillar in national development and a primary basis for social and economic mobility. The constitution guarantees the right to education of every Filipino and landmark legislations (R.A. 6655 and R.A. 9155) have been implemented to provide Filipino children, in particular, free and compulsory education in the elementary and high school levels. Yet despite these actions of the state, not to mention the long list of policy interventions to see to it that all Filipino children are studying full time, the phenomenon of child labor remains to be an enduring social malady over the years.

This study is an attempt to contribute to the effort of providing policy makers with timely and relevant insights and descriptive information that would help in crafting action plans or legislations that would effectively curb, if not minimize, the problem of child labor in the country. It employs the latest available public use raw data files of the recently available Annual Poverty Indicator Survey (2011 round) to simultaneously model the behavior of Filipino children with respect to their decisions on choosing any of the four permutations of studying or working (study only; study and work; no study, no work; and work only) which represent the mutually exclusive and exhaustive options open for every Filipino child.

A value added feature of this study is the use of survey design consistent estimation procedures, which are implemented on the descriptives and the primary model itself to obviate the possibility of biased and inconsistent inferential results if equal weighing of observations (as in SRS) is used. This adjustment is also seen as a move to mitigate the expected onset of heteroscedasticity that may compromise inference.

The primary result of the study is somewhat revealing particularly the stylized facts generated by design consistent estimation. The estimated proportion of children who are full time students of 0.7726 in 2011 is a lot smaller than the figure of 0.8323 in 2008. The proportion of idle children in 2011 was estimated at 0.1577, which was only 0.0900 in 2008. These set of figures are indicative of the presence of a problem serious enough to be a target for policy intervention. The study also uncovered the plight of the 16 and 17 years old Filipinos, that despite the guarantee by the state for free and compulsory elementary and high school education, only 49.39% of the 16 years old and 34.07% of the 17 years old are studying full time, whereas 15.98% of the 16 years old, and 23.06% of the 17 years old are full time workers, which means that, of the children aged 5 to 17 who are reported as working, 39.04% were aged 16 to 17.

The likelihood of Filipino children in choosing the various categorical study/work options available to them truly vary with the elements of the vectors of global attributes I posited. The confrontation of the survey data and the *multinomial logit model* I constructed adequately supplied the empirical content to these theoretical covariations. Among the most significant and intuitively appealing covariates uncovered by this study are the following: age of the child, gender of the child, the child being married, family size, per capita household expenditure, the presence of younger children (6 to 12 years old) in the household, the number of younger children (6 to 12 years old) studying, household head's educational attainment, provision for electricity to the household, household's engagement in self employment activities, urbanization, regional location, and most importantly the poverty status of the household.

Contrary to the predictions of certain strands in the literature regarding the influence of basic demographics of household head (age, sex and marital status) on the child's schooling/work choices, the study found no significant influence of such factors.

ENDNOTES

[1] In this study, "full time work" or "exclusively working" is defined to mean that the child is only working and not studying at the time of the survey.

[2] The reasons for the child not being in school are available in the survey but not analyzed to avoid complications

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