DETERMINANTS OF CHILD LABOUR IN INDONESIA: THE ROLES OF FAMILY AFFLUENCE, BARGAINING POWER AND PARENTS' EDUCATIONAL ATTAINMENTS

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ABSTRACT

Using the Indonesian Family Life Survey (IFLS) 1997 and 2000, this paper investigates the relationships between family affluence, parents' bargaining power and education on their children's likelihood to be in school and at work. The research obtains that higher bargaining power of mother, in terms of having larger share of total couple's years of schooling, is significant in mitigating a child's work likelihood. Mother's years of schooling are also more influential on determining her children's work and schooling likelihoods, relative to father's educational attainment. There also exists a U-shaped relationship between per capita expenditure and boys' likelihood to work, and an inverted U-shape between expenditure and boys' schooling.

INTRODUCTION

The International Labour Organization (ILO) Convention 138 specifies fifteen years old as the age below which a person who participates in actively in economic activity will be considered as a child labourer. ILO global estimates indicate that in the year 2000 there were 211 million of children at work in economic activities, out of which 186 million of them were child labourers. Economic activity itself encompasses most productive activities by children such as unpaid, casual, and illegal work as well as work in the informal sector. All the aforementioned ILO estimates however, do not cover children working in non-economic activities mainly due to the fragmented global data on the extent of non-economic child work. ILO estimates however, are still in line with international labour standards which provide for exceptions for household chores in the child's own household.

There is a rich collection of literatures on the topic of child labour which look at various determinants of child's work and schooling, ranging from birth order, parental schooling, family wealth, credit constraints to trade and globalization (see, for instance, Edmonds and Nina Pavcnik, 2004). The main contribution of this paper is to carry out empirical investigation of the impacts of parental education and family affluence on child's work and schooling using the available data from the Indonesia Family Life Survey (IFLS) as thus far, no existing studies on Indonesia has simultaneously examined the impacts of family affluence, parents' years of schooling, mother's bargaining power on child's work and schooling in Indonesia. The paper is interested in finding (1) whether bargaining between parents, as represented by their education ratio, affects children's work and schooling likelihoods, (2) whether parents' years of schooling affect their children equally and (3) whether only children from poor families will work. This paper will also condition the analyses based on the child's gender. The rest of the paper is organized as follows. Section II provides facts and figures of child labour in Indonesia, section III empirical findings and analyses. Section VI concludes.

FACTS AND FIGURES OF CHILD LABOUR IN INDONESIA

In the year 2000, ILO finds that slightly more than half of working children of age 10-14 years in Indonesia combine work and schooling, while the remaining either have no schooling or are no longer in school. In addition, more than 60% of child labourers have also been recorded as unpaid family workers and this percentage reached the peak of 76.50% in 1998 and fell to 69% in 2000. The peak in 1998 might be attributable to the 1997/1998 economic crisis which was likely to have forced many family businesses to cut costs by engaging their children to help out instead. Overall, there has been a declining employment rate among the 10-14 years old from 8% in 1996 to 4.7% in 2000, in which the percentage distributions are as follows.

TABLE 2.1

CHILD WORKERS BY YEAR AND STATUS OF EMPLOYMENT, 1996-2000 (%)

	1996	1997	1998	1999	2000
Self employed	16.47	10.77	11.78	14.15	15.91
Employer	0.77	0.84	-	2.31	0.62
Paid employees	13.84	12.93	11.72	10.90	14.07
Unpaid family workers	68.92	75.46	76.50	72.64	69.41

As for working hours, ILO shows that between 0-34 work hours, the percentage distribution is higher in rural areas, but this trend reverses itself for 35 work hours onwards. Children in urban areas thus worked longer hours than their counterparts in the rural regions. These results are summarized in Table 2.2.

TABLE 2.2

DISTRIBUTION OF WEEKLY WORK HOURS OF CHILDREN
AGED 10-14 YEARS, CONDITIONAL ON AREAS (2000)

Work hours	Urban	Rural	Urban+Rural
<10 hours	5.40%	13.50%	11.60%
10-24 hours	18.99%	36.77%	32.61%
25-34 hours	7.12%	16.30%	14.15%
35-54 hours	40.92%	28.13%	31.13%
>= 55 hours	27.57%	5.30%	10.52%
Work hours@ week	43 hours	27 hours	31 hours

In addition, according the Central Bureau of Statistics (BPS) Indonesia Children Welfare Indicator 2000 tabulated in the Table 2.3, the size of the labour force of children

aged 10-14 years old has declined between 1999 and 2000, for both urban and rural regions. However, for those children *not* in the labour force, there is a significant fall in the percentage of children aged 10-14 years who are enrolled in school, from 85% to 80%. More children are now recorded to be engaged in housekeeping and other activities. In reconciliation of the two results by BPS and ILO, an inference can be drawn that although the size of the labour force for the rural areas is larger than that in urban areas, within the labour force itself, a higher percentage of urban child labourers are actually working longer hours as compared to those in rural areas.

TABLE 2.3

DISTRIBUTION OF CHILDREN AGED 10-14 YEARS ACCORDING TO
PAST WEEK ACTIVITIES, 1999-2000

	Urban		Rural		Urban+Rural	
	1999	2000	1999	2000	1999	2000
Total no. of children (in thousands)	8,035 (100%)	8,060 (100%)	14,177 (100%)	12,799 (100%)	22,212 (100%)	20,859 (100%)
Labour Force (% out of total number of children)						
Employed	2.86	2.13	9.18	7.78	6.90	5.60
Look for work	0.55	0.34	0.77	0.37	0.69	0.36
Not in labour force (% out of total children)						
Schooling	91.44	85.90	80.61	77.63	84.53	80.83
Housekeeping and others	5.14	11.63	9.43	14.22	7.88	13.21

Children Welfare Indicator 2000 also breaks down the distribution of children according to their gender and major occupational sectors, as tabulated in Table 2.4. This table indicates that for boys, they are likely to be found working in agricultural sector whereas for girls, they tend to work in manufacturing and services such as becoming factory workers or as domestic helpers.

TABLE 2.4

SECTORAL DISTRIBUTION OF CHILDREN AGED 10-14
WHO WORKED FOR THE PAST WEEK, BY GENDER (1999-2000)

Gender	Agriculture		Manufacturing Industry		Services	
	1999	2000	1999	2000	1999	2000
M	76.31	79.59	9.62	8.99	14.07	11.42
F	55.94	59.54	15.19	15.94	28.87	24.51
M+F	68.47	72.01	11.77	11.62	19.76	16.37

Note: M=Male, F=Female

As shown in Table 2.5, the Welfare Indicator also notes that for those children aged 10-14 years, there is a higher percentage of girls working more than 45 hours as compared to boys. This could potentially be contributed to the fact that girls may tend to work as domestic helpers or factory workers which involve much longer working hours each day, as compared to the agricultural sector which is dominated by boys. It is worth noting as well that the overall number of child labourers in Indonesia itself fell from 1.5 million in 1999 to 1.2 million in 2000. These results are captured in the following table.

TABLE 2.5

WORK HOURS OF CHILDREN AGED 10-14 WHO WORKED FOR THE PAST WEEK ACCORDING TO GENDER, 1999-2000

Gender	Year	Work Hours					Number of child workers
		0*	1-24	25-34	35-44	45+	
Male	1999	1.35	69.97	13.45	8.06	7.18	942,659(100%)
	2000	1.37	67.95	14.58	8.61	7.49	726,158(100%)
Female	1999	1.55	68.34	11.62	8.25	10.24	589,608(100%)
	2000	1.52	69.38	10.92	7.82	10.36	441,598(100%)
Male+Female	1999	1.42	69.34	12.74	8.14	8.36	1,532,267(100%)
	2000	1.42	68.49	13.20	8.31	8.58	1,167,756(100%)

Note: 0*=temporary not working

LITERATURE REVIEW

Using a nonparametric approach, Edmonds (2005) investigates the relationship between improvements in per capita expenditure and child labour in Vietnam. He found non-linearity correlation between economic status and child labour. Basu and Van (1998), Balland and Robinson (2000), and Rogers and Swinnerton (2003) also conjecture in their theoretical models that there are nonlinearities in the relation between child labour and household income.

Edmonds (2004) provides two justifications of using expenditure rather than income. First, calculating the true income level of a household maybe difficult as the household may not participate solely in formal labour markets. Secondly, expenditure varies less than income as households generally try to smooth their consumption over time. Using empirical evidence on Thailand, Paxson (1993) also supports this second justification.

Bhalotra and Heady (2003) propose that there could be a wealth paradox for child farm labour, in which children from land-rich households have higher tendency to work as compared to children from land-poor families. In their paper, they attribute this paradox to failures of the markets for labour and land, which is mitigated by credit market failure. Bhalotra and Heady finds that the wealth paradox persists for girls, but for boys in both countries, it disappears. Basu and Tzannatos (2003) however, propose that there is actually an inverted U-shaped relationship between land wealth and the incidence of child labour. On a separate study, Grootaert and Patrinos (1999) and Dayioglu and Assad (2002) find that child labour is more prevalent in households with family enterprises. Using Pakistan and Peru data sets, Ray (2000) also found that in Peru, those households that live in poverty have lower child labour. In Pakistan however, Ray found the reverse occurs.

Kambhampati and Rajan (2004) study the determinants of child work and schooling in rural India using a bivariate probit analysis. They conclude that mother's education, rather than employment or wages, is the single most important factor in reducing a child's work likelihood. Using data on urban Turkey, Dayioglu and Assad (2002) also support this finding.

METHODOLOGY

The Indonesia Family Life Survey is a longitudinal socioeconomic and health survey which collects data on individual respondents, their families, their households, the communities in which they live, and the health and education facilities they use. IFLS was conducted by Rand in 1993, 1997 and 1998, covering 13 provinces in Indonesia. In 1997, IFLS covers 7,629 households. In 2000, it covers 10,500 households.

In the pooled data of IFLS 1997 and 2000, the paper considers only children who have ever been to school and those have at least one biological parent in the household. Children who have never been to school are omitted for two reasons, majority of them are below age 5 and because the focus of this paper is to examine the relationship between child labour participation and current school attendance. Children whose parents are not in the household, either due to death or other reasons, are also omitted as the data does not provide information about the characteristics of those missing parents. This paper has also dropped children below 15 years' old who are recorded to be married from the sample as the paper considers these married children to be 'adults' forming a separate decision-unit in the household.

This paper defines child economic participation as participation of children within the range of 5 to 14 years of age in the labour market, either to earn a living to support oneself or to supplement household incomes. Housekeeping activities have been excluded. Supplementing family incomes can be done explicitly through wages received or implicitly through the provision of extra helping hands in family business and/or farms.

The likelihood of whether a child has ever worked and of current school attendance is analysed using probit in which the dependent variable takes a binary response. Ever work participation is used instead of current participation due to high level of turnover of children in the labour market. Using dprobit, DF/dx captures the marginal change in probability of a child working from an infinitesimal change in each independent, continuous variable and, by

default, the discrete change in the probability for dummy variables[1]. The probit model takes the following form:

$$Y_w = f(X_i) + \varepsilon, \varepsilon \sim N(0,1)$$

$$Y_s = f(X_i) + \gamma, \gamma \sim N(0,1)$$

where Y_w=1 if works, 0 otherwise and Y_s=1 if the child goes to school, 0 otherwise; X_i is a vector of independent variables; ε and γ are stochastic terms not correlated with the independent variables.

This paper has also included bivariate probit models to capture any interrelation in decisions making process between working and studying, conditional on gender of the child. Bivariate probit model allows us to gain efficiency since it takes into account the correlation between the unobserved factors in the work and schooling regressions. The bivariate probit model is presented as follows:

$$y_{i,w} = f(X_{i,w}) + \varepsilon$$

where y_w=1 if the child works, 0 otherwise;

$$y_{i,s} = f(X_{i.s}) + \gamma$$

where y_s=1 if the child is currently in school, 0 otherwise; and,

$$E[\varepsilon]=E[\gamma]=0;$$

$$Var[\varepsilon]=Var[\gamma]=1;$$

$$Cov[\varepsilon,\gamma]=\rho;$$

Assuming normally distributed residuals, the joint probability is given by:

$$P_{i,k} = P(Y_{i,w} = y_{i,w}; Y_{i,s} = y_{i,s}) = \theta(f(X_{i,w}), f(X_{i,s}), \rho)$$

where $X_{i,w}$ and $X_{i,s}$ are two vectors of independent variables and $\theta(.)$ is the joint normal cumulative distribution. In this paper, common independent variables are used for each decision choice to facilitate the ease of discussions. The p-value derived from the statistical

[1] STATA Help Manual

test for the correlation of errors in the bivariate model will also indicate whether ρ is significantly different from zero.

Independent variables to be considered in the models in this paper are age of child, log of household's per capita expenditure, community level average wage, gender of child, number of children five years' old and below, children age 6-14, number of 15-59 years' old females, number of 15-59 years' old males, number of 60 and above females and males, on top of dummies for current enrolment in school, being the first born, landownership and dummy for residential region which takes value of one if urban. As the square of age is insignificant for all cases, the paper has omitted it from the regressions (results not shown). The paper includes a year 2000 dummy in which 1997 is taken to be the base year. To denote mother's power, the paper uses education ratio in which is defined as the mother's share of education out of total years of schooling of the couple. The use of education ratio will be accompanied with years of schooling of the most educated parent. In the bivariate probit analyses in section 5.2.6, both parents' years of schooling will also be used in place of the two aforementioned measures so as to observe any potential differing magnitude and direction of impact of parents' educations on girls and boys. This paper has also introduced three cross products in the probit analyses of overall children's work and schooling likelihoods. The cross-products are obtained from multiplying gender with log pce, gender with square of log pce, and gender of child with the education ratio. This paper has only generated the cross products between gender of child, per capita expenditure and education ratio for the main focus of the research lies in the investigating the roles of family affluence and mother's bargaining power as determinants of child labour.

This paper uses per capita expenditure to proxy for family income, using both food and non-food items. These items have either been purchased or self-produce. This has been done due to several reasons. First, as individuals carry out consumption-smoothing behaviour based on their anticipation of the lifetime income, per capita expenditure hence makes a good proxy of the household permanent income component based on the household consumption

pattern. Such consumption-smoothing behavior has been put forth in the Permanent Income Hypothesis which suggests that individuals try to smooth out spending based on their estimates of permanent income. Only if there has been a change in permanent income will there be a change in consumption. Second, household assets are not used as there is potentially greater obfuscation and under-reporting of the true value of the assets. In addition, using reported earnings may not capture the underlying earnings of farmers especially since some produce may be self-consumed as well. There might still also be volatility on 2000 household income due to the impact of the economic crisis, despite the three- year gap. As such, this paper adopts per capita expenditure (pce) as a proxy for affluence as such expenditure may give a more reliable reflection of permanent income. As a household's permanent income is better reflected in the perpetuity of regular pattern of consumption, this paper has thus excluded intermittent expenditures.

To mitigate the issue of endogeneity from using children's reported earnings, the community-level wages is used instead in order to capture the impact of change in exogenous children wage rate on their likelihood to work. However, due to insufficient data on the community-level child wage rate per se, such wage rate has been proxied using community-level average wages for both adult males and females. This paper assumes that there is positive comovement between the children and adults' wages. In the presence of children's unpaid work, the community wage rate will represent the child's opportunity cost of not having taken up a paid job, assuming that there is both demand and supply for child's work. The exogenous average wage rate encompasses both IFLS and non-IFLS villages, and for both farm and non-farm labours.

Landownership itself carries two potentially opposing effects on child labour. On one hand, having a farm will increase the likelihood that a child will be employed as work is readily available and children's labour is inexpensive as well. Dayioglu and Assad (2002) also reason that the availability of work in such household enterprise will minimise the costs from job search and mitigate the risks of placing the child on 'wrong hands'. On the other hand, as lands are one form of household assets, larger size of land hence conveys greater household

wealth which can have mitigating impact on child labour. Readers should note that although it is possible that poorer households may also own small plots of land, it is unlikely that such landownership will persist in the long-run as the produce harvested from the small plots of land may only be sufficient to meet household's self-consumption but not as a source of income. Hence, poor households may be forced to sell their lands to meet the households' more immediate needs. Nonetheless, as data is not available for the size of land in year 1997, this paper will hence not be able to infer whether there is indeed the wealth effect. Data limitation also prevents this study from finding further evidence on whether the Wealth Paradox as postulated by Bhalotra and Heady (2003) does prevail among land-rich households in Indonesia. The sign on coefficient for landownership will hence capture the net outcome of the two opposing effects.

Due to the construct of 1997 IFLS questionnaires, this paper is unable to discern how many children have recently worked in 1997. As such, the paper has to use data on children who have ever worked for the pooled analysis. This paper assumes that there is a consistent trend of school enrollment in which the majority of children who are still in school have always done so with little interruptions in their study and children who had previously dropped out will not go back to school.

This paper has also used the household decompositions to capture any differing impact of any group of householders on a child's work and schooling, for example the impact from having more elderly males age 60 and above on a child's work and schooling. To observe any birth order effect, this paper has included the dummy of being the first born.

EMPIRICAL FINDINGS

5.1 Comparative Statistics

The following table highlights comparative descriptive statistics of selected households' characteristics using IFLS 1997 and 2000 pooled data. Per capita non-child-labour earning is calculated from total household's income contributed solely by adults' earnings divided by household size.

TABLE 5.1.1

SAMPLE MEANS

	With working children	Without working children
Log Pce	12.078	12.174
Per capita HH non- child- labour earnings	22.259	22.288
Household size	5.760	5.651
Landownership	0.503	0.365
Urban	0.332	0.434
Mother's years of schooling	3.275	5.114
Father's years of schooling	3.578	5.452

Note: Per-capita non-child-labour earnings have been deflated to base year 2000 using Tornquist CPI for Province/Urban/Rural. Pce: real per capita expenditure.

Table 5.1.1 shows that households with child workers have larger family size. In addition, the table also shows that households with working children have smaller per capita expenditure and smaller per capita household earnings as compared to households without child labourers. This reflects that child labourers generally come from households with lower level of affluence. This inference is reaffirmed by the relatively lower per capita non-child labour earnings of the households with working children. However, later on this paper will show that not only boys from poor families will work, but boys from richer families will do so as well. In reconciliation of the two findings on household size and family income as proxied by per capita expenditure, this paper infers that there is a negative correlation between fertility rate and income, which is accounted for by the quantity-quality trade-off theory as proposed by Becker and Lewis (1973). This model states that individuals may spend more on the improving the quality of their children rather than increasing the number of children that they have as the family income rises.

There is higher incidence of child labour among landowners. These landowners are more likely to be residing in the rural areas as well. These imply that the incidence of child labour is higher in rural households who own farm lands as their children can be a source of inexpensive labour on those lands. In addition, parents in those households without working child have higher education compared to those households with child labourers. Table 4.1.1 also shows that fathers are generally more educated than mothers.

As shown in Table 5.1.2, work hours for year 2000 are shorter compared to the year 1997. Girls are also more likely to work longer hours than boys for each year. This could be attributable to the fact that girls are more likely to work in manufacturing and services sectors which entail longer work hours as they are not constrained by the daylight factor, unlike in agricultural sector.

TABLE 5.1.2

MEANS WORK HOURS, BY YEAR AND GENDER

	Boys	Girls	Total
1997	23.23	24.27	23.59
2000	14.54	16.05	15.27
Pooled	16.54	17.26	16.87

Based on 75th percentile of work hours, this paper has also defined long working hours as those above 20 hours per week. Although this cut-off is lower than that used by ILO, the sample data still indicates that children in the urban areas are more likely to work long hours as compared to their counterparts in rural areas. In year 2000, the data also indicates that there are 30 children who have worked for both wages and family business in the past week prior to the survey, for which their average work hours for the week is obtained to be 29.44 hours. Apart from these 30 children, the rest of the work hours are below 20 hours per week or roughly 4 hours each day for a 5-days work week. Due to potential under-reporting of hours, exclusion of housekeeping activities from the definition of child labour and lack of information on child labourers in other parts of Indonesia who may work for much longer hours but who have not been covered by the surveys, the reported work hours may hence under-state the prevalence of child labour beyond working for wages and/or for family

business. Housekeeping activities for instance, could be detrimental to a child's long run subjective well-being as they could pose substantial demand on the child's time, health and even education as these children may have to help out not only with household chores, but also in looking after younger siblings or tending to sick family members. A study done by Ilahi (2001) finds that children's schooling is affected by whether the child has to help in tending to sick family members.

Table 5.1.3 summarizes the average work hours for children in each category of work in year 2000[2]. From the table, older children are observed to work longer hours than younger children and girls' average work hours are longer than boys'. This latter inference is in support of a similar finding by Indonesia Central Bureau of Statistics Welfare Indicator 2000 as presented in Table 2.5.

TABLE 5.1.3

AVERAGE HOURS WORKED PER WEEK

Age	Average Total Work Hours			Average Work Hours for Wages			Average Work Hours for Family Business		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
5-9	14.90	12.26	13.52	0.73	0.22	0.46	14.13	11.5	12.72
10-14	18.57	19.60	19.09	6.32	7.06	6.69	11.48	12.00	11.73
5-14	18.19	18.76	18.47	5.73	6.25	5.99	11.75	11.94	11.84

5.2 Data Analyses

5.2.1 Overall Children's Work: Probit

This paper carries out probit analysis on children's work likelihood. The results are tabulated in Table 5.2.1. The results indicate that older children are more likely to work, and boys are also found to be more likely to work than girls. Current school attendance and being a Muslim are associated with a lower child's probability of work. Upon adding a dummy variable of whether the child has enrolled in an Islamic school, the latter dummy coefficient estimate is not significant at 10% level but dummy for Muslim is still significant (results not shown). It is plausible that this could be because Muslims may place less emphasis on the

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[2] Year 1997 data does not decompose work hours into categories of work.

TABLE 5.2.1

PROBIT OUTPUT ON CHILDREN'S WORK DECISION

Independent Variables	Coefficients	DF/dx
Age of child	0.20138*** (0.01209)	0.01440*** (0.00093)
Male dummy[c]	10.98454*** (4.13130)	0.99983*** (0.00133)
Muslim[c]	-0.24398*** (0.09344)	-0.02102*** (0.00954)
Landownership[c]	0.30269*** (0.05913)	0.02257*** (0.00466)
Urban[c]	0.05843 (0.06933)	0.00426 (0.00516)
Log pce	0.84631 (0.57346)	0.06050 (0.04119)
(Log pce)^2	-0.02973 (0.02265)	-0.00213 (0.00163)
Still in school[c]	-0.79483*** (0.07751)	-0.10642*** (0.01679)
First born[c]	0.00724 (0.05272)	0.00052 (0.00377)
≤ 5 years' old children	0.02397 (0.04044)	0.00171 (0.00289)
6-14 years' old children	0.05512** (0.02904)	0.00394** (0.00209)
15-59 years' old male	0.00805 (0.03431)	0.00058 (0.00245)
15-59 years' old female	-0.01050 (0.03579)	-0.00075 (0.00256)
≥ 60 years' old female	0.15649** (0.07627)	0.01119** (0.00546)
≥ 60 years' old male	0.20324** (0.08495)	0.01453** (0.00608)
Education Ratio	-0.15194 (0.13067)	-0.01086 (0.00939)
Years of schooling of most educated parent	-0.03447*** (0.00789)	-0.00246*** (0.00056)
Community-level average wage rate	-0.19394*** (0.06599)	-0.01386*** (0.00469)
Mother in HH[c]	0.08065 (0.20790)	0.00536 (0.01283)
Father in HH[c]	0.16492 (0.12222)	0.01039 (0.00670)
Year2000[c]	1.16090*** (0.10783)	0.08308*** (0.00875)
Gender*(log pce)	-1.61617** (0.65509)	-0.11553** (0.04705)
Gender*(log pce)^2	0.05955** (0.02597)	0.00426** (0.00187)
Gender*(education ratio)	-0.07121 (0.15580)	-0.00509 (0.01113)
Constant	-8.10104** (3.62610)	-
Pseudo R-square	0.2431	
Log pseudo-likelihood	-1659.2744	
No. of obs	8267	

Note: [c] refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level.
*:10% significance level,**:5% significance level and ***:1% significance level.

accumulation of material wealth, which hence could be translated into smaller pressure being exerted on their children to work.

The paper also obtains that a child's work likelihood is not correlated with regions. On the other hand, landownership is positively correlated with the child's work likelihood. This positive correlation implies the fact that lands provide readily available work for children who serve as an inexpensive source of labour, dominates the wealth effect from asset ownership. The impacts from having more children younger than six and 15-59 years' old adults are statistically insignificant. Being the first born is also insignificant in determining a child's work likelihood. On the other hand, the impact from having more 60 years'- old- and-above adults in a household is positively correlated with a child's work likelihood. This could be attributable to the fact that the more elderly there are in a household, the less manual labour will be available to carry out physically-demanding works especially those related to farming. Young children will thus have to work in place of this 'lost' labour. There exists a negative relationship between years of schooling of the educationally-superior a parent with a child's likelihood to work, with statistical significance level at 1%. Education ratio itself is insignificant. In reconciliation of these last two findings, this paper concludes that mother's bargaining power has no significant impact in mitigating a child's work likelihood but parents' years of schooling are of greater importance in reducing the child's probability to work.

Absence of parents in a household has no correlation with a child's work likelihood, ceteris paribus. This may be because such absence is compensated by having an extended family network which can provide support in times of need. Nonetheless, such observation deserves future empirical investigation so as to ascertain whether having a close knit extended family support does help to reduce the incidence of child labour in Indonesia.

Higher exogenous average wage rate itself is associated with a lower probability of a child to work. This negative correlation may be attributable to the fact that richer communities are less likely to employ child labourers or because these affluent communities

have more schools and better transportation system to facilitate children's education. In year 2000, children are more likely to work, plausibly due to the availability of more jobs.

The cross products between gender of child and log per capita expenditure raise a highly interesting point. Given that a child is male, an increase in per capita expenditure (pce) is associated with a fall in the child's work likelihood albeit at a decreasing rate. For girls, the relationship between pce and work likelihood is statistically insignificant. This key finding prompts the paper to extend its research to disaggregate the sample based on gender.

5.2.2 Boys vs Girls: Work analyses using Probit

Upon carrying out separate probit analyses on boys' and girls' work likelihood, this paper finds that the number of 15-59 years' old females is associated with a fall in boys' work likelihood but indicates a positive correlation with girls'. This may imply that adult females' labour is a complement to girls' work but a substitute boys' labour. For children age 6-14 years, there is a positive relationship with girls' work likelihood, albeit not for boys. Moreover, the impact from having more elderly females age 60 in a household is associated a higher girls' work likelihood but insignificant for boys'. This may imply that there is an underlying favouritism towards boys. In addition, it is possible that the elderly females' and girls' labour in Indonesia are complements which hence induces positive association between them. This deserves future empirical investigation.

`The inference made in the section 5.2.1 pertaining to the potential U-shape between log per capita expenditure (pce) and boys' incremental change in work likelihood has been affirmed by the results in Table 5.2.2. Figure 1 in the Appendices captures this U-shape relationship between boys's work likelihood and the household's log pce. The minimum point corresponds to the probability of 0.0321 and log pce of 12.6346. Log pce of 12.6346 in is equivalent to real per capita expenditure value of Rp 306,999, or approximately US$32.40[3].

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[3] Rp 306,999 also corresponds to S$56.23. Calculated based on exchange rate of 1 US$=Rp 9474.9 and 1 S$=Rp 5459.4, as of December 2000.

TABLE 5.2.2

PROBIT OUPUTS ON WORK: GIRLS vs BOYS

Independent Variables	Girls		Boys	
	Coefficients	DF/dx	Coefficients	DF/dx
Age of child	0.1785175*** (0.01683)	0.01156*** (0.00114)	0.218184*** (0.01697)	0.01667*** (0.00136)
Muslim[c]	-0.258269** (0.13413)	-0.02058** (0.01286)	-0.2323494** (0.11273)	-0.02105** (0.01195)
Landownership[c]	0.287377*** (0.08229)	0.01934*** (0.00586)	0.3260024*** (0.07582)	0.02612*** (0.00648)
Urban[c]	0.058477 (0.09495)	0.00387 (0.00642)	0.0647015 (0.09000)	0.00505 (0.00719)
Log pce	0.7823592 (0.57987)	0.05066 (0.03784)	-0.6916294* (0.41590)	-0.05283* (0.03152)
(Log pce)^2	-0.0277253 (0.02290)	-0.00180 (0.00149)	0.027369* (0.01660)	0.00209* (0.00126)
Still in school[c]	-0.718673*** (0.11761)	-0.08424*** (0.02177)	-0.8674553*** (0.10604)	-0.12831*** (0.02601)
First born[c]	0.0797634 (0.07629)	0.00514 (0.00491)	-0.0497578 (0.07801)	-0.00381 (0.00601)
≤5 years' old children	-0.0266862 (0.05411)	-0.00173 (0.00352)	0.0657492 (0.05308)	0.00502 (0.00412)
6-14 years' old children	0.0815863** (0.03875)	0.00528** (0.00253)	0.0459804 (0.05308)	0.00351 (0.00299)
15-59 years' old male	-0.0453494 (0.05107)	-0.00294 (0.00331)	0.0448539 (0.04345)	0.00343 (0.00335)
15-59 years' old female	0.0912628* (0.04875)	0.00591* (0.00317)	-0.1083676** (0.04720)	-0.00828** (0.00363)
≥60 years' old female	0.1831716* (0.10251)	0.01186* (0.00662)	0.1352491 (0.10160)	0.01033 (0.00775)
≥60 years' old male	0.1941992* (0.11478)	0.01258* (0.00749)	0.1941442* (0.11371)	0.01483* (0.00873)
Education ratio	-0.1922576 (0.13838)	-0.01245 (0.00910)	-0.1956778* (0.12100)	-0.01495* (0.00929)
Years of schooling of most educated parent	-0.0321397*** (0.01113)	-0.00208*** (0.00073)	-0.0371544*** (0.01058)	-0.00284*** (0.00078)
Community-level average wage rate	-0.286957*** (0.08853)	-0.01858*** (0.00570)	-0.1158781 (0.08457)	-0.00885 (0.00648)
Year 2000[c]	0.2129938*** (0.47654)	0.01133*** (0.02042)	0.024093*** (0.23218)	0.00180*** (0.01700)
Mother in HH[c]	0.1264648 (0.17377)	0.00741 (0.00915)	0.1828274 (0.15529)	0.01219 (0.00889)
Father in HH[c]	1.343278 (0.15037)	0.09120 (0.01187)	1.012573 (0.13938)	0.07524 (0.01146)
Constant	-6.985146 (3.67208)	-	1.739174 (2.62498)	-
Pseudo R-square	0.2363		0.2562	
Log pseudo-likelihood	-771.9037		-876.48322	
No. of obs	4092		4175	

Note: [c] refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level.
*:10% significance level, **:5% significance level and ***:1% significance level.

Education ratio is weakly significant at 10% level for boys but statistically insignificant for girls. The education level of the most educated parent itself is negatively associated with both genders' work likelihood. Both boys and girls are more likely to work in year 2000, confirming the finding in previous section using the overall sample.

It is interesting to note as well that the impact from higher community-level wage rate is associated with a fall in girls' probability of work, but insignificant for boys. Community wage rates potentially reflect the community level of affluence. Hence the prevalence of higher community wage rates implies that the community is richer and less likely to employ child labour, in particular girls. As the community-wage rate is only statistically significant for girls, this may also imply that girl's labour supply is more elastic than that of boys' since the girls' provision of labour is more sensitive to changes in the exogenous wage rates.

The rest of the variables which have not been discussed in this section have the same impacts on both girls' and boys' work likelihoods.

5.2.3 Overall Children's Schooling: Probit

With reference to the following Table 5.2.3, older children are obtained to be less likely to be in school. Boys are less likely to be in school than girls as well. Being a Muslim is associated with a lower probability to be in school, possibly reflecting differences in emphasis on the importance of children's education. Landownership which conveys greater household's wealth contributes to a higher child's schooling likelihood. Education ratio itself is statistically insignificant but the years of schooling of the most educated parent are associated with higher child's likelihood for schooling. In reconciliation of these last two findings, this paper concludes that mother's relative share of couple's total years of schooling has no significant influence on her child's schooling, but the education levels of parents have highly significant impact on increasing the child's current school attendance.

TABLE 5.2.3

PROBIT OUTPUT ON CHILDREN'S SCHOOL ATTENDANCE

Independent Variables	Coefficients	DF/dx
Age of child	-0.27658*** (0.02562)	-0.00820*** (0.00099)
Male dummy[c]	-10.57234** (5.01040)	-0.99843** (0.01260)
Muslim[c]	-0.44109*** (0.13621)	-0.00885*** (0.00253)
Landownership[c]	0.15719** (0.06513)	0.00458** (0.00201)
Urban[c]	0.02135 (0.08468)	0.00063 (0.00249)
Log pce	0.59025 (0.65728)	0.01751 (0.02024)
(Log pce)^2	-0.01045 (0.02715)	-0.00310 (0.00082)
Ever work[c]	-0.73082*** (0.07075)	-0.04462*** (0.00997)
First born[c]	0.05644 (0.06766)	0.00168 (0.00201)
$\leq$ 5 years' old children	-0.03193 (0.04437)	-0.00095 (0.00130)
6-14 years' old children	-0.02462 (0.03559)	-0.00073 (0.00107)
15-59 years' old male	-0.03623 (0.03894)	-0.00107 (0.00118)
15-59 years' old female	0.09654* (0.05125)	0.00286* (0.00150)
$\geq$ 60 years' old female	0.09592 (0.09745)	0.00285 (0.00289)
$\geq$ 60 years' old male	0.08279 (0.09406)	0.00246 (0.00284)
Education ratio	0.16657 (0.12869)	0.00494 (0.00374)
Years of schooling of most educated parent	0.05825*** (0.01267)	0.00173*** (0.00033)
Community-level average wage rate	-0.06937 (0.05875)	-0.00206 (0.00177)
Mother in HH[c]	-0.18767 (0.23131)	-0.00454 (0.00449)
Father in HH[c]	0.16299 (0.12756)	0.00565 (0.00524)
Year2000[c]	-0.10309 (0.10447)	-0.00302 (0.00312)
Gender*(log pce)	1.82777** (0.83348)	0.05422** (0.02603)
Gender*(log pce)^2	-0.07759** (0.03456)	-0.00230** (0.00109)
Gender*(education ratio)	-0.19928 (0.17353)	-0.00587 (0.00516)
Constant	-0.12838 (4.07563)	-
Pseudo R-square	0.3113	
Log pseudo-likelihood	-1171.736	
No. of obs	8267	

Note: [c] refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level.
*:10% significance level,**:5% significance level and ***:1% significance level.

For girls who are in the base reference group, the impact from per capita expenditure on girls' probability of schooling is statistically insignificant. However, given that the child is a male, Table 5.2.3 shows that higher household per capita expenditure is associated with higher possibility of boys in attending school, in which this probability increases at a diminishing rate. This implies that well-to-do families are more likely to send their sons to school and there will also be a turning point in which boys' likelihood to be in school will fall when household's wealth status increases. These latter findings on the relationship between expenditure and children's schooling motivate the paper to carry out separate probit analyses on girls' and boys' probability in being in school. Section 5.2.4 highlights the main findings of this latter empirical work.

5.2.4. Boys vs Girls: Schooling Analyses using Probit

The results of probit analyses on girls' and boys' probabilities of work are tabulated in the following table.

Landownership indicates a positive comovement with girls' probability of work, but statistically insignificant for boys. The impact from having more adult females on the other hand, is positively associated with boys' probability of currently school attendance, but statistically insignificant for the case of girls. Such observation may underscore female favouritism towards boys. Interestingly, the impact from having more elderly male age 60 and above in a household is positive on girls' current school attendance, but insignificant for boys' schooling. This finding might imply that girls are favoured over boys, by the elderly males in the household.

The impacts of the rest of the variables on a child's schooling likelihood in this section confirm previous findings in section 5.2.3.

TABLE 5.2.4

PROBIT OUPUTS ON SCHOOL ATTENDANCE: GIRLS vs BOYS

Independent Variables	Girls		Boys	
	Coefficients	DF/dx	Coefficients	DF/dx
Landownership[c]	0.27404***	0.00566***	0.07090	0.00250
	(0.09208)	(0.00242)	(0.08946)	(0.00320)
Log pce	0.89240	0.01881	2.12478***	0.07546***
	(0.68101)	(0.01665)	(0.47915)	(0.02488)
$(\text{Log pce})^2$	-0.02298	-0.00048	-0.07638***	-0.00271***
	(0.02814)	(0.00064)	(0.02006)	(0.00098)
15-59 years' old female	0.07997	0.00169	0.11081*	0.00394*
	(0.08383)	(0.00163)	(0.06118)	(0.00230)
≥ 60 years' old female	-0.01984	-0.00418	0.24021*	0.00853*
	(0.13774)	(0.00294)	(0.13689)	(0.00517)
≥ 60 years' old male	0.26265*	0.00554*	-0.06205*	-0.00220*
	(0.15644)	(0.00381)	(0.12082)	(0.00433)
Education ratio	0.30939	0.00652	-0.18733	-0.00665
	(0.13918)	(0.00315)	(0.15347)	(0.00577)
Years of schooling of the most educated parent	0.09301	0.00196	0.03289**	0.00117**
	(0.01740)	(0.00053)	(0.01713)	(0.00053)

Note: [c] refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level. Full regressions can be found in Appendix A1. *:10% significance level,**:5% significance level and ***:1% significance level.

Log per capita expenditure (pce) on the other hand, indicates an inverted U-shape relationship with boys' current school attendance, but shows no statistically significant association with girls' schooling. Such observation supports the same finding in section 5.2.3 pertaining to the inverted U-shape relationship between boys' schooling and log pce. The relationship between girls' schooling and log pce on the other hand is statistically insignificant, which again is in agreement with the same conclusion drawn is section 5.2.3.

Figure A1 in the Appendices plots the relationship between log pce and boys' work likelihood. In Figure A1, the minimum point corresponds to boys' probability of working of 0.0321 and log pce of 12.6346. Log pce 12.6346 corresponds to Rp 306,999, or approximately US\$32.40[4]. In Figure A3, the boys' maximum probability of being in school is 99.29% with the corresponding log pce of 13.9094. Log pce of 13.9094 is equivalent to the value of real per capita expenditure of Rp 1,098,438, or approximately US\$115.93[5]. Figure A2 in the Appendices itself, plots the relationship between log pce and girls' work likelihood.

[4] Rp 306,999 corresponds to S\$56.23. Calculated based on exchange rate of 1 US\$=Rp 9474.9 and 1 S\$=Rp 5459.4, as of December 2000.
[5] Rp 1,098,438 corresponds to S\$201.20. Calculated based on exchange rate of 1 US\$=Rp 9474.9 and 1 S\$=Rp 5459.4, as of December 2000.

One caveat is in order pertaining to Figure A2. Readers should note that despite the fact that the graph in Figure A2 shows an inverted U-shape relationship between girls' schooling and log pce, the regression results in Table 5.2.4 indicate that no conclusion can be drawn whether the relationship between log pce and girls' probability of work is significantly different from a straight line as log pce and the square of log pce have been obtained to be statistically insignificant. A joint significance test on these two variables yields p-value of 0.2580 which implies that there is no evidence to refute the null hypothesis that they are not significantly different from zero. As the two variables are not jointly significant, this paper hence does not exclude the square of log pce from the girls' equation. Figure A4 plots the relationship between log pce and girls' schooling likelihood.

Boys who are first-borns are more likely to be in school, but such schooling privilege does not hold for first-born girls. This observation raises two important issues. The fact that being the first born makes it more likely for boys to be in school implies that   parents may place more emphasis on educating their first borns as these children are likely to yield quicker and higher returns to parents when they go out to work upon finishing school, as compared to their younger siblings. In addition, as the first born's privilege to be more likely to be sent to school only prevails for boys and not for girls, this potentially implies that parents may favour sons in schooling investment. Emerson and Souza (2005) suggest two potential reasons to sons being favoured in parents' education investment. First, the opportunity cost of sending daughters' to school may be higher than for boys, as girls' schooling time is a substitute for the time available for housekeeping activities which are generally performed by girls. Second, as it is traditionally boys who will take care of their parents when they are old especially when the boys are the eldest in the family, both parents may hence prefer to increase their sons' human capital in relation to their daughters. Daughters' human capital returns are likely to be lost to the in-laws family upon marriage. Hence, these contribute to the finding that the impact from being the first born is positive on boys' work likelihood, but not for girls'. The impact from higher community-level average wage is insignificant for both girls' and boys' schooling.

Education ratio itself is positively correlated with girls' probability of work but insignificant for boys'. This implies that as mother's years of schooling constitute a larger share of the couple's total education, girls will benefit as they will be more likely to be attending school. Years of schooling of the most educated parent on the other hand, are positively associated with both girls' and boys' current school attendance.

From the probit results on a child's work and schooling likelihoods, one can deduce that there is a potential correlation unobserved factors in children's work and schooling decisions. The main illustration of such correlation would be the observation that a child who is currently in school is found to be less likely to work, i.e current school attendance enters negatively into work decision; and a child who has worked is also found to be less likely to be in school, i.e labour participation has entered negatively into schooling decision. Hence, these two decision choices may not made independent of each other. This finding motivates the paper to carry out bivariate regressions in section 5.2.5, using the same set of independent variables as those in probits. This set of independent variables is termed under Specification I. In section 5.2.6, in view of the findings of various studies (see, for instance, Emerson and Souza, 2005) which conclude that mother's years of schooling has greater mitigating impact on a child's work likelihood, this paper has also carried out bivariate probit analyses on boys and girls using Specification II in which both parents' educational attaiments are used in place of the education ratio and years of schooling of the most educated parent. As the results obtained in the bivariate probits are generally consistent with those from the probit analyses, the probit results of Specification II are thus not shown.

To summarize sections 5.2.1 till 5.2.4, this paper has thus far obtained the following: (1) there exists a U-shape relationship between log per capita expenditure (pce) and boys' work likelihood, (2) log pce and boys' schooling likelihood forms an inverted U-shape relationship, (3) there is statistically insignificant relationship between log pce and girls' schooling and work likelihoods and (4) the unobserved factors in work and schooling decisions-making process might potentially be correlated.

5.2.5 Children's Work and Schooling: Bivariate Probit

Specification I: Using education ratio and years of schooling of the most educated parent, conditional on the gender of child.

From the bivariate regression estimates for girls in Table 5.2.5, the main results can be summarized as follow. Older girls are more likely to work under bivariate probit, which also confirms previous finding under probit. Under both probit and bivariate probit analyses, girls are more likely to work in year 2000, which may be attributable to greater job opportunities after the economic crisis. The impact of landownership is again obtained to be positively correlated with girls' work likelihood, which confirms the same finding under probit analysis in section 5.2.2. Having more children aged 6-14 years old and total adults females will increase girls' work likelihood. On the other hand, Muslim girls are less likely to work. This confirm the result under probit. The impact from the years of schooling of the most educated parent will also lower girls' work likelihood, which can be attributable to the previously discussed direct and indirect effects of parents' education.

The impact from higher mother's bargaining power in terms of higher education ratio, acts to increase girls' likelihood of schooling but insignificant in mitigating girls' work likelihood. These results confirm previous findings under probit analyses for girls' work and schooling likelihoods.

In addition, older girls are less likely to be in school. Girls are also less likely to be in school in the year 2000 under bivariate probit analysis. Under probit analysis however, the impact of being in year 2000, is insignificant for girls' schooling likelihood. This result suggests that work and school decisions choice in the two years is dependent of each other and that bivariate probit approach may be more suitable than probit in analyzing child's school and work decisions. The impacts from landownership and having more years of schooling for the most educated parent are positive on girls' probability of schooling, which also confirm previous findings under probit.

The bivariate probit regressions results in Table 5.2.5 yield the following conclusions for boys. Ceteris paribus, older boys are more likely to work. Muslim boys are less likely to

work, possibly due to the smaller emphasis placed by Muslim families on material accumulation. These findings confirm results under probit. The dummy variables for landownership are also positively correlated with boys' work likelihood. Having more elderly males in a household is associated with a higher work probability for boys, which also confirms previous finding under probit. Boys are also more likely to work in the year 2000, possibly because there might also be more job opportunities for boys in year 2000. Having more adult females aged 15-59 years old in a household boys' work likelihood will fall. The impact from having more elderly males of age 60 and above will increase boys' likelihood. Higher mother's education share out of total couple's years of schooling and the more years of schooling of the most educated parent are associated with a lower boys' probability of work.

Older boys are less likely to be in school, and so are boys who are Muslims. Boys are also less likely to be in school in the year 2000. The impact from having more adult females age 15-59 years old in the household is positive on boys' likelihood to be currently in school. The impact from having more years of schooling for the most educated parent in the household will raise the boys' probability of schooling. On the other hand, boys who are first born are more likely to be in school. All these conclusions confirm the finding under probit analysis in section 5.2.4.

The impact from higher community-level wage rate is negative on both girls and boys' work likelihoods but insignificant for both of their schooling equations. Hence for exogenous community-level average wage rate, the results obtained for both girls' and boys' work and schooling likelihoods are consistent under probit and bivariate probit analyses.

The impacts from having more elderly male aged 60 and above are insignificant for both girls' work and schooling likelihoods under bivariate probit. This finding contrasts the

TABLE 5.2.5

BIVARIATE PROBITS ON WORK AND SCHOOLING
USING SPECIFICATION I: GIRLS vs BOYS

Independent Variables	Girls		Boys	
	Work Coefficients	School Coefficients	Work Coefficients	School Coefficients
Age of child	0.20126*** (0.01700)	-0.31621*** (0.04154)	0.24886*** (0.01684)	-0.29249*** (0.03072)
Muslim	-0.22449* (0.13657)	-0.47667** (0.21509)	-0.20045* (0.11155)	-0.29675** (0.15056)
Landownership	0.25301*** (0.08134)	0.23058** (0.08930)	0.31827*** (0.07407)	0.00537 (0.08618)
Urban	0.05958 (0.09418)	-0.01106 (0.11026)	0.06733 (0.08931)	0.03872 (0.11628)
Log pce	0.45742 (0.54726)	0.75304 (0.68632)	-1.19615*** (0.39691)	2.28159*** (0.46608)
(Log pce)^2	-0.01644 (0.02168)	-0.01813 (0.02821)	0.04587*** (0.01588)	-0.08265*** (0.01943)
First born	0.09262 (0.07549)	-0.07257 (0.09761)	-0.07434 (0.07557)	0.17436** (0.08884)
$\leq$ 5 years' old children	-0.01815 (0.53168)	-0.07180 (0.06732)	0.06242 (0.05138)	-0.01764 (0.05626)
6-14 years' old children	0.08621** (0.03808)	-0.05740 (0.05171)	0.04690 (0.03713)	-0.02102 (0.04266)
15-59 years' old male	-0.03369 (0.04848)	-0.03333 (0.05021)	0.05457 (0.04002)	-0.02750 (0.04711)
15-59 years' old female	0.09034** (0.04735)	0.03791 (0.08579)	-0.12827*** (0.04565)	0.13342** (0.05797)
$\geq$ 60 years' old female	0.17991* (0.10177)	-0.06200 (0.13157)	0.09272 (0.09898)	0.19624* (0.12724)
$\geq$ 60 years' old male	0.16953 (0.11496)	0.23817 (0.15400)	0.21845** (0.10982)	-0.11297 (0.11559)
Education ratio	-0.21786 (0.12032)	0.19480** (0.13294)	-0.20175** (0.10509)	-0.14599 (0.12958)
Years of schooling of most educated parent	-0.03863*** (0.01096)	0.09266*** (0.01648)	-0.04114*** (0.01028)	0.04157** (0.01647)
Community-level average wage rate	-0.26517*** (0.08637)	-0.09340 (0.08240)	-0.11548 (0.08230)	0.04487 (0.08293)
Mother in HH	0.29314 (0.47911)	-0.93888 (0.59902)	-0.01704 (0.22587)	0.18328 (0.27003)
Father in HH	0.08675 (0.16582)	0.23648 (0.20345)	0.15817 (0.14785)	0.07787 (0.14858)
Year2000	1.34062*** (0.14760)	-0.24654* (0.13764)	1.02304*** (0.13653)	-0.36030** (0.14505)
Constant	-5.45012 (3.46213)	-0.26151 (4.28454)	4.22712* (2.53184)	-10.72700*** (2.86649)
Log pseudo-likelihood	-1353.0627		-1507.8705	
No. of obs	4092		4175	
/artrho	-0.41990		-0.46052	
rho	-0.39684		-0.43050	
Girls	Wald test of rho=0: chi2 (1)= 38.9788 Prob > chi2 = 0.0000			
Boys	Wald test of rho=0: chi2 (1)= 61.486 Prob > chi2 = 0.0000			

Note: ^{c} refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level.
*:10% significance level,**:5% significance level and ***:1% significance level.

results from probit, in which this group of householders is associated with an increase in both girls' work and schooling likelihoods. The insignificance of having more elderly males in the household may be attributable to the fact that it has both positive impacts on girls' work and study, hence upon controlling for the correlation between the unobserved factors, the impacts derived under probit may offset each other.

An interesting point to note is the fact that there is a gender difference in the direction of correlation between the number of adults females aged 15-59 years old and a child's work likelihood. For girls, the direction is positive; but for boys, it is negative. This difference may imply that the activities or jobs performed by adult females aged 15-59 years' old and girls' work are complementary in nature, whereas for boys, these activities are substitutes to their likelihood to work. There still exist a U-shape relation between log per capita expenditure (pce) and boys' work likelihood, and an inverted U-shape between log pce and the boys' probability of being in school. The U-shape between log pce and boys' work likelihood may be attributable to the fact that more affluent families are likely to own household enterprises which employ their own children. Boys are more likely to be working in those enterprises than girls, may be attributable to the fact that boys are more likely than girls to inherit those family businesses. Hence, such gender biasness in inheritance allocation underscores cultural norms in Indonesia which are likely to favour boys over girls.

Comparing the probit results of boys and girls' work and schooling likelihood with the bivariate probits analyses, there four main differences. The number of elderly males age 60 and above, is insignificant for both girls' work and schooling likelihoods under bivariate probit analysis but significant at 10% level under probit. The reverse occurs for education ratio, in which the education ratio becomes significant at 10% level in the bivariate probit but insignificant under probit. Under bivariate probit, greater mother's bargaining power is associated with a fall in the girls' probability of work. Both genders are also less likely to be in school in the year 2000 under the bivariate probit analyses but insignificant under probit regressions.

5.2.6 Children's Work and Schooling: Bivariate Probit

Specification II: Using Parents' Educational Attainments, conditional on gender of child.

From the regression estimates using each parent's years of schooling in Table 5.2.6, this paper concludes the following.

For girls, the older they are, the more likely that they will work. Girls are also more likely to work in the year 2000. Landownership is positively associated with girls' work likelihood. Similarly, the more children aged 6-14 years old and adult females aged 15-59 years old there are in a household, the more likely the girls will work. Having mother with high educational attainment and the prevalence of higher community-level wage rate are associated with a lower probability of girls working. Father's education however, is not statistically significant.

As for girls' schooling, age of the girl and the dummy of being a Muslim indicate a negative association with her probability of attending school. Landownership is positively correlated with girls' schooling. This paper also obtains that higher mother's schooling will accentuate girls' likelihood to be in school more than the positive impact derived from father's educational attainment.

For boys, their work likelihood is positively correlated with their age and household landownership. In addition, the total number of adult males in the household and the year dummy are positively related to higher boys' probability of work. Positive correlation between the overall number of adult males may imply that males' and boys' labour are complements to each other. On the other hand, the impacts from being a Muslim, having more adult females aged 15-59 years old in the household and higher mother's years of education are associated with boys' lower probability of work. Similar to the finding for girls' work, father's years of schooling also have insignificant impact in reducing the incidence of child labour for boys. Dayioglu and Assad (2002) attribute this insignificance to the possibility that father's schooling may only work to reduce child labour indirectly through increase in paternal wages.

TABLE 5.2.6

BIVARIATE PROBIT OUTPUT ON WORK AND SCHOOLING
USING SPECIFICATION II: GIRLS vs BOYS

Independent Variables	Girls		Boys	
	Work Coefficients	School Coefficients	Work Coefficients	School Coefficients
Age of child	0.20060*** (0.01664)	-0.30521*** (0.03791)	0.24831*** (0.01634)	-0.29885*** (0.03040)
Muslim[c]	-0.21058 (0.13344)	-0.37560** (0.19250)	-0.20926** (0.10906)	-0.34178** (0.15211)
Landownership[c]	0.23418*** (0.08002)	0.20145** (0.08573)	0.31694*** (0.07269)	-0.00912 (0.08477)
Urban[c]	0.05011 (0.09202)	-0.00972 (0.10346)	0.07264 (0.08731)	0.05726 (0.11805)
Log pce	0.35608 (0.51728)	0.30865 (0.63866)	-1.06573*** (0.40520)	2.33633*** (0.45974)
(Log pce)^2	-0.01266 (0.02060)	-0.00091 (0.02648)	0.04110** (0.01623)	-0.08572*** (0.01912)
First born[c]	0.08993 (0.07366)	-0.10222 (0.09168)	-0.06625 (0.07327)	0.13454 (0.08633)
≤5 years' old children	-0.02340 (0.05207)	-0.04763 (0.06270)	0.06168 (0.05051)	-0.01744 (0.05583)
6-14 years' old children	0.06696* (0.03758)	-0.05701 (0.04746)	0.05195 (0.03628)	-0.02777 (0.04148)
15-59 years' old male	-0.02656 (0.04605)	-0.03734 (0.04680)	0.06374* (0.03856)	-0.01867 (0.04588)
15-59 years' old female	0.08883** (0.04577)	0.03709 (0.07475)	-0.12510*** (0.04460)	0.10898** (0.05465)
≥60 years' old female	0.13162 (0.09771)	0.02153 (0.12375)	0.08145 (0.09289)	0.16023 (0.11378)
≥60 years' old male	0.17016 (0.10957)	0.11037 (0.13605)	0.21462** (0.10346)	-0.05845 (0.11150)
Mother's years of schooling	-0.03468*** (0.01206)	0.07253*** (0.01814)	-0.03418*** (0.01159)	0.03326** (0.01730)
Father's years of schooling	-0.01207 (0.01059)	0.04562*** (0.01301)	-0.00797 (0.01005)	0.02910 (0.01557)
Community-level average wage rate	-0.24064*** (0.08470)	-0.12034 (0.07863)	-0.11909 (0.08092)	0.05784 (0.08205)
Mother in HH	0.04298 (0.21312)	-0.15320 (0.18298)	0.09799 (0.16735)	-0.0037925 (0.1652681)
Father in HH	0.17249 (0.15304)	0.17344 (0.16859)	0.28095** (0.13470)	0.07117 (0.14191)
Year 2000[c]	1.29090*** (0.14349)	-0.16099 (0.13251)	1.01621*** (0.13146)	-0.39745*** (0.13877)
Constant	-5.03136 (3.25773)	2.68059 (3.96950)	3.19655 (2.55677)	-10.94686*** (2.82830)
Log pseudo-likelihood	-1423.3182		-1580.2252	
No. of obs	4277		4353	
/artrho	-0.41651 (0.06420)		-0.44717 (0.05780)	
rho	-0.39399 (0.05424)		-0.41957 (0.04711)	
Girls	Wald test of rho=0: chi2 (1)= 42.0849 Prob > chi2 = 0.0000			
Boys	Wald test of rho=0: chi2 (1)= 61.1595 Prob > chi2 = 0.0000			

Note: [c] refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level.
*:10% significance level, **:5% significance level and ***:1% significance level.

For boys' schooling, this paper obtains that being a Muslim is associated with a lower boys' probability of being in school. Older boys are also less likely to be in school. Boys are also less likely to be in school in the year 2000. These three findings confirm the probit results under boys' schooling. Having more adult females aged 15-59 years' old in a household is associated with higher probability of boys of being in school, which plausibly reflect favouritism towards boys. Mother's years of schooling is again obtained to have greater positive impact on boys' likelihood to be in school, relative to the impact from father's education.

Comparing the regression outputs using Specifications I and II, there are several points worth highlighting. Under the new specification of using each parent's years of schooling, there still exists a U-shape relationship between log per capita expenditure (pce) and boys' work likelihood. The inverted U-shape also prevails for the relationship between log pce and boys' probability to be in school. However, in the Specification II, the dummy of being a Muslim and being the first born are insignificant in the girls' work likelihood, ceteris paribus. The impact from having more adult males aged 15-59, which was initially insignificant for boys' work in Specification I, is obtained to be significant at 10% level for boys' work in Specification II. In the Specification II, year dummy and the number of elderly females of age 60 and above have become insignificant in girls' work and schooling likelihoods, respectively. Father's presence in the household will also increase boys' work likelihood under Specification II, but the impact from father's presence has no significant impact under Specification I.

From the table, this paper obtains that the p-values for the rho are significant at 1% level, which indicate that the correlation between the unobserved factors is significantly different from zero. In other words, work and schooling decisions are not made independent of each other. Furthermore, the values for rho are negative which imply that the unobserved factors might have opposite impacts on a child's schooling and work.

Conclusion

The Indonesia Family Life Survey (IFLS) 1997 and 2000 data provides numerous insights on child labour in Indonesia. First, as income increases, boys' work likelihood will fall at a dimishing rate. For per capita expenditure (pce) greater than US$32.40, boys's work likelihood will increase with income. For girls, the impact from having higher income is not significant in mitigating their work likelihood. These findings may be attributable to the fact that more affluent families are likely to own family enterprises which engage boys' labour. This employment may be done as boys are generally more likely than females to inherit these enterprises. Second, the relationship between log pce and boys' schooling likelihood forms an inverted U-shape. For per capita expenditure greater than US$115.93, boys' schooling likelihood will fall. For girls, the impact of higher per capita expenditure is again insignificant in influencing their schooling likelihood. Third, the unobserved factors in work and schooling decisions-making process might potentially be correlated. To control for the potential correlation between work and schooling decisions, bivariate probit analyses have been employed. This paper has also discussed the similarities and differences in probit and bivariate probit results.

This paper obtains that mother's educational attainment has greater mitigating impact than that of father's. Mother's bargaining power in terms of education ratio has also been obtained to be significant in some cases, as this paper has discussed in Section IV. Parents' schoolings however, do not affect their children equally. In addition, child labour is not limited only to children from poorer families will work but it also extends to children from richer families. The types of jobs that are carried out by children from these two different income groups will differ, as children from poorer households will be more likely to work for pay. Children from richer households however, will be more likely to work in family enterprises. Due to limited observations, the current research is not able to carry out separate analyses on biological and adopted children in which the 'emotional cost' of parents in

sending their children to work may actually differ between these two cases. This will be left for future empirical investigation.

As education has been obtained to be highly significant in mitigating the incidence of child labour, more policy efforts should thus be targeted at increasing education levels of both parents and children, for they will help to break any intergenerational poverty trap.

Appendix A1: Probit regression outputs for school attendance

Independent Variables	Girls		Boys	
	Coefficients	DF/dx	Coefficients	DF/dx
Age of child	-0.29922*** (0.04219)	-0.00631*** (0.00134)	-0.25863*** (0.03141)	-0.00919*** (0.00129)
Muslim[c]	-0.53253** (0.22194)	-0.00681** (0.00273)	-0.36232** (0.16234)	-0.00946** (0.00395)
Landownership[c]	0.27404*** (0.09208)	0.00566*** (0.00242)	0.07090 (0.08946)	0.00250 (0.00320)
Urban[c]	-0.00576 (0.11303)	-0.00012 (0.00240)	0.05178 (0.11958)	0.00180 (0.00416)
Log pce	0.89240 (0.68101)	0.01881 (0.01665)	2.12478*** (0.47915)	0.07546*** (0.02488)
(Log pce)^2	-0.02298 (0.02814)	-0.00048 (0.00064)	-0.07638*** (0.02006)	-0.00271*** (0.00098)
Ever work[c]	-0.70022*** (0.11101)	-0.31475*** (0.01149)	-0.76891*** (0.09449)	-0.05585*** (0.01548)
First born[c]	-0.05902 (0.09861)	-0.00124 (0.00215)	0.16957* (0.09187)	0.00611* (0.00349)
≤ 5 years' old children	-0.06926 (0.06852)	-0.00146 (0.00138)	-0.00899 (0.05840)	-0.00032 (0.00207)
6-14 years' old children	-0.04339 (0.05246)	-0.00091 (0.00119)	-0.01410 (0.04493)	-0.00050 (0.00159)
15-59 years' old male	-0.05941 (0.05368)	-0.00125 (0.00119)	-0.02420 (0.05067)	-0.00086 (0.00182)
15-59 years' old female	0.07997 (0.08383)	0.00169 (0.00163)	0.11081* (0.06118)	0.00394* (0.00230)
≥ 60 years' old female	-0.01984 (0.13774)	-0.00418 (0.00294)	0.24021* (0.13689)	0.00853* (0.00517)
≥ 60 years' old male	0.26265* (0.15644)	0.00554* (0.00381)	-0.06205 (0.12082)	-0.00220 (0.00433)
Education ratio	0.30939** (0.13918)	0.00652** (0.00315)	-0.18733 (0.15347)	-0.00665 (0.00577)
Years of schooling of the most educated parent	0.09301*** (0.01740)	0.00196*** (0.00053)	0.03289** (0.01713)	0.00117** (0.00053)
Community-level average wage rate	-0.13772 (0.08364)	-0.00290 (0.00193)	0.02381 (0.08727)	0.00085 (0.00310)
Year2000[c]	0.92340 (0.60152)	-0.00752 (0.00277)	0.19388 (0.27572)	0.00847 (0.01469)
Mother in HH[c]	0.25691 (0.20834)	0.00707 (0.00782)	0.09710 (0.15219)	0.00377 (0.00641)
Father in HH[c]	-0.05326 (0.14552)	-0.00112 (0.00308)	-0.17465 (0.15318)	-0.00607 (0.00547)
Constant	-0.48157 (4.29729)	-	-10.10748 (2.93028)	-
Pseudo R-square	0.3326		0.3088	
Log pseudo-likelihood	-558.56335		-597.50617	
No. of obs	4092		4175	

Note: [c] refers to dummy taking value of 1 if true, 0 otherwise. Robust standard errors are in parentheses and have been adjusted for clustering at household level.
*:10% significance level,**:5% significance level and ***:1% significance level.
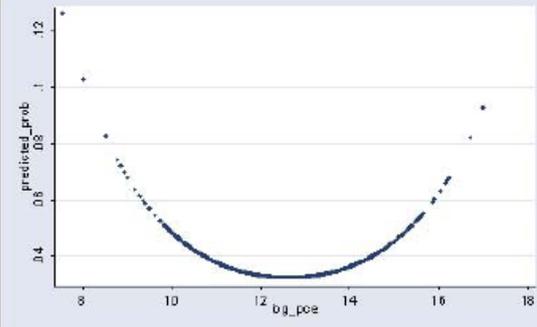
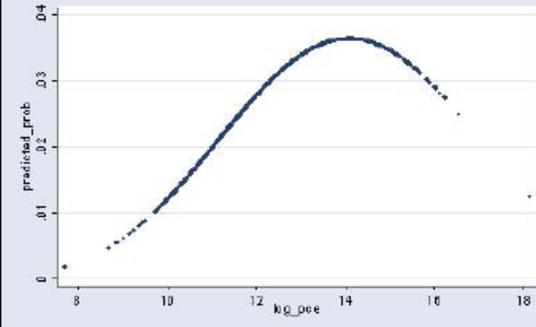Figure A1
PROBIT ON WORK: BOYS

Figure A2
PROBIT ON WORK: GIRLS
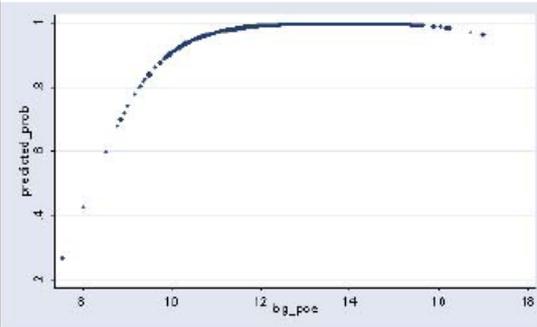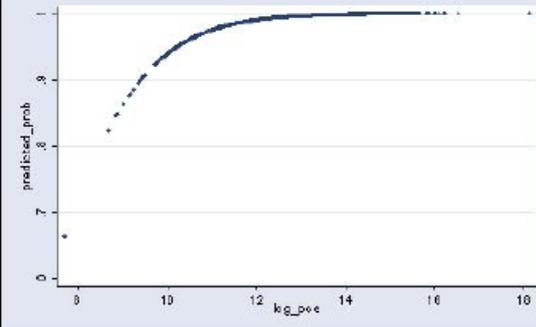
Figure A3
PROBIT ON SCHOOLING : BOYS

Figure A4
PROBIT ON SCHOOLING: GIRLS

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