Determinants of Child Labor: A Case Study of Automobiles Workshops, Fan Industry and Ceramics Industry in Gujrat

Sikander Pervez[1] and Zeeshan Mukhtar[2]

Abstract

Child labor is an important issue now-a-days. The developed and developing countries are taking serious action to eradicate child labor from the society. Asia has a larger number of 18 % children employed as child laborers. A case study of Gujrat, children working as a labor in fan industry, ceramics industry and automobile workshop was taken. Logit, Probit technique is applied in this research. Results conclude that family income and average family size have significant role, negative and positive relation respectively. Father's education doesn't have any significant role. The study recommends that the government should introduce income- generating activities for the enhancement of poor people's income. Population growth needs to be controlled. A campaign should be organized everywhere to make people aware of the adverse effects of child labor. The implementation of labor laws concerning child labor should be taken well care of. Education should be made compulsory and free for all at least up to middle level.

Keywords: Logit, Probit, Child labor

Introduction

Child labor is one of the most emerging, serious and widespread topic in many parts of the world. Child labor exists all over the world. International Labor Organization (ILO) defines child labor as any activity other than study or play, paid or unpaid, that is carried out by a person under the age of 15 (14 in certain countries). According to ILO (1998) over 200 million children are engaged in some form of child labor and over eight million are engaged in dangerous and abusive forms of child labor (Malik *et al*, 2006). Pakistan has a per-capita income of approximately $1900. A middle class person in Pakistan earns around $5 a day on average. The average Pakistani has to feed nine or ten people with their daily wage. Further there is high inflation rate to contend with. In 2008, 17.2% of the total population lived below the poverty line, which was the lowest figure in the history of Pakistan. Social Policy Development Centre (SPDC) Karachi has stated in one of its reports that the percentage of people living in poverty in Pakistan was 33% during 1999 that increased in 38% within two years (Zaidi *et al*, 2013).

Child labor is a big problem in developing countries especially in Pakistan. According to child labor survey (1996) about 3.3 million children under 15 are working in Pakistan. Pakistan has a significant number of children participating in economic activities and contributing considerably to household income. 5–14 years of children are performing a wide range of business activities. Some are helping their parents in house-keeping, some are selling newspapers or cigarettes in the streets, while some are working in formal and informal sectors of market. But this was child work, an occasional form of work having no element of exploitation. This form of work was acceptable and in fact prepared children for adulthood. But children seldom worked outside their villages without their family members until the 1960s. In this era, a dramatic effort was made to expand the manufacturing base in Pakistan, which led to a large increase in the number of children working outside their homes in factories and workplaces whose owners sought to maximize profits by keeping down labor

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[1] *Graduate Student, University of Gujrat, Email: sikander.pervez786@gmail.com*
[2] *Graduate Student, University of Gujrat, Email: zeeshanmukhtar003@gmail.com*

costs. The range of child labor extends from children being involved in family occupations such as sheep rearing to pernicious forms reminiscent of children's work. Children work in family based agriculture, factories, workshop, tailoring, handicrafts, carpet weaving, manufacturing surgical instruments, leather, footwear, brick kilns, stone/brick crushing and sports goods production (Bhatty, 1998).

Children work for a variety of reasons. One of the most important reasons is poverty. Sometimes, children work to ensure the survival of their family and themselves. Though children are not well paid, they still serve as major contributors to family income in developing countries. There is no shortage of studies at the macro level, which show that the children of poor families have immediate economic value and poverty of the parents pushes many children into the labor market. Low income households face economic constraints in the present time, which makes it difficult for them to afford education along with making them short sighted by not investing in long term future returns (Dreze & Kingman, 1999).

Gujrat is one of the most important and industrial city of Punjab (Pakistan). There exist lots of industries in Gujrat like ceramics industry, fan industry and furniture industry. There are about 1,059 cottage-level and small to large-scale industrial units operating in this district. Rice production and export is another major product of Gujrat. There are many other factories engaged in manufacturing of electrical goods, electric motors and rice cleaning mills. In Gujrat there is also a problem of child labor in the ceramics industry, automobile workshops and furniture industry. In these industries thousands of people are employed but there exists also child labor. Children below 14 years of age are working in these factories.

The purpose of this study is to find the determinants of Child Labor by collecting the survey in Gujrat, Pakistan. The Logit method is applied to estimate the model. Primary Data is used for this analysis. This type of study is not investigated in context of Gujrat before this study.

This paper will follow in the sequence. Section 2 sheds light on literature review provides empirical evidence. Section 3 provides theoretical explanation about relationship between variables and modeling process. Section 4 contains on material and modeling. Section 5 contains on estimation results and interpretation of findings. Finally in section 6 conclusions is drawn on the basis of results.

Literature Review

Ali *et al* (2012), tiny hands on hefty work: Determinants of child labor on automobiles workshops in Sargodha (Pakistan).published in international journal of humanities and social sciences, vol.2 no.3. Researcher tries to find the determinants of child labor working on automobiles workshops in Sargodha city. He used primary data for this purpose and took a sample of 200 respondents and find that poverty, illiteracy, unemployment and parent's low education are the major determinants of this social evil.

Yasin *et al* (2011), Causes of child labor and discrimination of wages in different sectors: a case study of urban Multan, Pakistan. Published in International research journal of Finance and Economics ISSN 1450-2887 issue 81 (2011). Researcher tries to find the main reasons of child labor in Multan city. For this purpose he used primary data and took a random sample of 200 children. He used Chi-square and Gamma test to measure the extent. He concluded that large family size, low income and low level of parent's education and unemployed adults in family are the main reasons of child labor.

Mahmood *et al* (2005), Socio-economic determinants of child labor in automobiles and engineering workshops, published in journal of agriculture and social sciences. Researcher tries to find the socio – economic factors responsible for child labor in auto mobiles and engineering workshops in tehsil Sumundri District Faisalabad (Pakistan). He used primary data and took a sample of 120 respondents. He find that majority of the respondents belong to rural areas, living in a nuclear family system, parents are alive but with

low income. Majority of the children are not willing to work but due to financial problems parents forced them to work.

Ali and Hamid (1993), major determinants of child labor in urban Multan (Pakistan).Published in the Lahore journal of economics, vol.4, and no.1. Researcher tries to find the major causes of female child labor in Multan city. He used a primary data and took a sample of 60 female child laborers, employed as maid servants, baby sitters, and other house hold activities like cleaning, washing, cooking and child care etc. and find that parent's education, family size, family tradition and increased educational expenditures and limited schooling facilities are the major determinants of female child labor in Multan city.

Khan et al (2007), study on child labor in automobile workshops of peshawar (pakistan) , published in eastern Mediterranean health journal , vol.13 , no .6 , 2007. Researcher tries to find the characteristics of children working in car workshops in peshawar. For this purpose he used primary data and used a random sample of 200 boys working in different workshops in Peshawar city and find that majority of the children has no education .poverty is the major reason parents have low education level and were poorly paid jobs. Family size also enforced them to work on workshops. Researcher also tries to find either working on these workshops children suffer from injuries or not .And he find that 31% children suffer from watery eyes and 29% has chronic cough and 22% suffer from diarrhea. While 40% have no major injuries.

Rena (2009), the child labor in developing countries: a challenge to Millennium Development goals, published in Indus journal of management and social sciences, 3 (1):1-8 (spring 2009). Researcher discussed in his paper child labor is a huge problem and a big challenge for Millennium Development Goals. And reduction of poverty and education for all are the primary objectives of Millennium Development Goals. He discussed that poverty and education are the biggest reasons that enforce children to work. Researcher concluded that it is a special economic and social issue that needs global attention for the development of child to reduce the intensity of child labor.

Ahmad and Mustafa (2011) have tries to find the determinants of child labor. They use primary data having a sample of 100 children from shadman market Lahore. Study design was descriptive and cross sectional. They estimated that in south Asia out of total thirty million children aged 5 to 14 twenty in point six million are laborers. Their resultshows that family size and poverty have positive relation with child labor and family income have negative relationship with child labor. It is suggested that anti child labor laws must enforced strictly by government.

Khan (2010) conducts a study on causes of no schooling and child labor in rural areas of Pakistan. Primary data was taken by cluster sampling from pakpaton and Faisalabad. House hold has Sequential probit model was used. he examined that house hold factor are to be consider for improving participation in schooling and elimination of child labor. It was found that education of head, assets of has a positive relation with schooling decrease in income negatively affect welfare of children. Result shows elder children have more capacity to work then younger become a reason of drop out schooling. Gender gap, school participation decreases as increasing age. Parent's characteristics are important determinants of child schooling and child labor.

Niagara and chgedozie (2007) have an econometrics analysis conducted on children age 8 to 17. Univariate probit regression model was used. The objective was to achieve determinants of participation in north, south, rural and urban Nigeria. They are different reasons across region sectorial participation of children in economic activity. Another study in Nigeria shows that child participation exposed to health risks, abuses and injuries. Results shows that child labor lead to and minimally workforce. Reduce adult wages is an obstacle to attainment of MDG. Nigeria is not recognizing regional differences because of variable

religion, tribe and poverty. Results shows children preferred domestic worth, gender differences, highest number of children participating in labor found in south west.

Awan & waqas (2007) tries to find out answer of the question of why parents make children work? A cluster survey for Punjab was used with probit model, child labor prevent children from education better health and harmful for economy. Almost 30% of child labor belongs two least developed countries Asia contributes 12%. Child labor indicators are age, gender, region, household head education, mother education, household head gender, family size and household income. Age, gender of head, family size and region positively related and household head education and mother education negatively related with child labor.

Study Objective

- To find out the answer of the question why children are engaged in work rather getting education

Data and Methodology

The quality of data is very important in order to draw reliable conclusions. The collection of data was complex because of the non- reliable responses of child labor. A fairly representative and sound sample is essential if a limited survey is to yield fruitful results. In this survey we interviewed a sample of 75 working children in the age group of 5-14 years at different work places of Gujrat City. These children were interviewed at different work places and were involved in different economic activities such as embroidery, tailoring, workshops, service stations, woodworks, metal works, brick kilns, shops and in hotels (helpers). The major problem encountered in data collection was to get information from teenage children who were afraid of their masters and hesitated in providing information. However, efforts were made to collect correct reliable information about child labor. This information was verified again and again pertaining to one workplace. The doubtful information was rechecked and matched with other responses and those which were not confirmed were dropped. Total sample size was 75, however, after screening the data **sixty** observations were utilized to draw meaningful results. Data is analyzed by the computer software Stata. Probit, logit and linear regression model would be used in this study.

Model

WON = α_1 + + α_2FS+ α_3 FI + α_4 FE +$€_i$

WON= children working as a labor or not
FS   = Family Size
FI   = Family Income
FE   = Fathers Education

Our dependent variable is binary in the form of 0 and 1. This study will use Probit and Logit model for checking significance of independent variables with dependent variable.

Probit model

For the probit model, F (μ) is the familiar normal, cumulative distribution function

$$F(u) = \Phi(\beta_1 x_1 + \beta_2 x_2 + \beta_{12} x_1 x_2 + X\beta)$$

When the interacted variables are both continuous, the interaction effect is the double derivative with respect to x_1 and x_2:

$$\frac{\partial^2 F(u)}{\partial x_1 \partial x_2} = \{\beta_{12} - (\beta_1 + \beta_{12} x_2)(\beta_2 + \beta_{12} x_1) u\} \phi(u)$$

When the interacted variables are both dummy variables, the interaction effect is the discrete double difference:

$$\frac{\Delta^2 F(u)}{\Delta x_1 \Delta x_2} = \Phi(\beta_1 + \beta_2 + \beta_{12} + X\beta)$$
$$-\Phi(\beta_1 + X\beta) - \Phi(\beta_2 + X\beta) + \Phi(X\beta)$$

When one continuous variable and one dummy variable are interacted, the interaction effect is the discrete difference (with respect to x2) of the single derivative (with respect to x1): (Norton *et al* 2004)

$$\frac{\Delta \frac{\partial F(u)}{\partial x_1}}{\Delta x_2} = (\beta_1 + \beta_{12})\phi\{(\beta_1 + \beta_{12})x_1 + \beta_2 + X\beta\}$$
$$-\beta_1\phi(\beta_1 x_1 + X\beta)$$

Results of Probit Model:

```
. probit  workingornot  familyincome fatherseducation averagefamilysize

Iteration 0:   log likelihood = -41.555491
Iteration 1:   log likelihood = -23.158685
Iteration 2:   log likelihood = -18.925333
Iteration 3:   log likelihood = -17.944268
Iteration 4:   log likelihood = -17.864328
Iteration 5:   log likelihood = -17.863531
Iteration 6:   log likelihood =  -17.86353
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Probit regression                            Number of obs    =         60
                                             LR chi2(3)       =      47.38
                                             Prob > chi2      =     0.0000
Log likelihood =  -17.86353                  Pseudo R2        =     0.5701
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workingornot	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
familyincome	-.0001739	.0000505	-3.45	0.001	-.0002729	-.000075
fathersedu~n	.0301818	.0718567	0.42	0.674	-.1106547	.1710183
averagefam~e	.5784144	.2057495	2.81	0.005	.1751528	.981676
_cons	-.9692782	1.316874	-0.74	0.462	-3.550304	1.611747

Results and Discussions

- In the output above, we first see the iteration log, indicating how quickly the model converged. The log likelihood (-41.555491) can be used in comparisons of nested models, but we won't show an example of that here. The first iteration (called Iteration 0) is the log likelihood of the "null" or "empty" model; that is, a model with no predictors. At the next iteration (called Iteration 1), the specified predictors are included in the model. At each iteration, the log likelihood increases because the goal is to maximize the log likelihood. When the difference between successive iterations is very small, the model is said to have "converged" and the iterating stops.
- Log likelihood - This is the log likelihood of the fitted model. It is used in the Likelihood Ratio Chi-Square test of whether all predictors' regression coefficients in the model are simultaneously zero.
- LR chi2(3) - This is the Likelihood Ratio (LR) Chi-Square test that at least one of the predictors' regression coefficient is not equal to zero
- Also at the top of the output we see that all 60 observations in our data set were used in the analysis
- The likelihood ratio chi-square of -17.86353 with a p-value of 0.0001 tells us that our model as a whole is statistically significant, that is, it fits significantly better than a model with no predictors.

- In the table we see the coefficients, their standard errors, the z-statistic, associated p-values, and the 95% confidence interval of the coefficients. Both family income and average family size are statistically significant. The probit regression coefficients give the change in the z-score or probit index for a one unit change in the predictor.
  o For a one unit increase in family income, the z-score increases by 0.001.
  o For each one unit increase in average family size, the z-score increases by 0.05.
  o Fathers education is not found significant for this study.

Logit Model

For the logit model, F (μ) is the familiar logit cumulative distribution function:

$$F(u) = \frac{1}{1 + e^{-(\beta_1 x_1 + \beta_2 x_2 + \beta_{12} x_1 x_2 + X\beta)}}$$

when the interacted r.ariables are both continuous, the interaction effect is the cross derivative with respect to x_1 and x_2:

$$\frac{\partial^2 F(u)}{\partial x_1 \partial x_2} = \beta_{12} \{F(u)(1 - F(u))\}$$
$$+ (\beta_1 + \beta_{12} x_2)(\beta_2 + \beta_{12} x_1) \left[F(u) \{1 - F(u)\} \{1 - 2F(u)\} \right]$$

When the interacted variables are both dummy variables, the interaction effect is the discrete double difference:

$$\frac{\Delta^2 F(u)}{\Delta x_1 \Delta x_2} = \frac{1}{1 + e^{-(\beta_1 + \beta_2 + \beta_{12} + X\beta)}}$$
$$- \frac{1}{1 + e^{-(\beta_1 + X\beta)}} - \frac{1}{1 + e^{-(\beta_2 + X\beta)}} + \frac{1}{1 + e^{-X\beta}}$$

When one continuous variable and one dummy variable are interacted, the interaction effect is the discrete difference (with respect to x_2) of the single derivative (with respect to x_1): (Norton *et al* 2004)

$$\frac{\Delta \frac{\partial F(u)}{\partial x_1}}{\Delta x_2} = (\beta_1 + \beta_{12}) \left(\begin{array}{c} F\{(\beta_1 + \beta_{12})x_1 + \beta_2 + X\beta\} \\ \times (1 - F\{(\beta_1 + \beta_{12})x_1 + \beta_2 + X\beta)\} \end{array} \right)$$
$$- \beta_1 \left[F(\beta_1 x_1 + X\beta) \{1 - F(\beta_1 x_1 + X\beta)\} \right]$$

Results of Logit Model:

```
Iteration 0:   log likelihood = -41.555491
Iteration 1:   log likelihood = -23.494725
Iteration 2:   log likelihood = -19.230731
Iteration 3:   log likelihood = -18.098348
Iteration 4:   log likelihood = -17.974569
Iteration 5:   log likelihood = -17.972294
Iteration 6:   log likelihood = -17.972293
```

```
Logistic regression                      Number of obs   =        60
                                         LR chi2(3)      =     47.17
                                         Prob > chi2     =    0.0000
Log likelihood = -17.972293              Pseudo R2       =    0.5675
```

workingornot	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
familyincome	-.0003103	.0000996	-3.12	0.002	-.0005056	-.0001151
fathersedu~n	.0570443	.1289164	0.44	0.658	-.1956271	.3097158
averagefam~e	.9457514	.3639085	2.60	0.009	.2325039	1.658999
_cons	-1.195192	2.394944	-0.50	0.618	-5.889195	3.498812

Linear Probability Model

OLS regression, when used with a binary response variable, this model is known as a linear probability model and can be used as a way to describe conditional probabilities.

However, the errors (i.e., residuals) from the linear probability model violate the homoskedasticity and normality of errors assumptions of OLS regression, resulting in invalid standard errors and hypothesis tests.

Source	SS	df	MS		
Model	7.70049065	3	2.56683022		
Residual	7.28284268	56	.130050762		
Total	14.9833333	59	.253954802		

```
Number of obs =      60
F(  3,    56) =   19.74
Prob > F      =  0.0000
R-squared     =  0.5139
Adj R-squared =  0.4879
Root MSE      =  .36063
```

workingornot	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
familyincome	-.0000267	6.19e-06	-4.31	0.000	-.0000391	-.0000143
fathersedu~n	-.0031491	.0121107	-0.26	0.796	-.0274097	.0211115
averagefam~e	.0835654	.0229908	3.63	0.001	.0375092	.1296215
_cons	.3946866	.2140129	1.84	0.070	-.0340327	.8234058

So this table shows that F vales at 19.74 which shows the overall significance of the model. R square of o.5139 is showing the explained variation within the model. Again as same as in logit and probit model, linear probability model tells that the family income and average family size are the significant independent variable with dependent variable children working or not.

Conclusion

This paper focused on pointing out the major determinants of child labor in the Gujrat City of Pakistan. Efforts were made to identify relationships between child labor and variables such as poverty, family size, adult literacy, schooling system and traditional factors in order to learn about the main causes of child labor in the city. The analysis shows that poverty is the main cause of child labor in the city but there are other factors contributing to it such as family size, schooling system and illiteracy of parents. The analysis shows that at certain levels of poverty, child labor plays an instrumental role in the economic survival of the family. The child has economic value at present so parents maximize their utility by making the best use of their economic assets at present for the satisfaction of basic needs. Another important factor causing child labor is large family size. When family size is large, the family cannot afford food, clothing, education and other necessities and thus more children are sent to work. Parents below the poverty 1ine cannot afford to send their children to schools, where a child spends a lot of time and money on books and school fees, and ultimately he is unable to get a job or their education does not add to their earnings. The parents face a trade off; sending their child to school means waiting for the next 10 to 15 years. They think it is better for a child to learn some practical skill and be able to earn something immediately, rather than sending them to school for a longer period. In some cases children are sent to work, as it is their family occupation. The parents believe that the child should learn and acquire a skill from childhood so that he can earn more in his field within 5 to 10 years.

For policy formulation an integrated approach to education, skill training, credit provision and income-generation will help in addressing the problem of child labor. Education in particular is a key strategy to combat child labor. The education offered must be effective, it must be affordable, of good quality and should improve the productivity of children. There is also a need to provide free basic education and also supplement the income

of the parents so that they can send the children to school. Adult education programs must be introduced effectively which will also help to reduce child labor. Education may be linked with skill training and provision of credit to attract the children and parents. Moreover, family planning must also be introduced through education and schools. This will help to reduce fertility and ultimately reduce family size and child labor. The present system of family planning is not helping achieve fruitful results. Along with these measures, enforcement of labor laws is essential.

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