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DETERMINANTS OF CHILD LABOUR IN INDIA

[1]Mala Parashar, [2]Ashok Sharma, [3]Pramod Kumar Pandey

ABSTRACT: *Child labour is a dynamic problem of worldwide concern. The eradication of child labour is major social development goal needs to be achieved by India. This study is an attempt to discuss various factors which affects child labour, such as poverty rate, population, male literacy, female literacy, school drop-out rate, fertility rate, urbanization rate, and per capita state domestic product. In the present study the Census data for the year 2001 & 2011, along with the RBI data on per capita state domestic product for the same years have been used. The number of child workers in a state has shown a decline from 2001 to 2011. Huge state level variation in the number can be seen in study.*

Keywords: *Child labour, per capita state domestic product, poverty rate, population, male literacy, female literacy, school drop-out rate, fertility rate and urbanization rate*

I. INTRODUCTION

Child labour is a curse to many developing and new industrial countries. Children are that group of population who need a lot of social care because of their vulnerability and dependence. They can be used, mishandle and directed into unwanted channels by unscrupulous section in the community as per National Institute of Public Cooperation and Child Development (NIPCCD), 1997. The child labour

System, which poses tremendous physical, psychological and moral risks for children themselves, often obscures the entire outlook for the poorest countries of the world. As per the estimates of International labour organization (ILO), about 218 million kids between the 5 and 17 years of age are in labour force. Out of those 218 million, 152 million are target of child labour, almost 73 million works under unsafe working conditions. The highest number of working children can be found in countries like India, Pakistan and Bangladesh. The position of child labour across countries reflects the country' economic as well as social status, the poorer the nation the higher will be the child labours.

According to Census, child labour in India observed a fluctuating trend over the years. Child labour increased from 1.08 crore in the year 1971 to 1.36 crore in the year 1981. In the past 50 years child labour was highest in the

[1] Research Scholar, GGSIPU, New Delhi
[2] Associate Professor, JIMS, Vasant Kunj, New Delhi
[3] Research Scholar, Jagannath University, Jaipur

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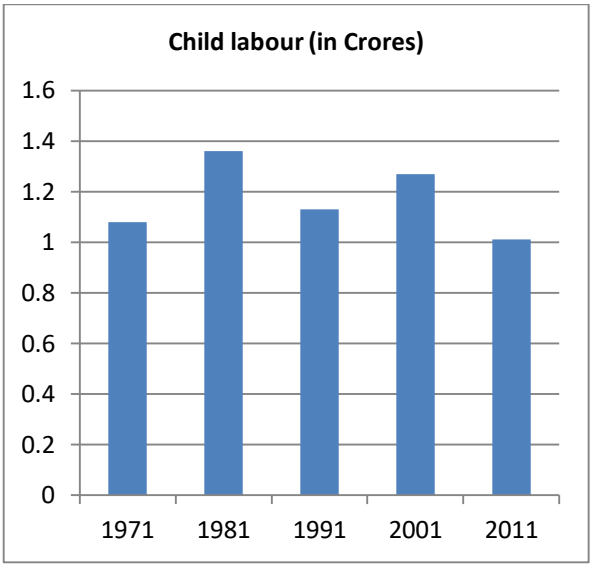
year 1981 and from then it is showing a declining trend in the numbers. The 5% of the total children aged 5-14 years were working in 2001, which accounts for the total of 1.27 crore children, whereas in 2011, the count of child labour was 1.01 crore which shows that 4% of the total children aged 5-14 were working in 2011.



TREND IN NUMBER OF CHILD LABOUR IN INDIA

Source: MOSPI, 2018

Child labour is a dynamic matter of worldwide concern. The Census 2011 of India shows that child labour has been a chronic problem. Child labor has empirically been understood as an indicator of economic underdevelopment. The assumption is that if a country is able to achieve higher economic growth, it will tend to reduce poverty and then automatically reduce child labour. But child labour must be seen as less an aspect of poverty and more of social conditions prevailing in the society. This is noticeable from the fact that many rich countries addressed this issue much before its economies grew strong. And even there are some emerging countries where this issue is relatively non-existent.

In India child labour has reduced by 2.6 million between 2001 and 2011. In rural India the prevalence of child labour is higher than in urban India in both the Census. However, in urban regions number of working children has increased, whereas the number has decreased in rural regions. Thus, the demand for child labour has increased in urban areas due to menial jobs. The kind of employment activities done by children vary between rural and urban regions. In urban and rural India the effect of child labour is different.

Year	**Percentage of child labour (5-14)**			**Total number of child labour(5-14)**		
	Rural	**Urban**	**Total**	**Rural**	**Urban**	**Total**

2001	**5.9**	**2.1**	**5.0**	**11.4**	**1.3**	**12.7**
2011	**4.3**	**2.9**	**3.9**	**8.1**	**2.0**	**10.1**

TOTAL, RURAL AND URBAN CHILD LABOUR (5-14)

**Source: ILO Census 2001 and 2011 study*

In India the distribution of child labour is not uniform across different states. State wise distribution of child labour is shown in table 3, we can observe a reduction in the number of working children in the all the Indian states and UTs, except Goa, between 2001 and 2011. According to census 2001 and 2011, in absolute numbers, Uttar Pradesh has the maximum number of child labourers in the country. In contrast, the magnitude was the lowest in Goa in census 2001, while Sikkim and Mizoram hold the lowest number of child labour in census 2011. As per census figure of child labour, Andhra Pradesh, Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and West Bengal are the best states in term of absolute decline in child labourers between 2001 and 2011. Despite this, in Goa, however there has been a rise in child labours in the year 2011 than the year 2001. This increase in requirement for child labour in Goa is because of the rise in income and expansion of tourism. As tourism sector in Goa engage the large number of child workers for menial jobs. As per the official Indian stats about 13 million kids work in the tourism sector and unofficial numbers lies between 60-100 million (Dr. Anupama Sharma, 2012). If we consider the percentage change between child labour in 2001 & 2011, the best performing states are Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Mizoram and Sikkim and the worst performing states/UTs are Chandigarh, Kerala, Maharashtra and Pondicherry.

Sr.No	Name of State/ UT	Child Labour (2001)	Child Labour (2011)	% Change (2001-2011)
1	Andaman & Nicobar Island	1960	999	-49.03
2	Andhra Pradesh	1363339	404851	-70.3
3	Arunachal Pradesh	18482	5766	-68.8
4	Assam	351416	99512	-71.68
5	Bihar	1117500	451590	-59.58
6	Chandigarh U.T.	3779	3135	-17.04
7	Chhattisgarh	364572	63884	-82.47
8	Delhi U.T.	41899	26473	-36.81
9	Goa	4138	6920	67.23
10	Gujarat	485530	250318	-48.44
11	Haryana	253491	53492	-78.89
12	Himachal Pradesh	107774	15001	-86.08
13	Jammu & Kashmir	175630	25528	-85.46
14	Jharkhand	407200	90996	-77.65
15	Karnataka	822615	249432	-69.67
16	Kerala	26156	21757	-16.81
17	Madhya Pradesh	1065259	286310	-73.12
18	Maharashtra	764075	496916	-34.96
19	Manipur	28836	11805	-59.06
20	Meghalaya	53940	18839	-65.07
21	Mizoram	26265	2793	-89.36
22	Nagaland	45874	11062	-75.88
23	Odisha	377594	92087	-75.61
24	Pondicherry U.T.	1904	1421	-25.36
25	Punjab	177268	90353	-49.03
26	Rajasthan	1262570	252338	-80.01
27	Sikkim	16457	2704	-83.56
28	Tamil Nadu	418801	151437	-63.84
29	Tripura	21756	4998	-77.02
30	Uttar Pradesh	1927997	896301	-53.51
31	Uttarakhand	70183	28098	-59.96
32	West Bengal	857087	234275	-72.66

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STATE LEVEL CHILD LABOUR FIGURES

Sources: Census 2001 & 2011

India is the world's 5th biggest and fastest growing economy, where child labour is a threat to the overall progress of the country. Several laws, acts, organization, and institutions have been enacted by the government of India. Some of those initiatives include the Child Labour Prohibition and Regulation Act (1986) the legislation that restricts the appointment of children in specific employment and regulates the working environment of child workers. The National Policy on Child Labour (1987) concentrates on physical rehabilitation of children working in perilous and risky occupation. The Ministry of Labour and Employment also functions to implement a variety of child labour policies in India. However, these efforts have been largely disappointing in their initial phase, and still showing slow success. The problem here is not only associated with the presence of working children but also the efforts for tackling this issue are not being fruitful. For the development of effective measure to combat child labour, better examination of different factors impacting child labour is also necessary.

II. LITERATURE REVIEW

There are considerable historical evidences which support that factors mentioned above affects the incidence of child labour in India and also suggested that child labour is issue of the world economy. Swaminathan (1998) in his study of fast developing states of India, which is Gujarat, discovered that child labour has increased with the increase in the level of state domestic product. In the study he mentioned that growth has been linked with a rise in the amount of working children in the last 15 years. His argument in the study was that high economic prosperity alone is not adequate to obliterate child labour. He also presented that if that child is engaged in the work it also reduces the chance of school education to most children. The kind of work in which children are involved are low paying hazardous and drudgery jobs. The study relies on the primary evidence and the strength of the relationship was not formally tested.

Literacy rate among population is seems to be the major factor affecting of child labour. The study presented by Das & Mukherjee (2006) focused on the part of women in education and child labour determination. The household level data, the 55th round (1990-2000) from National Sample Survey Organization (NSSO) was used in the study. The analysis was done only for the case of urban boys, which somewhere fails to tell true story. As child labour persist majorly in rural areas and the role of female parent in the household decision is minor in these areas. They concluded that the education qualification of parent's plays an essential part in eliminating child labour. Mother's level of education is considered as the most notable element in reducing the occurrence of child labour in injurious and manual jobs, whereas father's education part in this case proves to be relatively small. Which suggest that women empowerment is actually effective in reducing child labour and in increasing parental awareness.

In a theoretical paper by AnuRammohan (2000) the theoretical perspective on relation of child labour and schooling was presented for poor countries. The paper first argued that child wage is an important factor affecting the fertility decision, as children in the young as well as in adult age act as a contributor in the family income.

Second, higher the costs of education more will the substitution away from education and towards child labour. The theoretical economic model consist parent and children. The comparative static showed the interaction of child wages with fertility, child labour and child schooling. A surge in child wages rate leads to raise the level of fertility as family will tend to send more kids to the workforce. The child wage represents direct benefit from child labour and as an opportunity cost of schooling. The kids going to school will be unable to support his/her family financially, due to which poor households tend to keep away their children from schools. In the study it is also concluded that a rise in child schooling cost will reduce the levels of schooling, and higher child labour. However, the effect of schooling cost is negligible on fertility rate. Like all the other studies presented, this study also suggested to provide higher educational opportunities and also on giving compensation to the parent of child workers equal to the amount earned by their children if working and not going to school.

One has to be very careful about the policy formation for curbing child labour. A study by Basu and Van, 1998, presented a model in which, whenever there is a balance in which not even a single children work, there has to be some rule of profit-sharing between the citizens, so that if this rule is productive then children would not be seen working in any equilibrium or balance state. This further stated that policies like complete bans are a powerful tool but are by no means unambiguously preferable and restricted bans are particularly expected to set back and lead to deterioration in work environment. The best and efficient strategy is to get at the source of the problem (Kaushik Basu, 1998). Another issue discussed by FarrazSiddiqi (1995) is that complete ban on child labour is not a good idea as education and employment of a child cannot be considered as mutually exclusive, as numerous children have to join labour force to get the opportunity to enroll in the school. The linkage between labour and education is much more complicated. The importance of education is always present in every policy analysis.

Child labour is also responsible for the derivation of children. As working children are at disadvantage of having good quality education and basic necessities. In a study by Das and Mukherjee (2010), they formulated indigence index for different type of work such as economic and non-economic. The paper also studied different determinants of such deprivation. Household level data on unemployment and employment state in India of National Sample Survey Organization for 61st round was used in the paper. The study was pioneering one in concluding that it is significant to cover the non-economic activity as a type of work for kids, as it will be helpful in identifying the actual number of child labour and large chunk of female kids who are often occupied in household tasks hindering their education and overall development will then also be acknowledged as child labour. The investigation for determinants showed family income, level of education of parents, and caste and religion as significant factors of deprived childhood.

III. DATA AND METHODOLOGY

3.1 Data base construction

The study attempts to identify the determinants of child labour and how they affect child labour. This study will be based on application of econometric models. The state level child labour data used in the study is extracted

from census of India report for 2001 & 2011. The census of India collects, compile, analyze or otherwise disseminate social, economic and demographic data, at a specific time, of all the persons in a country or a well-defined part of a country. The data has been collected for states/UTs and also based male/female characteristics where possible. The data used represents total population and is assumed to be the significant data among the all available ones.

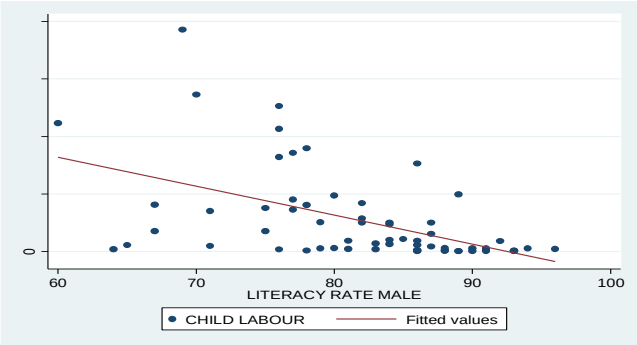
Measures

Dependent Variable

The experimental variable included in this study is child labour. Child labour measured as the number of children working of the age group of 5-14 years in all the states/UTs. It is taken as combined for overall population as male, female, rural and urban population. In India the issue of child labour is quite troubling. The only legitimate source for collecting data on child labour is the Census conducted after every 10 year in the country by the Government.

Independent Variables

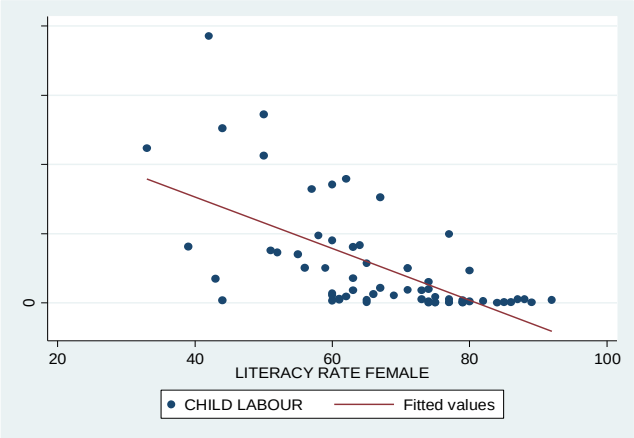
Literacy Rate Male: It represents the percentage of male population 7 years or above who can read and write. Education is the most important variable in eliminating the rate of involvement of children in labour force. The better the educational background of the households the less be the chances of their children engaged in the labour force. The education of the parent has an important effect on the future of the child. The notion behind this explanatory variable is that whether having educated male in the household affect number of working children. Ahmed (2012) studied that many poor household consider that employment enhance skills which can further be utilized to earn higher wages, in contrast education is not considered as a benefit to individual and society. The data is taken from National Sample Survey Organization (NSSO) states wise data on education for the census year 2001 & 2011.



Literacy rate male on child labour

Literacy Rate Female: It represents he percentage of female population 7 years or has the ability to read and write. In India education is considered as the key to the social-economics growth, and the difference in the literacy

rate between male and female shows the gender bias present in the country. Some empirical studies present that female literacy rate has the most powerful impact on the child labour than the male literacy rate. The female literacy is taken into account so as to explain the real change in dependent variable when female literacy rate rises or fall. The data is taken from National Sample Survey Organization (NSSO) states wise data on education for the census year 2001 & 2011.



Literacy rate female on child labour

Per Capita State domestic product: It is the per capital share of individual of the entire state domestic product. The state domestic product is the total estimate of goods and services produced within the state's geographical borders during any financial year. State domestic product is the good estimate of the state's economic welfare. The better the economic condition of the State is, higher will be the stock of resources available for its people. Per capita SDP is an indicator of the economic growth of the state. The economic growth of the state will increase the standard of living of people, as with higher per capita income people will able to fulfill their basic needs. The state with higher per capita product will be in the position to spend more on social and economic infrastructure in their state. If good quality education will be provided, with better policy implementation, the number of children working in the state could be less. The improvement in the economics condition might also encourage families to send their children to schools not to work. Improved availability of resources will further raise the standard of living and access to better economic facilities for education and health. The data is taken from RBI Indian states statistics. Per Capita SDP has been estimated at the base year of 1999-2000 for the year 2001 and at the base year 2004-2005 for the year 2011.

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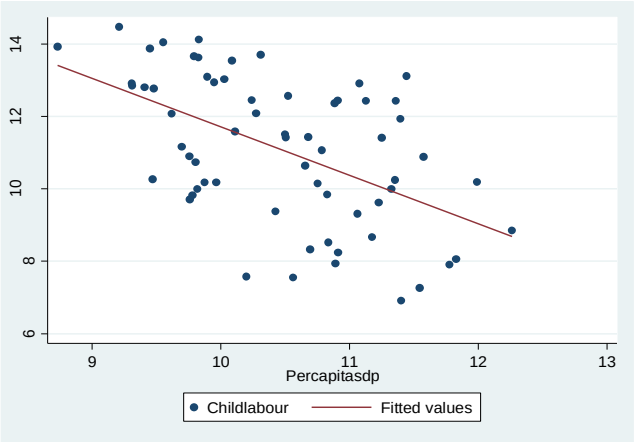
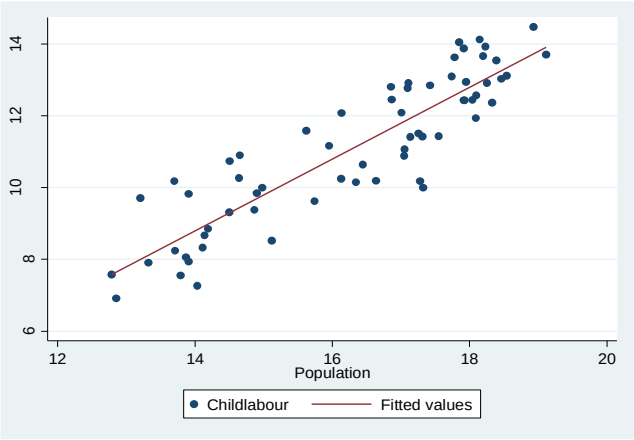


Percapitasdp on child labour

**variables in log form*

Population: It represents the number of people living in a particular geographical area. Child labour is primarily associated with underdevelopment. India has the highest number of workers, with its larger population in the whole world, under the age of 14 (UNICEF). Change in the actual figure of child labour in particular region is also influenced by their demographic division. Population of a particular region affects the child labour positively, as higher the population of the region, less resources will be available per individual, force maximum children in the workforce. The States with high population tends to be those identified as the under-developed or developing State. Therefore, the relation between population and dependent variable tends to be positive. The state-wise population data is taken out from RBI Indian state statistics for the year 2001&2011.



Population on child labour

**variables in log form*

Fertility Rate: The numbers of kids that average women have of the age 15-49 years. Fertility rate of the state is also an important factor that has led many children entering into the labour force market. The fertility rate is considered as the supply variable mainly in rural areas, such that the household with higher number of children has

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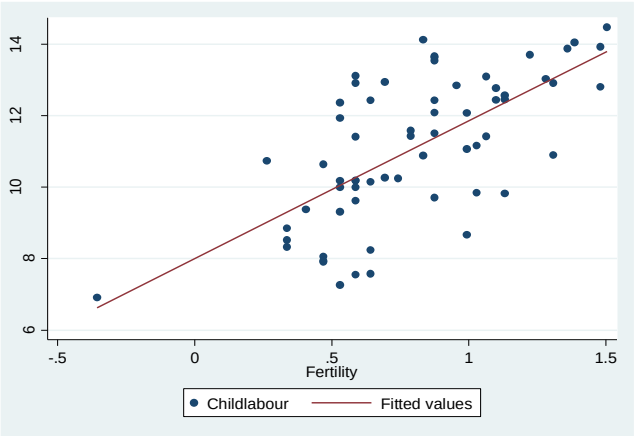
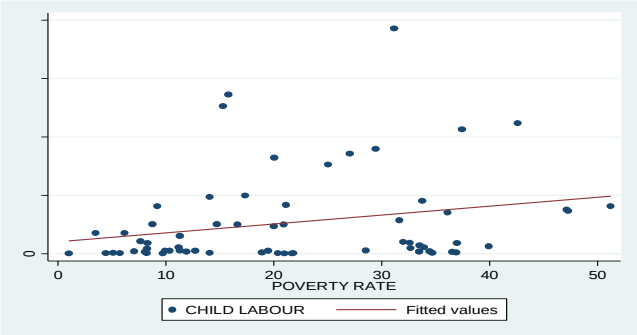
ability to supply higher labour to the agricultural area and increase their household earning. Greater the supply of child labour also lower will be the wages paid to them in urban areas, which further made child workers more attractive than adult workers and increase their demand. High fertility rate is associated majorly with the underdeveloped and poor States. Fertility rate is considered to be the important determinant of child labour supply. The state level data has been taken from the website of NitiAyog.



Fertility rate on child labour

**variables in log form*

Poverty Rate: The poverty rate is the percentage of people whose income is lower than the estimated poverty line. The higher the number of people living below poverty line, there will be high incidence of child labour. It is widely believed that poverty is the originator of child labour as only because of this parents are forced to send their children to work. Children in those families work to ensure the survival of their families and themselves. The working children are deprived of education and a fair chance to move out of the poverty trap in which they are born (Barge, 2004). Ahmed (1999) studied that poverty is the main, although not the only cause of child labour. It is the combined rate for rural and urban areas. The rationale behind considering poverty rate as the independent variable is to check if the empirical relationship between child labour and poverty still exist. The data used is taken from RBI Indian state statistics. The data for the year 2011 is based on the MRP consumption, as the same method was not available in the year 2001, for 2001 the data collected was based on different parameters.



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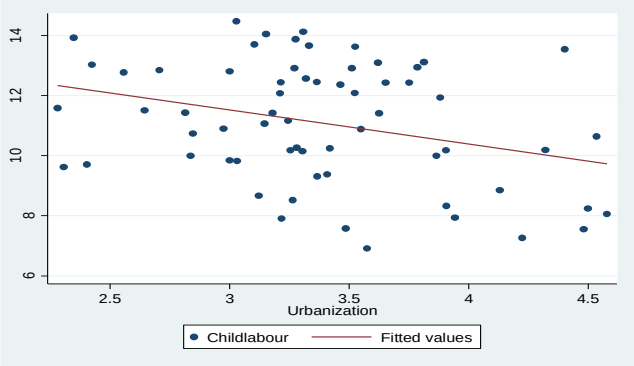
Poverty rate on child labour

**variables in log form*

Urbanization Rate: It represents the percentage of people living in urban areas. Urbanization results in the physical growth of an area. Urbanization is a process through which cities develop, and higher percentage of people comes to live in the city. According to World Bank report urbanization rate in India is 34% in 2017, which has shown an increase of 4% from 30% in 2011 census. Economic diversification and productivity has increased due to urbanization, but it has also led to marginalization and deprivation. Urbanization also provides better schooling and economic facilities to the migrated people. Urbanization can also be considered as a factor which is affecting child labour negatively, as migrated families can get better earning job in urban areas, through which they can have enough resources to let their children to go to the school and keeping them out of work force. It has been calculated from the census data of urban population and total population for the year 2001&2011.



Urbanization rate on child labour

**variables in log form*

Drop-out Rate: The school dropout rate represents the percentage of children who have enrolled in a grade but not completed their school studies or left the school in between. India is becoming young as presented in the demographic profile of the country. People of the young age group are the most productive section of human resource. Sustainability and development of the country is largely depends upon on how this section is built up and used. Education is the key to human resource formation. In order to develop comprehensive access to education, there is a need to identify why some children are enrolled but not completed their education. Many children are out of school in India due to reasons like poverty, quality of education, social and demographic circumstances and academic performance of student. All the children dropped out of the school, have the maximum likelihood of joining the labour force. Dropout rate can be seen as a supply factor of child labour as with the rise in school dropout rate, child labour will increase. Education is the key to remove social economic backwardness. The school dropout rate considered to be the real indicators of negligence of education and underestimation of the importance of education. The higher the dropout rate, higher the portion of children in the workforce. The data used for different state and UT, has been taken out from the website name IndiaStat.

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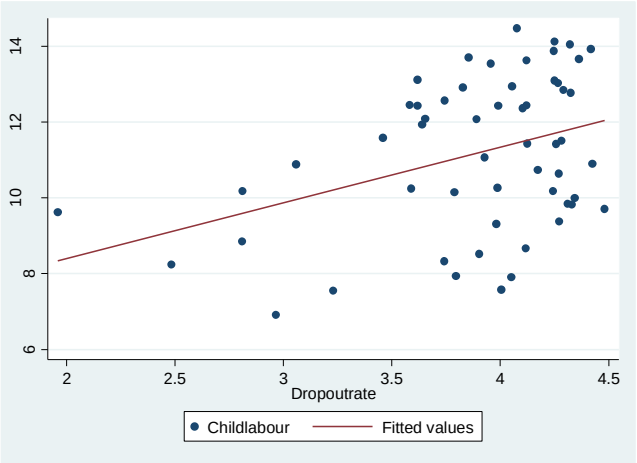

Drop-out rate on child labour

**variable in log form*

3.1 HYPOTHESES

Empirical studies suggested that child labour in the byproduct of bad economic and social conditions of the household. Children are forced to work because of less household income, more family members and uneducated parents. This research is built to check the theoretical relationship of child labour and all independent variables. Thus the hypotheses can be formulated as follows:

Hypotheses 1:

Higher the population in a state will results in rise in the amount of children going out for labour to support their family and themselves. There is positive relationship between child labour and population.

Hypotheses 2:

Higher the poverty rate of the particular state will results in higher children participating in the work force. The link between poverty rate and child labour also seems to be positive.

Hypotheses 3:

The greater the per capita state domestic product, lower will be the number of children working. Child labour and per capita state domestic product is inversely related with each other.

Hypotheses 4:

When fertility rate is high, the supply of child labour will also be high enough. There is a positive association between child labour and fertility rate.

Hypotheses 5:

The higher the percentage of school drop-out in state, higher will be the occurrence of child labour. The relationship between child labour and drop-out rate is positive.

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Hypotheses 6:

The interrelation between child labour and urbanization is negative. Higher the urbanization rate, lower will be the chances of children entering into labour force.

Hypotheses 7:

Higher the percentage of educated females, lower will be the number of working children. The relationship in the sense considered to be negative between child labour and female literacy rate.

Hypotheses 8:

The male literacy rate is inversely related to child labour as the educated male in the family would not let their children to enter in the workforce.

3.2 METHODOLOGY

In this paper panel study has been performed through the fixed effects and random effects model followed by the Hausman test to determine which of the following model is appropriate. Panel data is a multidimensional data which involves measurement over time. Panel data contains cross-sectional effects; along N, variation across States/UTs and also variation across time.

In panel data analysis, to choose between fixed effects and random effects model, Hausman test is performed. Random effects model is selected under the null hypothesis due to greater efficiency, whereas under the alternative fixed effects model is consistent and selected. The test identifies whether there is a correlation between the errors and repressors in the model.

The test for multicollinearity is conducted to test if there is any problem of multicollinearity. Multicollinearity occurs when two or more independent variables in the model are significantly and highly correlated. Variance Inflation Factor (VIF) is used for calculating multicollinearity. The value of VIF > 10 shows high multicollinearity in the model.

The heteroskedasticity test is also conducted for determining whether the variance is homogenous or heterogeneous. In this null hypothesis sets, variance is homogenous and an alternative hypothesis says the variance is heterogeneous. If it is actually heterogeneous then it is corrected by a robust model.

3.3 REGRESSION MODEL

To test the hypothesis, regression models are used. Two different multiple linear regression models are used, one with six independent variable i.e. population, poverty rate, urbanization rate, fertility rate, school drop-out rate and per capita state domestic product, with dependent variable child labour. Another model is consist of two independent variables, which are literacy rate male and literacy rate female, with the same dependent variable i.e. child labour. The variable literacy rate female was coming out to be as highly collinear with the other explanatory variables. To get rid of the issue of Multicollinearity I had to take two different multiple regression equations. The

models are to explain the relative influence of the explanatory variables on the experimental variable in panel data setup.

Model 1:

$log(CLit) = \beta_0 + \beta_{1i}\ log(POPit) + \beta_{2i}\ log(POVRATEit) + \beta_{3i}\ log(PCSDPit) + \beta_{4i}\ log(FERRATEit) + \beta_{5i}\ log(DRRATEit) + \beta_{6i}\ log(URRATEit) + uit$

i: States/UTs

t: time; 2001 & 2011

Model 2:

$CLit = \alpha_0 + \alpha_{1i}\ LRF + \alpha_{2i}\ LRM + vit$

i: States/UTs

t: time; 2001 & 2011

IV. EMPIRICAL ANALYSIS AND RESULTS

This chapter scrutinizes the empirically tested theories of the effects of numerous social economic indicators on child labour. The section deals with the analysis and results. The section also asserts that the models chosen above are appropriate through the test of heteroskedasticity and multicollinearity.

❖ **Summary Statistics**

First of all we are going to present the descriptive facts for each and every variables used in the study. It list down all the variables, their minimum and maximum values and their mean and standard deviation. Table 4 gives the descriptive stats for all the explanatory variables used in the study.

The data is of 32 different States/UTs for 2 years, making it altogether 64 observations. Data for 3 union territories was not available for the year 2001, because of which I dropped all three UTs from the study. The minimum child labour was 999 in 2011 for Andaman & Nicobar Island and the maximum was found to be for Uttar Pradesh in 2001, 1927997. The minimum population is given for Andaman & Nicobar Island in 2001 and maximum for Uttar Pradesh in 2011. The poverty rate is lowest in Andaman & Nicobar Island for the year 2001and highest in Jharkhand in 2001. The per capita state domestic product is lowest for Bihar in the year 2001 and highest for Goa in 2011. The fertility rate is lowest in Andaman & Nicobar Island in the year 2011, while the highest is in Uttar Pradesh in year 2001. The school drop-out rate is lowest in Himachal Pradesh for the year 2011 and highest is in Sikkim for the year 2001. If we talk about the urbanization rate, it was lowest in Himachal Pradesh in the year 2001 and highest in Chandigarh in the year 2011. Both literacy rate male and literacy rate female was lowest in Bihar in the year 2001and highest in Kerala in the year 2011.

Variable	*Observation*	*Mean*	*Standard Deviation*	*Min*	*Max*
CL	64	265824	397754.8	999	1927997
POP	64	3.50e+07	4.15e+07	356000	2.00e+08
POVRATE	64	21.53828	12.71479	1	51.2
PC SDP	64	47899.13	40220.76	6200	211570
FERRATE	64	2.3625	.8363754	.7	4.5
DRRATE	64	54.045	19.94491	7.1	88.39
URRATE	64	34.48656	21.17309	9.79	97.25
LRM	64	81.96875	8.123977	60	96
LRF	64	66.78125	13.23352	33	92

SUMMARY STATISTIC FOR THE STUDY

4.1 Regression Model 1

Model 1:

$log(CLit) = \beta_0 + \beta_{1i}\ log(POPit) + \beta_{2i}\ log(POVRATEit) + \beta_{3i}\ log(PCSDPit) + \beta_{4i}\ log(FERRATEit) + \beta_{5i}\ log(DRRATEit) + \beta_{6i}\ log(URRATEit) + uit$

- **Multicollinearity**

Multicollinearity is analyzed through VIF. If the estimate of VIF is greater than 10, it suggests that explanatory variables are highly correlated. A value of VIF less than 10 implies that there is moderate or no multicollinearity present in the model.

VARIABLES	*VIF*	*1/VIF*
POP	1.40	0.711862

POVRATE	1.89	0.529326
PCSDP	1.78	0.562935
FERRATE	2.19	0.456586
DRRATE	1.78	0.561984
URRATE	1.31	0.764421
MEAN VIF	**1.72**	

CALCULATION OF MULTICOLLINEARITY FOR MODEL 1

INTERPRETATIONS:

The mean VIF of the model is much less than 10, which indicates that our overall model is free from multicollinearity. The VIF of all the explanatory variables is also very less than 10, hence we conclude that there is moderate multicollinearity among the explanatory variables.

❖ **Heteroskedasticity**

Heteroskedasticity in the model can be checked in two ways:

1. Breusch-Pagan test for heteroskedasticity- In this test variance is homogenous under the null hypothesis; while under an alternative variance is heterogeneous.

H0: variance is homogenous

Ha: variance is heterogeneous

$\boldsymbol{chi^2(1)}$	***2.28***
$\boldsymbol{Prob>chi^2}$	*0.1309*

CALCULATION OF HETEROSKEDASTICITY FOR MODEL 1

INTERPRETATIONS:

The p-value is 0.1309, which is quite higher than 0.05 at a 5% level of significance, hence we are not able to reject null hypothesis and that is why we accept null. Also the value is insignificant at 5% level of significance. Therefore, we conclude that our model is free from heteroskedasticity.

2. Graphical method: Under this method scattered diagram is constructed with the independent variable and the squared residuals from the OLS. If they don't form any particular pattern and are widely scattered, the model is free from the problem of heterogeneity otherwise the model has a problem of heterogeneity.

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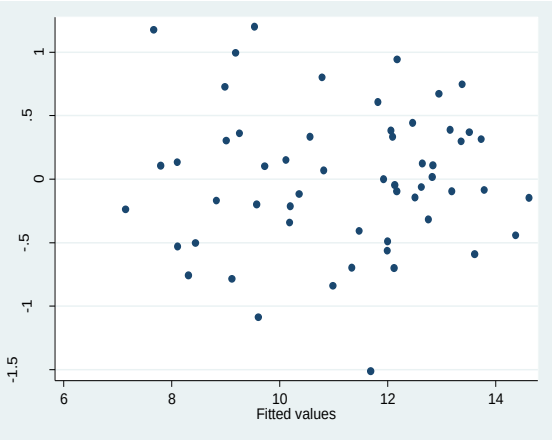

HETEROSKEDASTICITY PLOT MODEL 1

INTERPRETATION:

In the above figure, there is no specific pattern followed by the residuals, and are scattered randomly. Hence, we can conclude that that our model is free from heteroskedasticity.

RESULTS

The panel data used in the model is strongly balanced means all the variables contain all the observations of the same point. A panel data deals with fixed effects and random effects. With fixed effects model, we do not estimate the impact of those explanatory variables whose value do not change across time and random effects model will estimate the effect of time constant explanatory variables. The table below shows that fixed effects and the random effects model values.

VARIABLES	FIXED EFFECTS	RANDOM EFFECTS
log(CL)		
log(POP)	-5.69357**	0.8565045***
	(2.432581)	(0.0606165)
log(POVRATE)	-.0614186	-0.342114**
	(.2472895)	(0.1470236
log(PCSDP)	.0455393	-0.7179066***
	(.3660722)	(0.1322617)

log(FERRATE)	.0364712	0.7647216**
	(.8543497)	(0.383701)
log(DRRATE)	.4721321	0.4819041 **
	(.3934122)	(0.2164999)
log(URRATE)	-1.283248	-0.0544017
	(.6240672)	(0.1924042)

FIXED EFFECTS AND RANDOM EFFECTS STATISTIC FOR MODEL 1

Value of Standard error is in parentheses

1%*** level of significance, 5%** level of significance and 10%* level of significance

After analyzing the above results it is clear that at 1%, 5% and 10% level of significance, only one variable population is coming out as significant under fixed effects model, whereas in random effects model maximum explanatory variables are significant at 1%, 5% and 10% level of significance. Therefore, we need to decide which regression would be appropriate for this model.

The Hausman test is used to select out of the two models. The null hypothesis for hausman test defines that random effects model is efficient, in contrast an alternative states that fixed effects models is efficient and should be used in the study. The hausman test has an asymptotic chi^2distribution. The table mentioned below states the p-value and chi^2 value. On the basis of the p-value we will decide the model with which we will proceed.

H_0: Random effect model is significant

H_a: Fixed effect model is significant

Chi2(6)	**3.02**
Prob> Chi2	0.8060

CALCULATION OF HAUSMAN TEST FOR MODEL 1

Looking at the above table, the calculated p-value is higher than 0.05 (0.8060 > 0.05). This concludes that the p-value 0.8060 is insignificant and hence we are unable to reject the null hypothesis for random effects model is appropriate and therefore accept $H_{0.}$ Hence, we will use random effects regression for this model.

The Random effect model

The random effects model is estimated through Generalized Least Square (GLS), as in the case of random effects model OLS is not efficient. The random effects model suggests that the individual specific factors are not correlated with explanatory variables.

log CL	***COEFFICIENTS***	***STD. ERROR***	***Z***	***P>IzI***
log POP	0.8565	0.0606	14.11	0.00
log POVRATE	-0.3421	0.14702	-2.33	0.02
log PCSDP	-0.7179	0.1322	-5.43	0.00
log FERRATE	0.7647	0.3837	1.99	0.04
log DRRATE	0.4819	0.2164	2.23	0.02
log URRATE	-0.0544	0.1924	-0.28	0.77

R-SQUARED	0.9218
Prob> Chi^2	0.0000

RANDOM EFFECTS STATISTICS FOR MODEL 1

In the random effects results, out of 6 control variables, all have the correct expected sign except poverty rate. The negative coefficient value of POVRATE indicates that child labour is inversely related to poverty rate; if poverty is increased by one percent, we expect child labour to decrease by 0.34 percent. This contradicts the theory, as theory suggests that when poverty rises, child labour also rises, but here the results conclude the opposite. This might due to the reason that poverty is not the only factor affecting child labour and the study is based on state level, household study might show positive relation between child labour and poverty. The calculated p-value for poverty

is 0.02, less than 0.05 and 0.1; this means that poverty is significant at both 5% and 10% level of significance. Hence, poverty has consequential impact on child labour.

The coefficient value of control variable population is positive, which indicated that child labour is positively related to population; if population is increased by one percent, child labour will increase by 0.85 percent. Population act as a supply factor, as higher the population of the region will push maximum number of children in the workforce. The p-value of population is 0.00, which is significant at 3 levels of significance, as it is less than 0.01, 0.05 and 0.10. Hence, population has a significant effect on child labour, which truly go along with the empirical findings.

The per capita state domestic product has negative coefficient, which suggests that child labour is inversely related with per capita SDP; with the one percent increase in per capita SDP, there is 0.71 percent decrease in child labour. The results satisfy the theoretical relationship between per capita SDP and child labour. The state with higher per capita product will be in the position to keep their children away from workforce. The p-value associated with per capita SDP is 0.00, which is less than 0.01, 0.05 and 0.10; through this we can conclude that our variable is significant at 1%, 5% and 10% level of significance.

Another explanatory variable fertility rate also has a positive coefficient which indicates a positive relationship between fertility rate and child labour. If fertility is increased by one percent, we expect child labour to increase by 0.76 percent. The results go along with the theory which also says that with the rise in fertility rate child labour will also rise as the families with higher children can supply more labour in the market. The p-value of fertility rate is 0.46, which is less than 0.05. This concludes that our variable is significant at 5% level of significance.

The variable school drop-out rate has a positive coefficient; this means that child labour is positively related to school drop-out rate that one percent rise in school drop-out rate leads to rise in child labour by 0.48 percent. Children dropped out of the school have the maximum likelihood of joining the labour force. The p-value of the variable is 0.026, which is significant at both 5% and 10% level of significance, as it is less than both 0.05 and 0.10. Hence, drop-out rate has expected effect on child labour.

The coefficient of the variable urbanization rate indicates an inverse relationship with child labour; if urbanization rate is increased by one percent, we expect child labour to decrease by 0.05 percent. The sign of the coefficient go along with some theories. Urbanization provides better schooling; jobs and economic facilities which encourage the families enroll their children to school and will also help in keeping them out of work force. The p-value given in the table for urbanization rate is 0.77, which is higher than 0.01, 0.05 and 0.10; thus we can conclude that our variable is not significant at any of 3 levels of significant i.e. 1%, 5% and 10%.

The goodness of fit of the overall model is calculated from R square. The R square gives the amount of change in experimental variable that is explained by the explanatory variables. In the random effect model the calculated value of R square is 0.9218. Thus, 92% of the variability in the log-transformed values of dependent variable is accounted by the independent variables included in the model.

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4.2 Regression of Model 2

MODEL 2:

$CLit = \alpha_0 + \alpha_{1i}\ LRF + \alpha_{2i}\ LRM + vit$

❖ **Multicollinearity**

Multicollinearity is analyzed through VIF. If the value of VIF is greater than 10, it means that explanatory variables are highly correlated. A value of VIF less than 10 implies that there is moderate or no multicollinearity present in the model.

VARIABLES	*VIF*	*1/VIF*
LRF	5.90	0.169457
LRM	5.90	0.169457
MEAN VIF	5.90	

CALCULATION OF MULTICOLLINEARITY FOR MODEL 2

INTERPRETATIONS:

The mean VIF of the model is much less than 10, which indicates that our overall model is free from multicollinearity. The VIF of both the explanatory variables is 5.90, less than 10; hence we conclude that there is moderate multicollinearity among the explanatory variables.

❖ **Heteroskedasticity**

Heteroskedasticity in the model can be checked in two ways:

1.Breusch-Pagan test for heteroskedasticity- In this test variance is homogenous under the null hypothesis; while under an alternative variance is heterogeneous.

H0: variance is homogenous

Ha: variance is heterogeneous

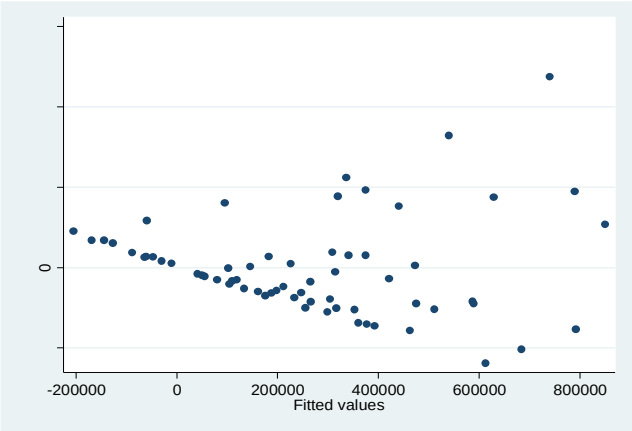
$\boldsymbol{chi^2(1)}$	31.38
$\boldsymbol{Prob>chi^2}$	0.0000

CALCULATION OF HETEROSKEDASTICITY FOR MODEL 2

INTERPRETATIONS:

The p-value is 0.0000, which is not more than 0.05; at a 5% level of significance we are able to reject null hypothesis and so we reject null. Hence, we can conclude that our model suffers from heteroskedasticity. Therefore, the variance is heterogeneous.

2. Graphical method: Under this method scattered diagram is constructed with the independent variable and the squared residuals from the OLS. If they don't form any particular pattern and are widely scattered, the model is free from the problem of heterogeneity otherwise the model has a problem of heterogeneity.



HETEROSKEDASTICITY PLOT MODEL 2

INTERPRETATION:

In the above figure, there is a specific pattern followed by the residuals. Hence, we can conclude that that our model suffers from heteroskedasticity. To overcome with the issue of heteroskedasticity we run robust standard error regression. Robust standard errors are asymptotically valid in case of heteroskedasticity.

RESULTS

A panel data deals with fixed effects and random effects. The table below shows that fixed effects and the random effects model values.

VARIABLES	FIXED EFFECTS	RANDOM EFFECTS
CL		
LRF	-	-32366.17***

	41581.38** (11615.19)	(0.0606165)
LRM *	38766.43** (17290.85)	23897.51** (9970.513)

FIXED EFFECTS AND RANDOM EFFECTS STATISTIC FOR MODEL 2

Value of Robust Standard error is in parentheses

1%*** level of significance, 5%** level of significance and 10%* level of significance

After analyzing the above results it is clear that at 5% and 10% level of significance, both the variable literacy rate female and literacy rate male are significant under fixed effects model and also in random effects model. Therefore, we need to decide which regression would be appropriate for this model.

The Hausman test is used to select out of the two models. The null hypothesis for hausman test defines that random effects model is efficient, in contrast an alternative states that fixed effects models is efficient and should be used in the study. The hausman test has an asymptotic chi^2distribution. The table mentioned below states the p-value and chi^2 value. On the basis of the p-value we will decide the model with which we will proceed.

H_0: Random effect model is significant

H_a: Fixed effect model is significant

$Chi^2(6)$	1.63
Prob> Chi^2	0.4419

CALCULATION OF HAUSMAN TEST FOR MODEL 2

Looking at the above table, the calculated p-value is higher than 0.05 (0.4419 > 0.05). This concludes that the p-value 0.4419 is insignificant and hence we are unable to reject the null hypothesis for random effects model is appropriate and therefore accept H_0. Hence, we will use random effects regression for this model.

The Random effect analysis

	COEFFIC	***ST***		
L	***IENTS***	***D. ERROR***		***>IzI***
		RO		
		BUST		
	-32366.17	723		
RF		5.747	4.47	.000
	23897.51	997		
RM		0.513	.40	.017

R-SQUARED	0.3943
Prob> Chi^2	0.0000

RANDOM EFFECTS STATISTICS FOR MODEL 2

The random effects model is estimated through Generalized Least Square (GLS), as in the case of random effects model OLS is inefficient. We have used robust standard error in the random effect regression to tackle with the issue of heteroskedasticity.

The coefficient of the variable literacy rate female is negative, which states that the relationship of child labour and female literacy rate is negative. With the rise in female literacy rate child labour will decline. The result is satisfies the empirical theories exist about the effect of female literacy rate on child labour. Mother's education has important negative affect on the child being the labour. The calculated p-value of the LRF is 0.0000; this means that the variable is significant at 1%, 5% and 10% level of significance, as the p-value is less than 0.01, 0.05 and 0.10. Thus, we can conclude that the level of female literacy has a significant effect on child labour.

The variable literacy rate male has a positive coefficient, which means that it affects child labour positively. If the level of male literacy increases there will be a subsequent rise in child labour. The result somehow contradicts with all the available theories, but it has also been identified that if we talk about child labour the impact of male

literacy is much less than that of female literacy. This might be due to the fact that some people don't see education as important and they also consider that employment leads to skill development that can be used to earn income. The p-value given in the table for LRM is 0.017; which is less than 0.05 and 0.10, thus we can conclude that our variable is significant at both 5% and 10% level of significance. The variable literacy rate male also has significant impact on child labour.

V. CONCLUSION AND IMPLICATION

In this study, we have considered the impact of different variables on child labour. Our analysis binds together facts from the Census of India for 2001 & 2011 and state level data from different sources. Our central concern was to check the theoretical validity of the determinants of child labour. We test this by examining a panel data random effects regression to analysis the relationship between variables and child labour across 32 Indian States/UTs.

Though there so many discussions going globally, associated to the reduction of child labour, in this context the important problem is to know the difference that exist in the conceptualization of child labour in various different countries. If we adopt same practices to eliminate child labour it might give us little or no results. For this reason we need to identify some major variables that create difference to reduce child labour. In order to have particular policies related to reduction of participation of children in labour force there is a need to examine the effects of various factors that influence child labour in a particular situation.

Our results lead us to conclude that in model 1 three factors population, fertility rate and school drop-out rate have significant and positive relationship with child labour, as suggested by the theory; when population, fertility rate and school dropout rate increases child labour also increase. The measures to control population and for the reduction of fertility rate will further lead to eradication child labour. The main strategy of the government should be to persuade people to accept and analysis the benefits of small family norms by a wide range of education and advertising efforts.

Other three factors of the model 1 poverty rate, per capita SDP and urbanization rate have negative relationship with child labour. The coefficient value of per capita SDP and urbanization rate satisfies the theoretical perspective; with the increase in per capita state domestic product and urbanization rate, child labour will decline. The variable poverty rate has shown the negative coefficient value which leads us to assume that opposite to popular theory, poverty decrease rather than increase child labour. The poverty or deprivation has always been seen as the major reason behind child labour, but with time we can see that poverty is really not the only cause of child labor, sometime the lack of will for education and greater diversion towards earning money rather than being well educated leads to rise in child labour. Hence poverty alleviation measures along with education awareness campaign should be functional in eliminating child labour in rural regions.

In model 2 we have considered the impact of parent's education on child labour through the State level male and female literacy rate. The relationship between male and female literacy rate with child labour is significant, but

only female literacy has negative influence on child labour, thus o along with all the other theoretical view exist. The variable male literacy rate has shown positive coefficient value which suggested that with the rise in male literacy level child labour will increase rather than decrease. There is no empirical research present which strongly claims the negative link between child labour and father's education. In maximum of the past researches we have found that the education level of mother has stronger impact on child labour than the education level of father. If the family is headed by an educated female than the chances of their children being engaged in work force is much less, whereas the impact of an educated male is not that powerful. Despite having that powerful impact on child labour, female literacy is something which has never achieved the attention and focus it deserves. There are various biases present in the schooling status of female and male population. These differences may further lead to the distinctive impact of education on female and male population.

There is a need to have better education system than we have now and it is also required to make sure that all the students who are enrolled left school only after the completion of their degree. Article 21a of the Indian constitution, states the importance of free and mandatory education. The Act was enacted on 4 August 2009, which makes education a fundamental right of each and every child of the age 6-14 years. There are several reasons which might lead the children to drop out of their school, we need to understand those factors and awareness about school education and female education is required at first place. After so many years of independence still we are not able to provide education to each and every section of the society. Government must ensure that education should be available for every citizen irrespective of their caste, race and gender. The encouragement of education at the family level by states can turn out to be as an important step for the reduction of child labour in India.

The policies which are aimed at promoting the development and meant for the betterment of the society should be in accordance with their impact on people's capabilities. Child labour is being a threat to the normal childhood, which is further responsible for the underdevelopment of these children. Child labour is a complicated multilayered problem it can only be effectively dealt with addressing other entrenched social problems. There is also a need to have a considerable expansion in public and official knowledge on the extent and outcome of child labour in India. The policy promotion role by non- governmental organization is also in its primitive form. The role of NGOs can be enhanced within local communities in dealing with such social issue. This is high time that we all must realize the cost we are paying for not bringing half of our children out of labour force.

Though we have certainly made a pronounced progress over the year in fighting over all social issue and measures which are prerequisite for safeguarding child labours, still there is a need to enlarge the web of administrative machinery required for the implementation of different ongoing laws and regulation on child labour in our country. This, if happen, will take a long time in preserving the valuable future of thousands of working children in India

REFERENCES

1. Das, S., & Mukherjee, D. (2007). Role of women in schooling and child labour decision: The case of urban boys in India. *Social Indicators Research*, *82*(3), 463-486.
2. Das, S., & Mukherjee, D. (2011). Measuring deprivation due to child work and child labour: a study for Indian children. *Child Indicators Research*, *4*(3), 453-466.
3. Internation Labour Organization (2004), *Child labour in India: Facts and Figures.* Geneva ILO
4. Internation Labour Organization (2016), *Child labour in India: Facts and Figures.* Geneva ILO.
5. Mridul, M., & Singh, M. (2008). Factors affecting Child Labour in India (No. WP2008-01-01). Indian Institute of Management Ahmedabad, Research and Publication Department.
6. Mukherjee, D., & Das, S. (2008). Role of parental education in schooling and child labour decision: Urban India in the last decade. *Social Indicators Research*, *89*(2), 305-322.
7. Rammohan, A. (2000). The interaction of child-labour and schooling in developing countries: A theoretical perspective. *Journal* of Economic Development, 25(2), 85-100.
8. Siddiqi, F., &Patrinos, H. A. (1995). Child Labor: Issues. Causes and Interventions Human Capital Developmental and Operations Policy Working Paper, 56.
9. Basu, K., & Van, P. H. (1998). The economics of child labor. American economic review, 412-427.
10. Barge, S., Anker, R., & Khan, M. E. (2004). Child Labour: Economic Gain or Social Cost. Small Hands in South Asia: Child Labour in Perspective, 147.
11. Ahmed, I. (1999). Getting rid of child labour. Economic and Political weekly, 1815-1822.

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