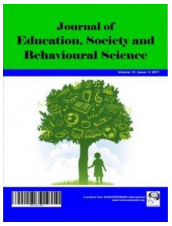

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Impact of Child Labour on Human Capital Development in Onitsha, Anambra State, Nigeria

Uche C. C. Nwogwugwu[1], Joan N. Ozoh[1*], Ebele S. Nwokoye[1] and Uju R. Ezenekwe[1]

[1]Department of Economics, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author JNO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors UCCN and ESN managed the analyses of the study. Author URE managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

In a bid to survive the hard times in the economy, some families have resorted to giving out their children as child labourers so as to earn income for subsistence. This phenomenon has scuttled efforts aimed at human capital development thereby increasing juvenile delinquency while perpetuating the vicious cycle of poverty. This study has its theoretical framework on the theoretical model of child labour supply and examined the impact of child labour on human capital development in Nigeria with a specific focus on Onitsha Metropolis, Anambra state. It is a descriptive survey research. Non-probability sampling was employed and the sample was drawn using quota and purposive sampling techniques. The Interview schedule was used as the instrument for data collection and the data collected were analysed using the qualitative response regression model (binary probit). The study established, from the regression analysis, that child labour has a negative impact on school enrollment rate, mental well-being and physical fitness of children in Onitsha. The study recommended amongst other things, the enforcement of free compulsory education to children in Onitsha. Also, child labour education should be introduced in school curriculum to help create awareness on the rights of the child and consequences of child labour on the mental, physical and social development of children to reduce the menace of child labour.

**Corresponding author: E-mail: joanozoh@yahoo.com;*

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1. INTRODUCTION

Development begins and ends with 'man', so it is logical to state that when any state ignores its human capital, it would remain under- developed (Kenneth, [1]). Human capital is the bed rock upon which productivity rests. The development of human capital has been recognized as the key for a country's socio-economic and political transformation. Human capital development is therefore associated with investment in man and his development as a creative and productive resource (Oluwatoyin, [2]).

Human capital is measured in terms of person's years of education and it can be formal or informal education (Mathur, [3]). Human capital development refers to the process of acquiring and increasing the skill of persons who have the education and experience which are critical for the growth of the country (Jhingan, [4], Harbison, [5]). It is about recruiting, supporting and investing in human resources through provision of education and health care services which is important for the increase in productivity, per capita income and expansion of knowledge and reduction of poverty (Appleton & Teal, [6]). Human capital skill acquisition hinges so much on basic education which provides an individual with the requisite footing for the acquisition and advancement of different skills. According to Todaro and Smith, [7]), the role of formal education is not limited to imparting knowledge that enables individuals to function as economic agents but imparts values, ideas, attitudes and aspiration. Knowledge is said to be power and has remained the formidable tool upon which the 21st century development propels. Education is the most powerful instrument for developing and empowering the citizens to master their social and cultural environments and compete for survival. It is expected that those who acquired qualitative learning and skill would avail the society the best of their intellectual wealth and skills and there can be no significant economic growth in any country without adequate human capital development (Olugbenga & Omolora, [8]).

The Nigerian experience dramatizes a paradox of systematic elimination of its human capital as millions of children are in the streets, markets, parks etc. doing some menial jobs instead of being in school, some have dropped out of school, not enrolled in school and work in unhealthy environment (Okoye and Okoye, [9]). According to National Bureau of Statistics, as at 2014, close to 3 million children between the ages of 6-14 years had never attended school and this represented about 8.1% of the population of children within the age group.

Factors that limit children from schooling have raised much concern. One of such factors is child labour. Child labour involves works that are harmful to a child's health as these include any work that violates children's fundamental human rights and is life- threatening to the child. It also includes works that exhaust children's strength, damage their bodies, and prevents children from going to school to gain basic skills and knowledge for their future development (UNICEF, [10]). Over eight million children manage to stay in school and work in their spare time to pay education fees. Due to high demands at work, these children often skip classes. Missing out on education makes it impossible to break the cycle of poverty and exploitation and this prevents children from having a better life and a safer future (Adegun, [11]).

According to Olatunji, [12], NAPTIP was able to find out that there were five major states where child labour was prevalent. These states were Ogun, Kano, Kaduna, Anambra and Edo states. In Anambra State, prevalent situation made the Anambra State Government ban children from working during school hours (UNICEF, [13]). Most child workers in Anambra are in domestic service and hawking (Kuti, [14]). Such labourers have been called 'the world most forgotten children'. Ordinarily, domestic service needs not be hazardous. Nevertheless, it often is as children in domestic servitude, living with or without their parents are poorly cared for while some of them are trafficked. They are, in most cases, deprived of affection, functional schooling and other social activities (Tade, [15]).

Most of the major cities in Nigeria face this problem and Onitsha, which is one of the major cities in Anambra state, is not left out. Onitsha rates high in the incidence of child labour because of the concentration of the population of people under poverty line. A lot of children residing in Onitsha are seen hawking sachet water, oranges, corn, engaging in prostitution, and working in restaurants, performing such chores like baby-sitting, fetching water, sweeping, splitting firewood and cooking as a labourer (Okoye and Tanyi, [16]). With this, it is clear that these children are not in school and

this is a threat to human capital development and the potentials of developing economies (Ravallion & Woodon, [17]). The existence of a large number of child workers hampers the possibility of growth by perpetuating the existence of unskilled labour. Basu [18] is of the opinion that child labour at the individual level impairs the physical and mental development of children. This situation according to him brings about an increment in the number of lay- about, mentally demented, and stunted persons in society. This condition spells doom as Basu maintained that there is a "child labour trap'' that the family is likely to fall into. His contention is that an increase in child labour frequently causes a decline in the acquisition of human capital. This research, therefore, is intended to find out specifically the mechanism through which this happens.

The evidence of child labour in Onitsha and seemingly dearth studies on its effects on human capital development provides the justification for this study. The major objective of this study is to find out the impact child labour has on the human capital development of children in Onitsha while the specific objectives are to find out the impact child labour has on school enrollment, mental well-being and physical fitness of children in Onitsha. To this end, this paper is organized as follows: Section two contains the review of relevant literature; Section three discusses the methods and procedures with which the study is conducted and Section four captures the data analysis and discussion while Section five concludes the study.

2. REVIEW OF BASIC THEORIES

2.1 Human Capital Theory

Theodore Schultz [19] views human capital as those resources that are inherent in each human being, which can be traded between the users and the owners to improve their respective living conditions.

Schultz argues that investment in human capital focuses on supporting individuals in acquiring education since it is skill and knowledge that affect one's ability to do productive work. The Human capital theory rests on the assumption that formal education is highly instrumental and necessary to improve the productive capacity of a population. The theory emphasizes on how education increases the productivity and the efficiency of workers by increasing the level of cognitive stock of economically productive human capability, which is a product of innate abilities and investment in human beings.

2.2 Human Capital Investment Theory

Becker [20] developed the human capital investment theory in which the analysis of investment in health and education are unified. He outlined the various interaction paths between income and human capital development. It assumed that low- income parents send their children into labour. According to the theory, rich parents can invest more financial resources in their children's education. Moreover, low- income parents might push their children into work in the labour market in order to contribute to family income.

2.3 The Theoretical Model of Child Labour Supply

Rossati and Rossi [21] analyzed the effects of work on a child when he/she attends school and the effects of the work on the child if he/she engages full time. This situation was seen by Rossati and Rossi as making the children have low academic performance, no interest in education, therefore, leading to school dropout.

In the model, child labour is assumed to be harmful to children's human capital accumulation, and also present and future health of the child. When a child spends hours at work, it reduces the time available for study, tires the child and reduces learning productivity. All these affect human capital accumulation which is basically got through education. The model assumes that human capital accumulation is the only way to transfer resources for children's future consumption and it is accumulated by sending children to school and when children are attending school, child labour supply is reduced.

2.4 Empirical Literature Review

This section reviews some scholarly works, research articles and other relevant studies that are related to child labour and human capital development in order to have a better understanding of the subject matter.

Owoaje, Olusimbo & Eniola [22] examined the prevalence, risk factors and effects of work on school performance and health of child labourers among school children in a rapidly urban community in south west Nigeria. The study used

a descriptive cross-sectional design. A sample of 386 Junior secondary school students was conducted and the study observed that the prevalence of child labour was 72.5%, and the median number of hours spent working per week was 18 hours (range 2- 56 hours).The study finds out that this affects the child schooling and his health. The study was also able to find out that the main reason for working was to augment the family income (37.6%) and also that child labour is associated with negative academic and health outcomes. Owolabi [23] investigated the forms of child abuse and its effect on sustainable development in Nigeria. The study stipulated that despite the fact that there are laws protecting children from abuse, many children are still being abused on daily basis. He also examined the link between child labour and sustainable development. The study was able to find out that Nigeria will continue to lag behind other nations in terms of sustainable development due to lack of investment in human resources (specifically on child education and development).Secondary data was used in the analysis.

Adejobi, Osonwa, Iyam & Udonwa [24] examined the effect of child maltreatment on the academic performance of senior secondary school students in Ibadan, Nigeria. Utilizing multiple regression analysis, the study revealed that there is a significant relationship between child maltreatment and academic performance in Ibadan. Chanda [25] studied the impact of child domestic labour on children's education in Zambia. The study found out that child labour does not only harm the welfare of individual children, but also slows broader national poverty reduction and development efforts. Also, the study showed that child domestic labour negatively affects school enrolment as parents send their children to work to supplement the family income. Holgado, Maya & Amar [26] investigated the effect of different variables of child labour on academic performance. A sample of 3302 children participating in the child labour eradication programme was collected. The data were analysed using the logistic regression model and the study found out that those labour conditions, the number of weekly hours dedicated to work and the presence of work scheduled negatively affect the academic performance of child labourers.

Asamu [27] examined child labour and its social implication on school enrollment rate in selected Nigerian cities and the study reveals that those who engage in child labour are not mostly enrolled in school and this affects the human capital development. They found a negative correlation between child labour and school enrolment. Using the individual records of the 2007 Cameroon household consumption survey. Sundjo, Uwem, Ndamsa & Totum [28] examined the effect of child labour on their health at adulthood in Cameroon. The result revealed that individuals with no level of education had a higher likelihood of being diagnosed with respiratory disease. In addition, both the standards probit and ordered probit models showed that adults, who worked as children, did not report poor self-assessed health status as they were on the contrary more likely to report better self-assessed health status.

3. METHODS AND PROCEDURES

This study is basically a survey research which gathered data through interview schedule. This study was restricted to Onitsha, Anambra state, Nigeria because Onitsha is a commercial city with industries and market. Because of its nature, children engage in labour activities to earn income.

3.1 Design of the Study

This study used a descriptive survey research design. The Interview schedule was used as an instrument for this study (Eboh, [29]). The interview schedule was used to elicit information from the child labourers on their point of duty through personal interview. The researcher used structured questions which are in a two- way questions. The schedule was ticked by the researcher and also was recorded on the tape. Igbo language was used for the interview on children because most of the child labourers do not speak English language. The interview lasted for one week and was conducted between 9.00 am to 2.30 pm during school hours to achieve the aim of this study. The result was coded using scaling estimation technique and analysed.

3.2 Population, Sampling Technique and Sampling Procedure

Child labourers make up the population of this study which can be seen in communities, streets, markets etc. The researcher made use of non-probability sampling because the study does not involve randomness and the population of the study was unknown. (Asika, [30]) In other words, the researcher has to imagine the population

element. The researcher made use of quota sampling and purposive sampling technique (Asika, [30]). Quota sampling and purposive sampling techniques were considered appropriate because the population elements are not deliberately given equal chance of being selected and also data was collected where the respondents are available. Based on the researchers' knowledge about the area of study, the researcher selects his sample for the study. Using the quota sampling, the population is segmented into mutually exclusive sub- groups and the researcher selected the units from each segment based on a specified proportion. We have 24 layouts in Onitsha according to the National Population Authority. For the purpose of this study, some of these areas were grouped into 4, thereby having four sub groups.

Group 1-	Akpaka, 30	Trans Nkisi, 10	GRA, 10	Marine, 30	Nkutanku 20
Group 2-	Inland town, 30	Omagba, 15	Military barracks, 15	Isiokwe, 10	Isiokwe extension 30
Group 3-	Fegge, 30	Woliwo, 25	Nigerbridge, 15	Okpoko 30	
Group 4-	Main market, 50	Ozalla, 10	Odoakpu, 20	Ogbeumu Onitsha 20	

The researcher assigned more values to some areas because of the concentration of children into labour in such areas. The criteria for the grouping were necessitated by the political delineations of the area by the Independent National Electoral Commission (INEC). The reason for this is its proximity to one another. From each of the sub group, a proportionate number of 400 interview schedule was used to elicit information on the child labourers from 5 to 17 years through personal interview until the whole instrument finished.

3.3 Empirical Model Specification

This study leans on the theoretical model of child labour supply by Rossati and Rossi (2003) because it was able to explain the relationship between child labour and human capital development. According to the theory, child labour affects human capital accumulation and the present and future health of children who engage in child labour and that the only way to transfer resources for the increase in children's future consumption is through human capital accumulation. However, this study decomposed the components of human capital development as a function of hours spent at work and age of working as indicators of child labour.

Thus, the aggregate function is

HCD=F (CHILD LABOUR).

Based on this, Human capital development variables are school enrollment rate (SCHER) as a proxy for education, mental well-being (MENWEL) and physical fitness (PHYFIT) as a proxy for health status of the child. On the other hand, the indicators of child labour are time spent at work (HW) and age the child started working (AW).

Thus, the model is expressed as

School enrollment rate (SCHER) =F (time spent at work, age of working)
Mental well-being (MENWEL) = F (time spent at work, age of working)
Physical fitness (PHYFIT) = F (time spent at work, age of working)

Expressing the model in an econometric form, we have

$SCHER = B_0 + B_1HW + B_2AW + U_{1t}1$
$MENWEL = \Pi_0 + \Pi_1HW + \Pi_2AW + U_{2t}2$
$PHYFIT = \delta_0 + \delta_1HW + \delta_2AW + U_{3t}3$

Where B_j, Π_j and δj are the coefficients to be estimated (for j = 0, 1, 2) and U_{1t}, U_{2t}, andU_{3t} are uncorrelated stochastic error terms that are assumed to be well behaved.

3.3.1 The variables and measurements

SCHENR=school enrollment rate. SCHER=1, if the child is enrolled in school and SCHER=0, if the child is not enrolled in school.

MENWEL=Mental Well-being. MENWEL =1, if the child is not depressed/stressed in any form and MENWEL =0, if the child is depressed/ stressed in any form.

PHYFIT= Physical Fitness. PHYFIT =1, if the child has not suffered any injury/sickness and PHYFIT =0, if the child has suffered any injury/sickness.

HW= Time spent at work. HW =0, if the child spends less than 8 hours a day and HW=1, if the child spends more than 8 hours a day.

AW= Age of working.AW=0, if the child started work late in life (at age more than 15 years) and AW=1, if the child started working early in life (at age less than 15 years).

3.4 Estimation Technique and Procedure

In applying OLS estimation technique to a qualitative response, Regression model is flawed with some shortcomings: (i) Non-normality of the disturbances ui (ii) Questionable value of R^2 as a major of goodness of fit (ii) Non-fulfillment of 0<E(Yi/X)<1, among others (Gujarati, 2004). Hence the Maximum likelihood (ML) estimation technique was used to estimate the parameters of the models.

4. DATA ANALYSIS AND DISCUSSION OF FINDINGS

To study the impact of child labour on human capital development in Onitsha metropolis, a total of 400 child labourers were interviewed using interview schedule. The analyses that follow are based on this.

4.1 Evaluation of Research Hypotheses

H0: Child labour has no significant impact on school enrollment of children in Onitsha.
H_1: Child labour has significant impact on school enrollment of children in Onitsha.
H_0: Child labour has no significant impact on mental well-being of children in Onitsha.
H_1: Child labour has significant impact on mental well-being of children in Onitsha.
H_0: Child labour has no significant impact on physical fitness of children in Onitsha.
H_1: Child labour has significant impact on physical fitness of children in Onitsha.

To clearly measure the impact of child labour on the three different components of human capital which include school enrollment, mental well-being and physical fitness, we decomposed the human capital model into three functions.

Probit output

Equation 1: SCHENR

Dependent Variable: SCHENR
Method: ML - Binary Probit (Quadratic hill climbing)
Date: 07/12/16 Time: 14:06
Sample: 1- 400
Included observations: 400
Convergence achieved after 3 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
HW	-0.726875	0.132664	**-5.479070**	0.0000
AW	-0.063600	**0.109684**	-0.579846	0.5620
C	**0.658757**	**0.092608**	**7.113425**	**0.0000**
McFadden R-squared	0.578505	Mean dependent var		0.370000
S.D. dependent var	0.483409	S.E. of regression		0.465758
Akaike info criterion	1.256664	Sum squared resid		86.12127
Schwarz criterion	1.286600	Log likelihood		-248.3328
Hannan-Quinn criter.	1.268519	Deviance		496.6656
Restr. Deviance	527.1645	Restr. log likelihood		-263.5823
LR statistic	30.49897	Avg. log likelihood		-0.620832
Prob (LR statistic)	0.000000			
Obs with Dep=0	252	Total obs		400
Obs with Dep=1	148			

Equation 2: MENWELL

Dependent Variable: MENWEL
Method: ML - Binary Probit (Quadratic hill climbing)
Date: 07/12/16 Time: 14:07
Sample: 1- 400
Included observations: 400
Convergence achieved after 3 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
HW	-0.124406	0.042216	-2.946892	0.00031
AW	-0.234279	0.101345	-2.312940	**0.00433**
C	**0.359213**	**0.089510**	**4.013099**	**0.00010**
McFadden R-squared	0.579290	Mean dependent var		0.360000
S.D. dependent var	0.480601	S.E. of regression		0.478968
Akaike info criterion	1.309696	Sum squared resid		91.07605
Schwarz criterion	1.339632	Log likelihood		-258.9393
Hannan-Quinn criter.	1.321551	Deviance		517.8786
Restr. Deviance	522.7346	Restr. log likelihood		-261.3673
LR statistic	34.04986	Avg. log likelihood		-0.647348
Prob (LR statistic)	0.000000			
Obs with Dep=0	256	Total obs		400
Obs with Dep=1	144			

Equation 3: PHYFIT

Dependent Variable: PHYFIT
Method: ML - Binary Probit (Quadratic hill climbing)
Date: 07/12/16 Time: 14:09
Sample: 1- 400
Included observations: 400
Convergence achieved after 4 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
HW	-0.549085	0.179727	-3.055103	0.0022
AW	0.019592	0.141653	0.138312	0.8900
C	**0.940091**	**0.102724**	**9.151609**	**0.0000**
McFadden R-squared	0.488397	Mean dependent var		0.870000
S.D. dependent var	0.336725	S.E. of regression		0.333665
Akaike info criterion	0.762738	Sum squared resid		44.19884
Schwarz criterion	0.792674	Log likelihood		-149.5475
Hannan-Quinn criter.	0.774593	Deviance		299.0950
Restr. Deviance	309.1094	Restr. log likelihood		-154.5547
LR statistic	21.98144	Avg. log likelihood		-0.373869
Prob (LR statistic)	0.004400			
Obs with Dep=0	52	Total obs		400
Obs with Dep=1	348			

Table 1. Summary of ML-Binary Probit estimation

Variable	Model 1 SCHENR function	Model 2 MENWELL function	Model 3 PHYFIT function
HW	-0.7269*** (0.1327) [-5.4791] *P*-value:0.0000	-0.1244*** (0.0422) [-2.9479] P-value:0.0031	-0.5491*** (0.1797) [-3.0551] P-value:0.0022
AW	-0.06360 (0.1097) [-0.5798] P-value:0.5620	-0.2343*** (0.1013) [-2.3129] P-value:0.0043	0.0196 (0.1417) [0.1383] p-value:0.8900
Constant	0.6588*** (0.09261) [7.1134] *P-value: 0.0000*	0.3592*** (0.0895) [4.0131] *P-value:0.0001*	0.9401*** (0.1027) [9.1516] *P-value: 0.0000*

Variable	Model 1 SCHENR function	Model 2 MENWELL function	Model 3 PHYFIT function
McFadden R-squared	0.58	0.63	0.49
LR statistics (2df)	30.50(0.0000)	34.05(0.0000)	21.98(0.0044)

*( ) and [ ] are the standard error and z-statistics respectively. *** indicates significant at 5% level of significance*
Source: Researcher's compilation 2017

We evaluate the above regression results based on economic criterion and statistical criterion.

4.1.1 Economic criterion

4.1.1.1 School enrolment and time spent at work

The result shows that the time spent at work is negatively related to school enrolment as indicated by the sign of the slope coefficient. This implies that the higher the time a child spent at work, the lower the enrolment rate. The coefficient of time spent at work is about -0.73 which implies that if the time spent by a child at work increases by one unit, the odd in favour of a child getting enrolled in school decreases by 108%.

4.1.1.2 School enrolment and age of working

The result shows that the age the child started work is negatively related to school enrolment as indicated by the sign of the slope coefficient. This implies that as early child labourers increase, the enrolment rate also decreases. The coefficient of -0.063 implies that if a child starts work early in life, the odd in favour of a child getting enrolled in school decreases by 6.6%.

4.1.1.3 Mental well-being and time spent at work

Evidently, the time the child spent at work is negatively related to the child mental well-being. This implies that as the child spends more time at work, the child mental well-being deteriorates. The coefficient of time spent is about -0.1244 which implies that if the time spent by a child at work increases by one unit, the odd in favour of the child mental well-being deteriorating is 13.2%.

4.1.1.4 Mental well-being and age of working

The result shows that the age the child started work is negatively related to the child mental well-being. This implies that early child labour affects the child mental well-being negatively. The coefficient of -0.234 implies that if the child started work early in life, the odd in favour of child having good health decreases by 26.4%. This is in line with our theoretical expectation.

4.1.2 Model 3: PHYFIT Function

4.1.2.1 Physical fitness and time spent at work

Evidently, the time the child spent at work is negatively related to the child physical fitness. This implies that if a child spends more time at work, his health becomes more affected. The coefficient of time spent at work is about -0.549 suggesting that as the time spent by a child at work increases, the odd in favour of the child's physical fitness decreasing by 73.2%. This is in line with our theoretical expectation.

4.1.2.2 Physical fitness and age of working

Though the result negates the theoretical expectation, it suggests that the age the child started work is positively related to the child's physical fitness. The coefficient of 0.0196 implies that as early child labour increases by one unit, the odd in favour of the child's physical fitness increases by 1.98%.

4.1.2.3 Estimating the probability of human capital development

Following the estimated logit model, we can estimate the probability that a child will get enrolled in school; have outstanding mental well-being and physical fitness (i.e., the value 1for SCHER, MENWELL and PHYFIT) given the values of the independent variables (HW and AW) in each of the models. To do this, we take hypothetical values for the different independent variables, and substitute them alongside the estimated coefficients into the following equation for estimating probability of success from a logit model:

Generally, we have

$$\text{Prob. HCD} = 1/ (1+e^{-(\alpha o + \alpha 1 HW + \alpha 2 AW)})$$

Where the human capital development is decomposed into SCHENR, MENWELL and PHYFIT.

In each case, we considered two different scenarios:

***Scenario 1*:** given that a child spends more than 8 hours daily at work (HW =1), and started work early in life (AW = 1).

We simulate for our three models.

SCHENR Function

Prob. SCHENR = $1/ (1+e^{-(\alpha o + \alpha 1HW + \alpha 2AW)})$
αo = 0.6588, α1 = -0.7269 and α2 = -0.06360
Prob. SCHENR = $1/ (1+e^{-(0.6588 - 0.7269*1 - 0.06360*1)})$
Prob. SCHENR = $1/ (1+e^{-(-0.1317)})$
Probability of school enrolment = 0.47

This probability is low and implies that if every child in Onitsha Metropolis spends more than 8 hours daily at work and started work early in life, the probability that the child will be enrolled in school will be 0.47.

MENWELL Function

Prob. MENWELL = $1/(1+e^{-(\alpha o + \alpha 1HW + \alpha 2AW)})$
αo = 0.3592, α1 = -0.1244 and α2 = -0.2343
Prob. MENWELL = $1/ (1+e^{-(0.3592 - 0.1244*1 - 0.2343*1)})$
Prob. MENWELL = $1/ (1+e^{-(-0.0005)})$
Probability of mental well-being = 0.50

The result, also suggests that if a child spends more than 8 hours daily at work and started work early in life, the probability that the child will be mentally balanced is 0.50.

PHYFIT Function

Prob. PHYFIT = $1/(1+e^{-(\alpha o + \alpha 1HW + \alpha 2AW)})$
αo = 0.9401, α1 = -0.5491 and α2 = 0.0196
Prob. PHYFIT = $1/ (1+e^{-(0.9401 - 0.5491*1 + 0.0196*1)})$
Prob. PHYFIT = $1/ (1+e^{-(0.4148)})$
Probability of physical fitness = 0.60

This probability is relatively high and suggests that if a child spends more than 8 hours per day at work and started work early in life, the probability that he will be physically fit is 0.60, all things being equal.

***Scenario 2*:** The probability of HCD, given that a child spends less than 8 hours daily at work (HW =0), and started work late in life (AW = 0).

We simulate for our three models.

SCHER Function

Prob. SCHENR = $1/ (1+e^{-(\alpha o + \alpha 1HW + \alpha 2AW)})$
αo = 0.6588, α1 = -0.7269 and α2 = -0.06360
Prob. SCHENR = $1/ (1+e^{-(0.6588 - 0.7269*0 + 0.06360*0)})$
Prob. SCHENR = $1/ (1+e^{-(0.6588)})$
Probability of school enrolment = 0.66.

If a child spends fewer hours at work and started work late in life, the probability that the child will be enrolled in school is 0.66. This probability is higher compared to the case where a child spends more than 8 hours and started work early in life. The probability difference is 0.19 (i.e. 0.66 – 0.47). Thus, we can conclude that child labour has negative impact on school enrolment in Onitsha Metropolis.

MENWELL Function

Prob. MENWELL = $1/ (1+e^{-(\alpha o + \alpha 1HW + \alpha 2AW)})$
αo = 0.3592, α1 = -0.1244 and α2 = 0.2343
Prob. MENWELL = $1/ (1+e^{-(0.3592 - 0.1244*0 + 0.2343*0)})$
Prob. MENWELL = $1/ (1+e^{-(0.3592)})$
Probability of mental well-being = 0.59

The result is also higher than the mere case of a child who spends more than 8 hours per day at work and started work early in life. This leads to the conclusion that child labour has impact on child's mental well-being.

PHYFIT Function

Prob. PHYFIT = $1/ (1+e^{-(\alpha o + \alpha 1HW + \alpha 2AW)})$
αo = 0.9401, α1 = 0.5491 and α2 = 0.0196
Prob. PHYFIT = $1/ (1+e^{-(0.9401 + 0.5491*0 + 0.0196*0)})$
Prob. PHYFIT = $1/ (1+e^{-(0.9401)})$
Probability of physical fitness = 0.72

This probability is relatively high, and follows our expectation. This result suggests that if a child spends less than 8 hours daily at work and started work late in life, the probability that he will be physically fit is 0.72. This probability is also higher than the former case where a child spends more than 8 hours daily at work and started work early in life. This again, leads to the conclusion that child labour has impact on child's physical fitness.

4.1.3 Evaluation based on Statistical Criterion (1st order test)

4.1.3.1 Coefficient of determination

According to Gujarati (2004), the conventional measure of goodness of fit, R^2, is not particularly meaningful in binary regression models. Measures similar to R^2, called pseudo R^2, are

available, and there are a variety of them. Eviews presents one of such measures, the McFadden R^2. The McFadden R^2 ranges from 0 to 1 and measures the goodness of fit of the regression model. From the regression results, the values of McFadden R^2s in each of the models are approximately 58%, 63% and 49% in models 1, 2 and 3 respectively. These results indicate that about 58%, 63% and 49% variations in school enrolment rate of a child, his mental well-being and physical fitness are explained by changes in hours the child spends working and the age he started work.

4.1.3.2 Z-test of significance

The Z-test is used to test for the significance of the individual parameter in the model, especially when the sample size is very large. It involves comparing the estimated Z-value with the table Z-value at a chosen significant level under a hypothesis.

H_0: β =0: The parameter estimate is not statistically significant at 5% significance level.

H_1: β ≠ 0: The parameter estimate is statistically significant at 5% significance level.

If α = 0.05, the probability of obtaining a Z-value of -1.96 or 1.96 is 5% (or 2.5 percent in each tail of the standardized normal distribution).

4.1.3.2.1 Decision rule

Reject H_o if calculated Z-value is greater than the critical Z-value in absolute term, otherwise accept it.

The Z- test shows that the hour spent by a child at work is statistically significant in each of the models, while the age the child started work has no significant impact on school enrollment and physical fitness at5% significant level.

4.1.3.3 Likelihood ratio (LR) statistic

To test the null hypothesis that all the slope coefficients are simultaneously equal to zero, the equivalent of the F-test in the linear regression model is the likelihood ratio (LR) statistic. Given the null hypothesis, the LR statistic follows the X^2 distribution with degree of freedom (df) equal to the number of explanatory variables. Thus under the hypothesis:

H0: βi = 0: the parameter estimates are not statistically significant at 5% significance level.

H1: βi ≠ 0: the parameter estimates are statistically significant at 5% significance level.

For i = (1, 2,)

$X^2_{0.05}(2) = 11.07$

4.1.3.3.1 Decision rule

If LR statistic > X^2 reject Ho, otherwise accept it.

Our results show that LR statistic of 21.48 > X^2 of 11.07, we therefore, reject the null hypothesis and conclude that the parameter estimates are statistically significant at 5% significance level.

From the analysis made, it was found that the hours the child spends at work (HW) and the age the child started working (AW) is negatively related to school enrollment. As AW and HW are indicators of child labour, child labour has a negative impact on school enrollment of children in Onitsha. Child labour also has a negative impact on mental well-being and physical fitness of children which means that as the child started working early in life and increases the number of hours spent at work, there will be a decrease in the mental well-being and the child's fitness which will definitely affect the health of the child.

Table 2. Summary of Z-test for significance

Variable	Z-calculated	Z-critical decision	Comment
Model 1: SCHENR			
HW	-5.4791***	±1.96	Statistically significant
Aw	-0.5798	±1.96	Not statistically significant
Model 2: MENWELL			
HW	-2.9479***	±1.96	Statistically significant
AW	-2.3129***	±1.96	Statistically significant
Model 3: PHYFIT			
HW	-3.0551***	±1.96	Statistically significant
AW	0.1383	±1.96	Not statistically significant

5. CONCLUSION AND POLICY RECO-MMENDATIONS

Obviously, parents need to know that child labour may in a short run benefit the families by assisting them in meeting some of their need, but on the long run, its effect causes fear. This is because in most cases, child labourers completely miss out or under accumulate the basic human capital (which is got through education) necessary to enhance their future productivity and earning capacity due to low school enrollment and poor health status resulting from their participation in work activities. The study made use of qualitative regression model and a sample size of 400 child labourers was used to illicit information from the children.

On the basis of the empirical result, the following recommendations are made; first, the government should provide compulsory free education in the state and local government area and be able to strengthen and enforce the policy so that the poor ones can have the privilege of attending school. Second, since most of these working children are not enrolled in school or dropped out of school, government and non-governmental organization can also provide scholarships for gifted working children which will serve as an incentive to reduce the rate of drop out. Third, since most of the children's health is affected negatively, child labour education should be introduced in the school curriculum in order to help create awareness on the child's right and the health consequences of child labour on children.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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