

CHILD LABOUR, PERFORMANCE AND EFFICIENCY OF PUBLIC PRIMARY SCHOOLS IN NIGER STATE OF NIGERIA

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ABSTRACT

This paper investigates the efficiency level of schools and its effects on child labour and academic performance in Nigeria. Dataset were obtained from School Census (SC 2014/15 Session) and Socio-Economic Survey (SES 2014) with a total observation of 117 schools and 1125 pupils ages 10 to 14 years. The study used DEA and Tobit model and found some schools to be efficient, while others are experiencing either increase or decrease return to scale. Also, school efficiency is negatively related to labour hours but positively related to academic performance. The study recommends government and stakeholders intervention in providing adequate facilities needed.

Keywords: School, Efficiency, Child, Labour, Performance, Rural

1 Introduction

The aim of elementary education in every society is to provide enable environment to all children, including the children of the vulnerable poor. This is achieved through the existence of public education provided to all and sundry. It's a common phenomenon that the potentials of every students are fulfilled through public education, which provides absolute free education to citizens (Williams, 2010; Nasibullov et al., 2016). In Nigeria like other developing countries, public education is the sole responsibility of the government. All the three tiers of government provide

education at various stages in a subsidize way. The federal government is responsible for tertiary education, state institutions are solely for secondary education, while local authorities are in charge of primary education (World Education News and Review, 2013). Despite this huge task by government over the years, the public expenditure on education is at lower percent. Experience shows that in 1998, public education expenditure is just 2.3% of GDP, a short fall from previous 3.6% of GDP in 1962 (Hinchliffe, 2002). Focusing on primary education, when the public

expenditure of Nigeria is compared with other Sub-Saharan African countries, the share of expenditure on primary education is 36% much lower than the 48% obtainable in the other African countries (Hinchliffe, 2002). Looking inward into the share of public expenditure to primary education between 1996 to 2002, the expenditure stood at 9.7% in 1996 and further fall to 7.5% in 2002; the expenditure was at peak for primary education in 1998 with 16.9% (Herbert, 2002). With this persistence fall in primary education expenditure, the resultant effect is the continuous inadequate infrastructural facilities, given the number of enrolment into public primary schools. This made the primary school net enrollment rate in Nigeria to decrease from 71% in 2012 to 68.7% in 2014 (NBS, 2015). With the continuous fall in the standard of public education, rural household heads who are mostly the vulnerable poor prefer to engage their children into life sustaining jobs at the expenses of education. This decline the completion rate in Nigeria from 87.7% in 2012 to 74% in 2014 (NBS, 2015).

Due to level of inefficiency of rural public school especially in terms of class rooms, teachers and other academic requisite, children are found engaging in various economic activities that gives immediate high net rate of return. Households in this regard thus choose between current net income and educational investment of a child. Those with large children substitutes their children for current stream of income, thereby leading to child low educational investment in the future (Coleman, 1987; Patrinos and Psacharopoulos, 1997). According to Verisk Maplecroft (2016), Nigeria is rated among the top ten worst countries with highest incidence of child labour in the world. International Labour Organization (2005) estimated about 20 million children under the age of 14 to be engaged in child labour activities, with

agricultural sector being the largest employer of child labour. In essence, these particular children are exposed to longer hours at work due to excessive work, and these later, affect their academic performance in school (Bezerra, Kassouf & Arends-Kuenning, 2009). Thus, these setbacks are always attributed to child labour and child labour related factors (Alfa & Karim, 2017). However, the ultimate question of this study is that, does inefficiency of school increase or decrease child participation in labour? If at all it does, what is it relationship with child labour and school achievement? Therefore, discussing child labour and school efficiency is paramount, as inefficiency of schools is expected to discourage parent aspiration for child education. This study therefore determines the efficiency level of schools, to see if schools are operating at increasing or decreasing return to scale. It also investigates the significance of school efficiency, child, household and community factors on child labour and academic performance at school. This paper is divided into six sections. Section two deals with literature review, section three explain the theoretical model, section four discusses the methodology used, section five presents the result, and section six concludes the study.

2. Literature Review

Studies have actually concentrated on the efficiency of schools and children schooling rate. Some early studies found high expenditure of wealthy parents on children education do makes schools to be fully efficient in it operation (Hanushek, 1981; Kingdon, 1996). Other study view efficiency of school from classroom management technique (Garmez, 1991; Jones et al., 2008). Experience shows that schools with lapses in efficiency always lose large number of pupils' enrollment rate (Willms and Echols, 1992). In most cases, household heads with large

number of children do maximize their efficiency in market work than schooling, by investing in more time and effort (Peterson and Gerson, 1992). Recent studies focus on school efficiency and child performance; for example, Primont and Domazlicky (2006) used efficiency to investigate school performance in Missouri and their finding shows that transfer of student sanction is more effective to managerial efficiency if sanction is considered. Looking into management in-depth decision in terms of urban-rural school type, Katanbutra and Tang (2006) findings of public schools in Thailand shows that both urban and rural school are efficient in terms of school size, while class size has only negative effect in rural areas. Misra et al. (2012) emphasize on competition among schools in Mississippi, and their result entails competition in private schools do significantly influence public school performance and efficiency. Also Bradley et al. (2001) earlier found competition to be an efficiency determinant. Gronberg et al. (2012) used cost efficiency of chartered schools and traditional schools and found learning in mathematics and science to be influenced by teacher's salary in Texas. Burney et al. (2013) examine technical efficiency in public schools of Kuwait, and their analysis shows that schools are operating at increase return to scale with teachers' salary being responsive for efficiency.

Although, study by Sherlund et al. (2002) discusses child labour but with efficiency in rice production in Co'te d'Ivoire and found child labour to be responsive to output production. Chavas et al. (2005) used child labour as part of inputs and found imperfection in labour to reduce productivity in Gambia. The result obtained by Isaac et al. (2013) in Kenya, their study concentrated on primary school internal efficiency with home

based factors. They found parental factors to influence pupils' academic achievement. Although, vast literatures were seen in terms of child labour and performance in relation to household and community characteristics. Early works found a positive association between child schooling and parent education and income with child schooling in Pakistan (Burney and Irfan, 1991). This assertion was confirmed by Onsomu et al. (2006) in their study of Kenya as they found children from high quality houses and more educated parents do perform better in school. Though Maani and Kalb (2007) found negative result between mother qualification and child academic performance in their study of New Zealand. However, the Malawi result obtained by Kunje et al. (2009) concluded that children achievement is always being influenced by the level of family wealth when compared with the poorer families. But Muola (2010) used nature of home environment in Kenya and found parent occupation and family size to motivate child academic performance. Looking at child labour, the result of Cockburn and Dostie (2007) in Ethiopia found children to be in school than engaging in work. Similar studies found child labour to negatively influence child educational success (Khanam and Ross, 2011; Nkamelue, 2009; Alfa et al., 2012). Ray and Lancaster (2005) used a multi-country evidence and found child work to be more harmful to learning experience especially for girls than boys. But the Guatemala study by Vasquez and Bohara (2010) entails child labour hours and schooling to be greater for boys than girls' when considering the ratio of boys to girls. Recent study by Alfa and Karim (2016) found a significant negative influence of child labour in relation to child performance in Nigeria.

3. Theoretical Model

The theoretical model of this study is based on the educational production function advocated by Hanushek (1971). The model considered educational output to consist of multidimensional factors ranging from child performance and parent influence on school inputs. The model is expressed as:

$$A_{it} = f(A_{it}, B_i^{(t-t^*)}, P_i^{(t-t^*)}, I_i, S_i^{(t-t^*)}) \dots\dots\dots 1$$

Where the vector of educational outputs of the i^{th} student at time t is A_{it} ; A_{it} represent the threshold of cross achievement levels at time t^* ; family inputs to education is $B_i^{(t-t^*)}$ of i^{th} student cumulative from time t^* ; $P_i^{(t-t^*)}$ is the peer influences of i^{th} student cumulative from time t^* ; I_i is vector of innate endowments of i^{th} student, and $S_i^{(t-t^*)}$ entails vector of school inputs to i^{th} student cumulative from time t^* . In line with educational production function, Rainey and Murova (2004) simplify the student achievement model and it measured as:

$$A = f(X, S) \dots\dots\dots 2$$

Where A is the student achievement; X is household characteristics and S is the school policy variables. Achievement of student is measured in terms of performance in major subject. The household factors X consist of child and parent socioeconomic variables, having child and household head education attainment and income. The school policy entails the status of the school either efficient or inefficient, efficient schools are expected to have large number of pupils' enrollment due to available school facilities. The decision of a child engaging in labour is subject to school available facilities, such that each individual school S is between the range of 0 and 1

$$0 \geq S_i \leq 1 \dots\dots\dots 3$$

When the school operates at 0, the household X prefer to encourages child engagement in labour to extract the current stream of income than to only school. Because they believe that inefficient of school will not give a child better education. Therefore, a child is trained alongside the traditional household occupation, which might give the child more advantage in the future.

4. Methodology

This section consists of efficiency estimation, data and model estimation.

4.1 Efficiency Estimation

In estimating the efficiency of schools, Data Envelopment Analysis (DEA) advocated by Charnes, Cooper and Rhodes (1978) was used. It's a non-parametric approach commonly used for educational management. The approach consists of maximization which measures outputs expansion with a given input, and minimization which measures inputs required given a level of output (Coelli, et al., 1998; Katanbutra and Tang, 2006). Following Burney et al. (2013), minimization model is emphasized in this study to efficiently minimize number of inputs required. In this case, the schools are thus considered as DMU (Decision Making Units) with a given condition that all DMUs are less than or equal to one. The DEA approach is based on certain inputs in assessing the efficiency of schools. The school i relationship can be written as:

$$Y_i = F(X_i), i = 1, \dots, n \dots\dots\dots 4$$

Where Y_i is a composite indicator reflecting our output measure, and X_i is relevant inputs in the school i . In line with Ruggiero (2003) and Blackburn et al. (2014), the DEA is

$$\left. \begin{aligned}
 &\theta^* = \text{Min } \theta \\
 &\text{Subject to} \\
 &\sum_{j=1}^n \lambda_j x_{ij} \leq \theta x_{io} \\
 &i = 1, 2, \dots, m \\
 &\sum_{j=1}^n \lambda_j y_{rj} \geq y_{ro} \\
 &r = 1, 2, \dots, s \\
 &\sum_{j=1}^n \lambda_j = 1 \\
 &\lambda_j \geq 0 \\
 &j = 1, 2, \dots, n
 \end{aligned} \right\} \dots\dots\dots 5$$

Where input consist of discretionary variables such as teachers, textbooks, and furniture, while classrooms are non-discretionary variable. The output is the student enrollment rate. θ^* refers to optimal enrollment rate and θ is the efficiency score. θx_{io} and y_{ro} refers to DMU and MU respectively under evaluation. x_{ij} and y_{rj} are the observation of the inputs and output of all the DMUs and λ_j are the ways going to be decided. Such that the convex combination ($\sum \lambda_j = 1$) requires that the sum of the weight (λ lambda) equals to one. The DEA is therefore subject to three constraints, such that each school (ith) is facing $m + s + 1$ constraints. m and s constraints are input and output each, and are all equal to one to attain efficiency. To obtain the relative efficiency score, the DEA is run n times for all the DMUs (Toloo and Nalchigar, 2009).

4.2 Data

Niger state is the prime of this study due to its Free Education Programme (FEP) launched in 2007, the state programme complement the effort of Universal Basic Education (UBE)

scheme initiated by Federal Government of Nigeria in 1999 to discourage child labour and related activities at homes, in order to boost children school attendance rate. This study used two datasets which comprises of school data and household data. The earlier data was obtained from School Census (SC 2014/15 Session) published by Niger State Bureau of Statistics in 2015; the bureau is charged with an in-depth analysis of state data management across various sector of the state economy. The observation of the school data comprises of various schools in the state; this is to incorporate the little variation in schools' educational facilities, in terms of enrollment rate, transfer and recruitment of teachers, and classroom constructions. The later data consist of household information, extracted from Socio-Economic Survey (SES 2014) conducted by the same organization. A total of 117 schools¹ with adequate information of school facilities were purposively analyzed; whereas 1125 household information were purposively

¹ 39 schools from each geo-political zone of the state with complete information on facilities and covered within the stipulated time were selected.

extracted from a population of 730,264 respondents using Saunders, Lewis and Thornhill (2007) sample size selection criteria. The data is restricted to only those with children ages 10 to 14 years old, because children below the age of 10 are not legitimately incorporated into child labour by households and those above 14 are already in Secondary Schools which are not located in rural areas. The choice of the age bracket is within the range of ILO age definition of 5 to 17 years old. The variables used for the study are presented in Table 1 with descriptive statistics; the estimation of school efficiency data in this study are based on the studies of Borge and Naper (2006); Bradely, et al. (2001); Burney et al. (2013); Charnes et al. (1978); Gronberg et al. (2012); Romanowski (2003); Vasquez and Bohara, (2010). For individual data, the variables of the study are measured according to the following studies Alfa and Karim (2016); Isaac et al., 2013); Kunje et al. (2009); Manni and Kalb (2007); Onsomu et al (2006).

4.3 Regression Estimation

The regression estimates the significance of school, child and household determining factor on technical efficiency (TE) obtained from the DEA estimation. The study used Tobit, OLS and logit model in analysing the second stage. Although, the use of Tobit or logit model is a common practice in estimating the TE after DEA as it is based on normality and homoscedasticity (see Borge and Naper, 2006; Gebremichael and Gessesse, 2016; Greene, 2012; kantabutra and Tang, 2006; Kumar and Gulati, 2008; Rassouli-Currier, 2007). The TE (dependent variable) is censored in either at upper or lower limit. Although several studies argued that, the fractional nature of Tobit model made the efficiency score analysis to be inappropriate because the TE are suppose not to be censored (see Burney et al., 2013; Hoff, 2007; McDonald, 2009). Thus, this study equally performed the OLS regression since its estimators are consistent with valid hypothesis, and are robust to error term distribution and heteroscedasticity. From the discussion, the Tobit, OLS and logit theoretical model are specified below:

$$Y_i = \text{Max}(Y_i, 0) \dots\dots\dots 6$$

$$Y_i = \beta_1 + \beta_2 X_i + \mu_i \quad i = 1, 2, \dots, N \dots\dots\dots 7$$

Such that

$$Y_i = Y_i \quad \text{if } Y_i > 0 \dots\dots\dots 8$$

$$Y_i = 0 \quad \text{if } Y_i \leq 0 \dots\dots\dots 9$$

Where, Y_i is the dependent variable that will be measured using a latent variable Y_i ; Y_i denotes latent variable for positive values and censored values for otherwise; β_s is the vector of estimable parameters, X_i connote vector of explanatory variables; μ_i stand for normally and independently distributed error term with zero mean and constant variance σ^2 , and N signify the number of observations. While the OLS theoretical model is

$$Y_i = \beta_1 + \beta_2 X_i + \varepsilon_i \dots\dots\dots 10$$

Where, Y_i is the dependent variable; β_s denotes the vector of estimable parameters; X_i indicates vector of explanatory variables; and ε_i stand for distributed error term. And the logit theoretical model is

$$\{\text{Pr}(y = 1/x)\} = \beta_0 + \beta X_i + \mu_i \dots\dots\dots 11$$

Where $\Pr(y = 1/x)$ is the probability of the outcome, Y is the response value, X_i denotes the vector of explanatory variables, β_0 signifies the intercept of the equation, and β entails vector of the parameters to be estimated. From the three models, the specification has technical efficiency (TE) for each school i as dependent variable; while the independent variables (X s) are aggregate teachers in each school, cumulated pupils' performance for each school, ratio of boys to girls, presence of village market within school environment, and μ_i and ϵ_i are the error terms.

However, apart from the school level model, individual level model was equally specified by segregating² the efficiency score between pupils from efficient and inefficient schools, using efficiency score index. The model consists of child labour hours and child academic performance as dependent variable with other child, household, community and school characteristics. A Tobit model was employed due to zero '0' nature of labour hours provided by children who only work and those that failed exams given the scale of performance (Maani and Kalb, 2007). The OLS estimator cannot be used to model this kind of scenario due to level of biasness and inconsistency (Gujarati, 2007; Maddala, 1983). Likewise, removing the censored values and estimating latent observations will still lead to biasness and inconsistency, due to non-zero expected value of the error term. By implication, the explanatory variables and random error term will be correlated through exogenous order leading to the violation of the assumption of absence of covariance; as such, child labour hours was estimated using tobit model. The model is therefore specified below:

$$H_i = \text{Max}(H_i, 0) \dots\dots\dots 12$$

$$H_i = \alpha + \beta_1 S + \beta_2 X + \beta_3 Y + \beta_4 Z + \mu_i \dots\dots\dots 13$$

Where H is hours of labour worked by a child i ; S denotes the school efficiency index allocated to each child having 1 and 0 for school efficient and inefficient respectively, X refers to child characteristics; Y indicate household characteristics; Z signifies community characteristics; and μ_i is the distributional error terms.

5. Result and Discussion

This consist of results for both the school's level and individual level data.

5.1 Estimation of School Efficiency

The result for school efficiency estimation in Table 2 shows 19, 14 and 18 schools to be efficient in South, East, and West respectively; while 20, 25 and 21 are found to be inefficient in the respective Zones. In general, 51 schools were found to be efficient, whereas 66 schools were inefficient. This schools experience either increase or decrease return to scale.

Using the input-orientated approach, the further result obtained from the DEA shows the mean of VRS (TE) varies from 0.76 to 0.84 which is higher than school efficiency in Chile, Kuwait and Thailand result of 1999/2000 (Burney, et al., 2013; Kantabutra and Tang, 2006; Mizala, et al., 2004). The SE result entails that many schools in the state are operating at increasing return to scale³, suggesting that the schools have the potentials to operate at large scale.

² i.e. stratification of schools based on efficiency score

³ With 67.5% of the schools operating at increasing return to scale

5.2 School Level Regression Result

Table 3 contain estimation of technical efficiency with set of variables that influence school efficiency. The estimation consists of three models, the first model entails OLS estimation, second model is for Tobit model, and the last model shows the logit model result. The coefficient for teacher salary is positive and statistically significant in the three models, it indicates that an increase in teachers' salary will make schools to be technically efficient. An increase in teacher's salary will make teachers to add more qualification which will eventually enhance pupils learning capacity, which is similar to the previous findings (Bradley et al., 2001; Burney et al., 2013). Although teachers' salary from the descriptive result in Table 1 is far below that of Argentina, Malaysia, South Africa, Tunisia, (Armstrong, 2014; Siniscalco, 2004). The ratio of teachers in terms of male to female staff in public primary schools is significant in determining the technical efficiency level of schools, as schools with more male staffs tends to be more efficient than those with higher number of female staffs. Having more female staffs might lead to schools being inefficient due to number of leave been taken by female staffs, such as annual, maternal and emergency leave. High number of Diploma/NCE staffs in public schools doesn't increase the technical efficiency of schools, but having high number of HND/Degree staffs makes schools to be more technically efficient, especially when emphasizing on OLS and tobit estimation as the estimation result indicates a significant and positive result. Most staffs with Diploma/NCE in public schools are found of not stable in school, due to quest for additional qualification.

The variable for pupils' performance observed from schools captured are not significant in the three estimation, this means performance doesn't influence the status of

school efficiency level. Although inefficient of schools to some extent do experience inadequate educational materials, which might affect the overall performance of pupils in a given school as postulated by Jones et al. (2008).

However, the ratio of boys to girls are equally associated with efficiency level of schools. The coefficient is positive and significant to technical efficiency level of schools in the first and second estimation, but was dropped in the third estimation due to failure of perfect prediction by the logit model which leads to omission of six observations. Thus, the study indicates the dominance of boys over girls in all the schools, which might be due to cultural heritage of the area where male education is more favoured.

5.3 Child Level Regression Result

This study does not only restrict itself to school factors alone, other factors such as child, household and community characteristics as seen in Hanushek (1971) theoretical model were estimated. The study identified the determinants of child engagement in labour and academic performance at school. The result in table 4 consist of two estimations; notably estimation for child labour hours at home, and estimation for child academic performance at school. In estimating the coefficients, the result for labours hours is omitted in the first estimation due to collinearity in the model, but its negative and significant to child academic performance at school in the second estimation. This means that the more a child partake in labour or increase their labour hours, it will lead to a corresponding decrease in their academic performance by 0.77%. These children are faced with high fatigue and high rate of missing classes, which eventually affect their performance. This is in line with the findings of Alfa et al. (2012); Alfa and

Karim (2016); and Khanam and Ross (2011). The coefficient for child performance in respect to hours of work were negative and statistically significant. It indicates an increase in performance by earning additional grade decrease child participation in labour by 0.6% for the first estimation, which is consistent with the study of Ray and Lancaster (2005).

For child efficiency level, the result is negative and significant to child work; such that the tendency of a child studying in efficient school is associated with a decrease in work by 6.74% respectively. It means efficiency level of school's decrease child participation in work at home, because most pupils from efficient schools are always punctual once it comes to attendance rate. Another issue is that, efficient school have series of engagement for their pupils such as homework, group work etc., which decreases their working hours when compared to inefficient schools. This finding is therefore in conformity with the study of Misra et al. (2012). But, in the estimation of child performance at school, the result shows that child efficiency level of school positively influences child performance and statistically significant. This indicate that children in efficient school have their performance to be increased by 10.6% as supported by Isaac et al. (2013). From the input and output factors, efficient schools have access to educational facilities especially the required number of teachers and classrooms in relation to their number of enrolment.

Looking at child characteristics, child age is positive and significant to hours of work by child, but not significant to child performance at school. Additional age by child increases their ability to work at home leading to fatigue and eventually affects their daily schooling schedule. Those that engage in labour at home experience 2.68% increase. Children are incorporated into labour at tender age, but become more legitimate as their age increases

by supplying labour to various sector of rural economy. The coefficient for gender of a child is only significant in hours of labour estimation, with 4.4% increase at the disadvantage of male children; the same result was obtained by Vasquez and Bohara (2010). Being a biological child of the household head decreases child engagement in work, but increases their performance in school; as the coefficient were negative to work and positive to performance estimation. In contrary, the number of siblings is positive and significantly increase child work, whereas significantly decreases child performance. With more siblings, the older children might have limited attention especially when it comes to basic necessities.

The household characteristics have gender and educational level of the household head to be only significant in the child performance estimation, with male heads having greater concern than their female counterparts, especially those with academic qualification (see Onsumu et al., 2006). The education of heads is paramount to child development, because educated heads prefer their children to be in school rather than engaging in any early work as well as attending extra lessons. But most children happened to be encouraged to work by their mothers or female relatives with little or no consent of the male household head. Also, occupation of head and household income are negative and statistically significant to child work, while only income is positively related to child academic performance (see Kunje et al., 2009). This suggest that children of skilled workers are always punctual in school and do perform far better than the children of unskilled workers' in most cases; equally household with high income do spend more on child education because their children may likely be in possession of required educational material needed in school, which may enhance their learning ability.

The community characteristics have school distance to be one of the impediment of child schooling and facilitator of child engagement in labour. The coefficient for school distance is positive and significant to work, but negative to child academic performance. School distance usually affects the children attendance rate, which in turn affect their performance as they often skip classes; while some poor household heads use the opportunity of school distance to engage their children in work. However, access to electricity is not associated with work, but positive and significant to child academic performance. This suggest that having access to electricity increase their learning ability by 2.31%. Children from areas connected to national grid⁴ have more advantage as majority of them always concentrate on their homework at night. For access to pipe water, the coefficient is negative and statistically significant to child work, while positively and statistically significant to child academic performance at school. This indicates that, having access to pipe water decrease child labour rate at home by 6.31%, as unavailability of pipe water lure children to be sourcing for water on commercial benefits, or have to source for water at early morning every day before going to school. But it availability increases child performance, as those children does not necessarily have to search for water every day, as obtained by Alfa et al. (2012) and Alfa and Karim (2016).

6. Conclusion

This study discusses the efficiency level of schools and its effects on child labour in relation to child academic performance. Thus, this study found some schools to be technically efficient, while the remaining schools are experiencing either increase or decrease return to scale. The mean of schools

TE in Western Senatorial Zone of Niger State is higher than the Southern and Eastern Senatorial Zone of Niger State which is 0.02 and 0.08 respectively, likewise western Senatorial Zone is greater than Eastern Senatorial Zone with 0.06. This entails that some schools are efficient given the number of teachers and classrooms as input with pupils' enrollment rate as output. The result of the technical efficiency model estimate found teachers' salary to be positively related to school technical efficiency. This is because, the quest for an increase in teachers' salary is always warranted by high increase in teachers' additional qualification, which eventually leads to school being efficient. But the ratio of boys to girls positively affect the efficiency level of schools as the greater school participation are always foreseen for boys than girls.

On the performance of child level data, the result of the study shows that child efficiency score has a negative relationship with child work, while positive relationship with child performance. That is, pupils from efficient schools always experience decrease in child labour and increase in their academic performance, because they are mostly found with complete educational materials and always engage in take home assignment usually assigned to them by their teachers. However, a significant result was found for child labour hours decreasing child performance, and likewise child performance decreasing child labour hours. Other variables such as age of a child, education level of head and school distance increases child participation in labour, as child age and school distance increases. Likewise, school distance decreases child performance. Although, occupation of head and household income decreases child labour hours and increase child academic performance. This is because household head with educational background, a skilled job and living above subsistence level always provide their wards with necessary

⁴ Niger State Rural Electrification Board

studying materials, and equally participate fully in their educational upbringing through extra lessons at home.

The study therefore recommends government intervention in providing adequate facilities needed, since it has taken the responsibility of providing free education for all. Or else, a minimal and bearable amount of fee should be charged per child, if it will enable schools to attain efficiency and be effective in their affairs. On the part of stakeholders especially the NGOs (Non-

governmental Organization's) and community leaders, effort should be made by supporting the government in terms of other needed school inputs like renovation and supply of furniture's to schools. They should revive the school competition such as quiz and debates among rural schools, and possible with urban schools. Also, recreational events like sport should be emphasize on, which might keep them busy in school always, so as to avoid longer hours of work.

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Table 1: Descriptive Results

Variable	Mean	σ	Variable Measurement
School level data			
Technical efficiency	0.80	0.23	Technical Efficiency (TE) is measured using the weighted mean of output over input.
Techers salary	41.82	10.12	Teachers salary per school is measured in terms of aggregate income paid to teachers per month.
Teachers ratio	0.64	0.48	The ratio of staffs in terms of gender difference.
Teachers qualification	2.71	1.39	Measured in terms qualification obtained such as 1 for Diploma, 2 for NCE, 3 for HND and 4 for Degree
Pupils' performance	48.02	9.14	School performance is calculated based on pupils aggregated performance per each school
Ratio of boys to girls	0.95	0.22	The variable ratio of boys to girls takes the value of one if boys greater than girls in a particular school and zero otherwise.
Total	117		
Individual level data			
Child labour	2.30	2.30	Child labour is measured in terms of average hours of work per day at home
Performance	1.79	1.18	Child school performance measured in a scale of five ⁵ as required by educational law.
Child efficiency	0.32	0.47	This is measured based on the efficiency score of schools, taking the value of one if a child hails from efficient school and zero otherwise.
Age of child	11.91	1.38	Age measured in number of years
Gender of a child	0.56	0.50	Gender as a dummy variable with one as male and zero otherwise.
Child relationship	0.74	0.44	Taking the value of one if biological child and zero otherwise
Number of siblings	2.48	1.53	Measured in numbers from the same mother
Age	47.02	10.81	The household characteristics consist of age of the head in years
Gender	0.80	0.40	Dummy for gender having one for male and zero

⁵ 0 (F) = 0% - 39%; 1(D) = 40% - 49%; 2 (C) = 50% - 59%; 3 (B) = 60% - 69%; and 4 (A) = 70% - 100%

Variable	Mean	σ	Variable Measurement
			otherwise
Education	0.55	0.50	Father and mother educational if once attend school taking the value of one if yes and zero otherwise
Occupation	0.23	0.42	Dummy for occupational indicating one if skilled and zero otherwise
Income	455.54	154.46	Average head daily expenditure denoting level of income
Family size	10.28	3.63	Total number of family members eating from the same pot as family size.
School distance	22.00	13.59	The community characteristics entails distance to school
Access to electricity	0.43	0.49	Dummy variable for the presence of electricity as one and zero otherwise.
Access to pipe water	0.18	0.38	Dummy variable for the presence of water as one and zero otherwise
Total	1125		

Source: Author computation; σ = Standard deviation

Table 2: Estimate of school efficiency (Arithmetic mean) by Niger State senatorial region

Zone	Overall TE (CRS)	Pure TE (VRS)	SE	Number of Efficiency Schools	Number of inefficiency Schools	n
South	0.60	0.82	0.75	19	20	39
East	0.56	0.76	0.73	14	25	39
West	0.61	0.84	0.73	18	21	39
N				51	66	117

Note: TE = Technical Efficiency, CRS = Constant Return to Scale, VRS = Variable Return to Scale, SE = Scale Efficiency.

Source: Author computation

Table 3: Estimation of technical efficiency using school level data

Variable	OLS	Tobit	Logit
Teacher salary	0.0036** (0.0014)	0.0051** (0.0020)	0.0651** (0.0256)
Teachers ratio	0.2190*** (0.0427)	0.2658*** (0.0552)	1.4158** (0.5873)
Diploma/NCE	-0.0003 (0.0093)	-0.0002 (0.0151)	0.0363 (0.1775)

HND/Degree	0.0234** (0.0097)	0.0410*** (0.0155)	0.2774 (0.1846)
Pupils' performance	0.0026 (0.0020)	0.0020 (0.0028)	0.0358 (0.0446)
Ratio of boys to girls	0.0585 (0.0075)	0.0871* (0.0458)	
R ²	0.6672		
Pseudo R ²		0.5362	0.2847
F-Statistics	52.90***	23.57***	
Wald Chi ²			22.17***
N	117	117	111

Notes: Robust standard errors are in parentheses, P values: significance *10%; **5%; ***1%.

Table 4: Tobit estimation using child level data

Variable	Child labour	Margins	Performance	Margins
Labour hours			-0.0756*** (0.0151)	-0.0077
Performance	-0.0543*** (0.0099)	-0.0060		
Child efficiency	-0.6082** (0.3053)	-0.0674	1.3350*** (0.0629)	0.1060
Age of child	0.2438*** (0.0834)	0.0268	0.0403 (0.0249)	0.0041
Gender of a child	0.4001* (0.2372)	0.0440	0.0064 (0.0645)	0.0006
Child relationship	-0.5734** (0.2503)	-0.0621	0.2507*** (0.0725)	0.0280
Number of siblings	0.1797** (0.0757)	0.0197	-0.0822*** (0.0232)	-0.0084
Age of head	-0.0015 (0.0126)	0.0002	-0.0002 (0.0034)	-0.0001
Gender of head	0.3220 (0.3041)	0.0357	0.2429*** (0.0836)	0.0277
Education of head	-0.1765 (0.2537)	-0.0194	0.1787** (0.0750)	0.0184

Variable	Child labour	Margins	Performance	Margins
Occupation of head	-1.2421*** (0.3506)	-0.1394	0.0930 (0.0868)	0.0091
Income of head	-0.0016* (0.0008)	-0.0002	0.0010*** (0.0002)	0.0001
Family size	0.0247 (0.0371)	0.0027	-0.0124 (0.0109)	-0.0013
School distance	0.0281*** (0.0082)	0.0031	-0.0048* (0.0026)	0.0005
Access to electricity	-0.3526 (0.2403)	-0.0388	0.2322*** (0.0671)	0.0231
Access to pipe water	-0.5857** (0.2947)	0.0631	0.3235*** (0.0840)	0.0280
Censored observation	513		193	
N	1125		1125	

Notes: Robust standard errors are in parentheses, P values: significance *10%; **5%; ***1%.