EVALUATING POVERTY ERADICATION IN DEVELOPMENT INTERVENTIONS: A CASE STUDY FROM NIGERIA

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ABSTRACT
The phenomenon of absolute poverty assumed an increasing dimension in Nigeria after the civil war ended in 1970. The number of Nigerians living below poverty line increased from 17.7 million people in 1980 to 112.47 million in 2010. This is an alarming figure given that the total population of the country stands at about 170 million. Concurrently, the number of government’s anti-poverty institutions rose over the years, beginning from the 1970s. The most recent and longest in terms of sustainability is the National Poverty Eradication Programme (NAPEP) – an amalgam of previous poverty alleviation initiatives. However, the impact of NAPEP on the welfare of the poor in quantitative terms is little known. The available studies on the effect of NAPEP are either merely descriptive or lack analytical depth and rigour. To correct this gap, the focus of this paper is to quantitatively evaluate the impact of NAPEP on poverty reduction in Imo State of Nigeria; and to undertake a binomial analysis of the perception of NAPEP interventions. The research design is based on the quasi-experimental approach, while appropriate econometric methodology was employed in the analysis. Some of the findings of the study are captured below: the objective quantitative evaluation indicates that poverty reduction through NAPEP is not statistically significant while the subjective evaluation indicates otherwise. Moreover, a supplementary analysis shows that the headcount index is 0.42. This is a move away from perfect targeting at the core poor. The paper recommends that NAPEP interventions should be directed wholly at the core poor as a step towards enhancing its impact on poverty eradication.

Key Words: Evaluation, Poverty Eradication, quasi-experimental design, Logit
JEL CODES: O15; C21; C25
1. Introduction
Poverty assumed an increasing dimension in Nigeria after the civil war ended in 1970. Perhaps, about 10 million Nigerians were poor in 1970. According to Igue (2005), available data from the Federal office of statistics indicates that 17.7 million people were below the national poverty line in 1980. This figure jumped to 34.7 million in 1985, 39.2 million in 1992, 67.1 million in 1996 and 68.7 million in 2003, and according to the National Bureau of Statistics, it stood at 112.47 million in 2010.

Against this backdrop, the Federal Government launched several programmes to combat the problem of poverty. Given that agriculture employed 71% of the country's labour force in 1960 and 56% in 1977, and that 80% of Nigeria's rural population were involved in one agricultural activity or the other (Anyawu, 1997) it is easy to appreciate the fact that poverty is more pronounced in rural areas than in urban areas. Consequently, all initial government's anti-poverty measures focused on revamping the agricultural sector and enhancing the incomes of the rural folk as agricultural production has witnessed steady decline due to neglect occasioned by the easy flow of petrodollars (Edozien, 1984).

The National Accelerated Food Production Programme (NAFPP) was one of the earliest anti-poverty measures launched in 1973 to boost food production in the shortest possible time. This initiative was relatively short-lived. Also, the Nigeria Agricultural and Cooperative Bank (NACB) came on stream in 1973 to channel credit to the agricultural sector. Additionally, the idea of the River Basin Development Authorities (RBDA) that was conceived in 1963 was first tried in 1974. Other noble initiatives targeted at poverty alleviation by focusing on agriculture include: The establishment of the World Bank assisted Agricultural Development Projects (ADPs) in 1974; the Operation Feed the Nation (OFN) in 1976 and the Green Revolution Programme of 1981. Furthermore, we had the Directorate for Food, Road and Rural Infrastructure (DFRR) of the late 1980's and in the early 1990's, the Rural Banking Scheme. Others include the sectoral credit guidelines of the Central Bank of Nigeria aimed at channeling funds to agriculture, the establishment of People's Bank, Community Banks, Family Support Programme, Better Life for Rural Women initiative, Family Economic Advancement Programme, among others (Ogwumike, 1998). Many of the previous anti-poverty measures have fizzled out.

However, of more concern to this paper is the establishment of the National Poverty Eradication Programme (NAPEP) in 2001, which represents an amalgam of some of the previous anti-poverty initiatives and in terms of sustainability, it represents the longest poverty eradication agenda in Nigeria. The impact of NAPEP on the welfare of the poor in quantitative terms is little known. The available studies on the effect of NAPEP are either relatively descriptive or lack analytical depth and rigour. For instance, Udoh and Omonona (2002) undertook a qualitative analysis to find out the people’s verdict in respect of government poverty reduction programmes in such areas as health, education, housing, nutrition, finance, and industry. The researchers classified NAPEP among programmes adjudged to corrupt, while others fell into the categories of elitist, foreign, and suitable. Ajulor (2013) used descriptive percentage analysis to conclude that the implementation of NAPEP has not impacted positively in the lives of Ado-Odo Ota rural people of Ogun state, Nigeria.

Thus, the twin objectives of this paper are: to evaluate the impact of NAPEP on poverty reduction in Imo State of Nigeria; and to carry out a binomial analysis of the perception of NAPEP interventions. After section one, the paper is organized as follows: section two addresses issues of literature review, section three dwells on the methodology while section four focuses on the empirical analysis and section five concludes the paper.
2. Brief Review of Literature

Uniamikogbo (1997) observed that unlike other concepts such as structural adjustment and stabilization, poverty defies objective definition because of its multi-faceted nature while Aboyade (1975) posits, that poverty is like an elephant, easy to recognise but difficult to define. Regardless of the lack of consensus as to what poverty is we agree with Anyanwu (1997) that any study of poverty must begin with a conceptualization of poverty.

Development economists often define poverty in terms of absolute poverty, which refers to the inability to earn a specific minimum income needed to satisfy the basic physical needs of food, clothing, and shelter in order to ensure continued survival (Todaro and Smith, 2009; Ravallion and Bidani 1994; Nwosu 2000). The World Bank (2001) emphasized that poverty is a broad concept and multidimensional. Poverty transcends material deprivations, low consumption and low income associated with the level and distribution of human capital and social and physical assets, to include: low achievements in education and health; vulnerability and exposure to risk and income shocks; and voicelessness and powerlessness.

Ajakaiye and Adeyeye (2001) adopted the participatory poverty assessment (PPA) approach to completely understand the nature of poverty. The PPA exposes quickly through the poor people’s own voices the realities of their lives. Furthermore, Nwogwugwu (2004) re-echoed the assertion of UNDP which notes that, if human development is about enlarging choices, poverty means that opportunities and choices most basic to human development are denied - to live a long, healthy, and creative life as well as to enjoy a decent standard of living and freedom.

About all the available studies on poverty evaluation in Nigeria employed simple descriptive statistic to capture the impact of poverty. However, such studies fail to account for the counterfactual. Some of these studies are presented below. Orji (2005) assessed the impact of poverty reduction in Nigeria as a development strategy between 1970 and 2005. It was found that 66.05% of the 717 respondents surveyed strongly agreed that the various poverty alleviation programmes of the government have not made any significant impact on the people while 33.05 strongly disagreed. Thus, based on percentage analysis as well as chi square statistical technique, the author concluded that the poverty eradication initiatives of the government have no significantly positive impact on the poor.

Shawulu, Adebayo and Binbol (2008) carried out an empirical appraisal of the impact of the National Poverty Eradication Programme (NAPEP) in Jalingo Local Government Area of Taraba State, Nigeria. By applying the student t-test to survey data obtained from 100 respondents, they concluded that beneficiaries’ income after the intervention was significantly higher than what it was before the intervention. For instance, the mean monthly income of Mandatory Attachment Programme (MAP) beneficiaries rose from N8,790 before NAPEP intervention to N17,010 thereafter.

Dakyes and Mundi (2013) evaluated the impact of anti-poverty programme on the development of rural areas, focusing attention on one of the local governments in Plateau state, Nigeria. The result of the study indicates that NAPEP has little positive impact on the well-being of the people. A sample 500 was adopted and simple percentage analysis was used. Dakyes and Mundi noted that inter alia the diversion of benefits meant for rural areas to urban centres and for personal use is one of the reasons why the NAPEP programme failed to impact on the rural areas investigated. In another study on the impact of NAPEP in Giwa Local Government Area of Kaduna state, Nigeria Yakubu and Abbass (2012) found that the programme did not achieve its goal of poverty reduction. Like other studies reviewed above, simple percentage analytical technique was employed. The authors found that only 17.2% of the
population surveyed benefitted from NAPEP loans while a whopping 82.8% did not. Furthermore, only 11.2% of the population received training while 88.8% were not privileged to do so.

Another study by Kasali and Sowunmi (2013) examined the effect of NAPEP loan on socioeconomic development of Ogun state, Nigeria. Using the differences of means and probit analysis, their findings reveals that there was no significant difference in the business worth of the loan beneficiaries and non beneficiaries. A shortcoming of the study is that the use of simple differences in means does not solve the problem of endogeneity which leads to biased in parameter estimation.

Shehu, Abdullahi and Haruna (2012) studied the impact of the intervention of the International Fund for Agricultural Development (IFAD) on poverty reduction in selected local government areas of Sokoto state, Nigeria. The study employed logit regression approach to data analysis. Increased capital expenditure was used as a proxy variable for IFAD intervention in the logistic model. The coefficient of the proxy variable clearly shows that IFAD poverty reduction intervention did not result in any statistically significant reduction in poverty. However, the major drawback of this study is the copious absence of any research design to address the problem of counterfactual. Iwuoha and Obi (2012) aver that the implementation of NAPEP programmes, including its youth empowerment scheme has not tangibly reflected on human capacity enhancement in Enugu state, Nigeria. The is a descriptive survey that utilized simple frequency and percentages for data analysis.

The fundamental shortcoming of all the above studies lies in the failure to employ appropriate research design to address the problem of what would have been if the intervention never took place, thereby rendering all the estimated results biased. In terms of analytical tools, apart from the study by Shehu, Abdullahi and Haruna (2012) and Kasali and Sowunmi (2013), all others focused essentially on simple percentage analysis which further aggravates the analytical conundrum. Thus, this paper is a modest attempt at a rigorous analysis which addresses the problem of counterfactual in the impact evaluation of development projects.

Al-Bazzaz (1988) distinguished evaluation from impact evaluation. Evaluation studies are mainly used to assist in the selection and design of new projects while impact evaluation studies compare the situation without the project to that with the project (and not before and after the project). It was further noted, that impact evaluation studies are carried out after the project had operated for several years.

Gittinger (1982) also emphasized that project analysis tries to identify and value the costs and returns that will arise with the proposed project and to compare them with the situation as it would be without the project. The difference is the incremental net benefit or return arising from the project investment. This approach is not the same as comparing the situation ‘before’ and ‘after’ the project. The before-and-after comparison fails to account for changes in production that would occur without the project and thus leads to an erroneous statement of the benefit attributable to the project investment.

According to Ezemenari, Rudqvist and Subbarao (2000:65), an impact evaluation assesses the extent or degree to which a programme has caused desired changes in the intended audience. It is concerned with the net impact of an intervention on households attributable only and exclusively to that intervention. They noted that the basic organizing principle for any good impact evaluation is to ask what would have happened in the absence of the intervention. In their words, “what would the welfare levels of particular communities, groups, households, and individuals have been without the intervention?” They emphasized the importance of using control groups to address the problem of endogeneity in development interventions.
Writing in the same vein, Prennushi, Rubio and Subbarao (2002) regarded impact evaluation as involving an assessment of changes in the well being that can be attributed to a particular programme or policy. The importance of using an appropriate counterfactual in simulated studies by comparing programme participants (the treatment group) with a control or comparison group was emphasized.

To correct or minimize the problem of bias, this paper follows the approach Baker (2000), who expatiated on various survey designs (including experimental and quasi-experimental designs). In addition, a collection of case studies which employs these methodologies were reviewed by Baker (see World Bank 1999; Jamison et al. 1981; Benus et al. 1998).

3. Methodology

3.1 Area of Study, Survey Design and Sampling Techniques
The area of study is limited to Imo State located in South-South Nigeria. The quasi experimental research design adopted in this paper entails the generation of cross sectional data in respect of various parameters of household characteristics such as gender, occupation, household expenditure, income, among others from both NAPEP and non-NAPEP beneficiaries. Both stratified and simple random sampling techniques were adopted.

For effective coverage of the state, a geographical stratification of programmes was made in line with the three zonal arrangement of Imo state. The stratification was done according to the concentration of the project in the zones. The highest concentration of 60% was in Owerri zone while Okigwe and Orlu have 23% and 17% respectively.

NAPEP interventions are multifaceted and this study focused on the following groups: Promise keepers programme, which has 279 beneficiaries; Village economic development solution, which has 420 beneficiaries; Keke NAPEP, which has 90 beneficiaries; and Farmers empowerment programme, which has 160 beneficiaries. This gave a total population of 1049 potential respondents, while 15% of the beneficiaries from each programme were randomly selected for the impact evaluation. Well structured questionnaires constitute the principal instrument for data collection. Moreover, a total of sixty respondents were obtained from the non-beneficiary beneficiary population which has similar characteristics to NAPEP beneficiaries.

3.2 Analytical Framework and Estimation Procedures
The two techniques of data analysis employed in this paper are given below.

3.2.1 The Impact of NAPEP on Poverty Eradication

The theoretical/analytical framework discussed below was adopted from Baker (2000). Using the quasi-experimental design, the NAPEP beneficiaries were compared to a group of non-project beneficiaries. Given that $P_i$ represent NAPEP participation of the $i^{th}$ individual which can assume two possible values, such as: $P_i=1$ if the person participates in NAPEP, and $P_i=0$ if the individual does not. The increase in welfare, $N$ of the $i^{th}$ person who participates is:
\[ N = W_{1i} - W_{oi} / P_i = 1 \] \hspace{1cm} \text{(1)}

Where,
\[ W_{1i} = \text{Welfare of the } i^{th} \text{ person when } P = 1 \]
\[ W_{oi} = \text{Welfare of the } i^{th} \text{ person when } P = 0 \]

An unbiased estimate of the true increase in mean welfare (that is, the expected value of \( N \)) is given by:
\[ N = E (W_{1i} - W_{oi} / P_i = 1) \] \hspace{1cm} \text{(2)}

This is the NAPEP treatment effect.

\[ N = E (W_{1i} - W_{oi} / P_i = 1) \] \hspace{1cm} \text{(3)}

Equation (3) cannot be observed in real life. Consequently, to estimate the counterfactual, it is important that we net out the effect of the intervention from other factors and this can be accomplished through the use of comparison or control groups.

On the other hand, the intervention impact that is observable will result in a biased estimate of the programme impact. The apparently observable impact, \( M \), is given by:
\[ M = E (W_{1i} / P = 1) - E (W_{oi} / P = 0) \] \hspace{1cm} \text{(4)}

Where,
\[ E (W_{1i} / P = 1) \] is the expected value of increase in welfare for beneficiaries of NAPEP who participated in the project and \[ E (W_{oi} / P = 0) \] is the expected value for non-NAPEP participants.

\[ M = N + B \] \hspace{1cm} \text{(5)}

\( B \) refers to the bias in the estimate and is given by:
\[ B = E (W_{oi} / P_i = 1) - E (W_{oi} / P_i = 0) \] \hspace{1cm} \text{(6)}

The generic form of the applicable multivariate relationship to control for endogeneity is:
\[ Y = b_0 + b_1 P + b_2 X + u \] \hspace{1cm} \text{(7)}

The vector \( X \) contains a plethora of control variables in respect of both NAPEP project beneficiaries and non-beneficiaries. The variable \( P \) stands for the treatment variable. The parameter \( b_1 \) measures the impact of NAPEP intervention on the programme outcome \( Y \) (a welfare measure). The proxy variable used to measure the welfare level of beneficiaries is the total household expenditure.

Three specific equations involving various combinations of household variables were estimated. Johnston (1972) noted that it is important that we must drop one dummy variable from each set if we are using an intercept term to avoid the problems of linear dependence. Consequently, the dummy variables entering the equations have adjusted accordingly.
\[ LW = c + a_1 \text{LAGE} + a_2 C_2 + a_3 \text{LPCE} + a_4 C_5 + a_5 C_6 + a_6 C_7 + a_7 C_8 + a_8 C_{11} + a_9 C_{12} + a_{10} C_{13} + a_{11} C_{15} + a_{12} C_{16} + a_{13} C_{19} + a_{14} C_{20} + a_{15} P + u \] ..............................(8)

\[ LW = c + b_1 \text{LAGE} + b_2 C_2 + b_3 \text{LPCE} + b_4 C_4 + b_5 C_5 + b_6 C_8 + b_7 C_9 + b_8 C_{13} + b_9 C_{14} + b_{10} C_{16} + b_{11} C_{17} + b_{12} C_{19} + b_{13} C_{20} + b_{14} P + u \] ..............................(9)

\[ LW = c + d_1 \text{LAGE} + d_2 C_2 + d_3 \text{LPCE} + d_4 C_4 + d_5 C_5 + d_6 C_8 + d_7 C_9 + d_8 P + u \] ..............................(10)

Where,

- \( LW \) is the log of total household expenditure
- \( c \) is the intercept term
- \( \text{LAGE} \) is log of the age variable
- \( C_2 \) represents household size
- \( \text{LPCE} \) stands for log of per capita expenditure
- \( C_5 \) is for FSLC/JSC/SSC (primary/secondary education variable)
- \( C_6 \) is for tertiary education
- \( C_7 \) stands for people who owned personal houses
- \( C_8 \) is for people occupying rented apartments
- \( C_9 \) refer to people occupying more than two rooms.
- \( C_{11} \) is for respondents whose houses are connected with electricity
- \( C_{12} \) refer to people with water closets
- \( C_{13} \) is for respondents using pit toilet
- \( C_{14} \) is for people using open air as toilet
- \( C_{15} \) is for people whose houses are connected with pipe-borne water or bore-hole
- \( C_{16} \), those using well as water source
- \( C_{17} \), those who drink from ponds, streams, etc
- \( C_{19} \) represents people living in brick houses
- \( C_{20} \) stands for demographic composition (proportion of children who are 15 years and below in a household)
• P is the treatment or participation variable (in this instance, NAPEP participation). P = 1 if the individual is a beneficiary of NAPEP intervention and P = 0 if the person is not a beneficiary.

• u is the error term

With the exception of LAGE, C2 and LPCE, all other control variables are dummy variables. The a priori expectations for the coefficients of the treatment variable, T, in the three multivariate equations in this sub-section are as follows:

\[ a_{15} > 0, b_{14} > 0, \text{ and } d_8 > 0 \]

All the assumptions of the classical least squares apply (see Koutsoyiannis, 1986)

### 3.2.2 Binomial Perception Analysis of NAPEP Interventions

The binomial logit is an estimation technique for equations with dummy dependent variables that avoids some of the critical shortcomings of the linear probability model, chief among which is that the regressed or the probability is not bounded by 0 and 1. The binomial logit method achieves bounded probability through cumulative logistic function. The binomial logit model is the choice model for analysing binary dependent variables in this paper. The general binomial logit model is given by:

\[ L = \ln \left( \frac{P_i}{1 - P_i} \right) = b_0 + b_1X_1 + b_2X_2 + \ldots + b_nX_n + u \]

Where

L = the log of the odds ratio or the logit

\( \left( \frac{P_i}{1 - P_i} \right) \) is the odds ratio in favour of a particular event occurring - the ratio of the probability that the event occurs to the probability that it does not occur.

The following multivariate relationship of the following type was evaluated using the binomial logit regression model (Gujurati 2003 and Studenmund 1997). In line with Johnston (1972), we dropped one dummy variable from each set since intercept terms were used to avoid the dummy variable trap or the problem of linear dependence.

(i) **Perception of NAPEP’s Success (based on performance variables)**

\[ N_1 = f (\text{new business skills acquired, improved living standard, desire for project continuity; general poverty reduction effect}) \] ......................................................................................................................... (11)

\[ L_1 = \ln (N_1/1 - N_1) = c + \sum g_1B_1 + \sum g_2B_2 + \sum g_3B_3 + \sum g_4B_4 + \sum g_5B_5 + u \] ......................................................................................................................... (12)

Thus, the perception of NAPEP success is viewed as a function of a set of performance variables. All the variables on the right-hand side of equation 12 are the performance variables.

More explicitly, we have:

\[ L_1 = \ln (N_1/1 - N_1) = c + h_1B_{11} + h_2B_{21} + h_3B_{31} + h_4B_{41} + h_5B_{51} + u \] ......................................................................................................................... (13)

\[ L_1 = \ln (N_1/1 - N_1) = c + k_1B_{11} + k_2B_{21} + k_3B_{31} + k_4B_{41} + k_5B_{51} + u \] ......................................................................................................................... (14)

L1 stands for log of the odds ratio which is linear in B’s and in parameters.
N₁ is the dummy variable for perception of NAPEP success (beneficiaries satisfaction with NAPEP programme is used as a proxy)

N₁ = 1 if beneficiary is satisfied with NAPEP or 
N₁ = 0 if not
B₁ represents vector of binary variable (B₁₁ and B₁₂) indicates new business skills acquired
B₂ represents vector of binary variable (B₂₁ and B₂₂) for enhanced income status.
B₃ is the vector of binary variables (B₃₁ and B₃₂) for improved living standard
B₄ is the vector of binary variables (B₄₁ and B₄₂) for project continuity
B₅ stands for vector of binary variables (B₅₁ and B₅₂) for general poverty reduction effect.

u is the error term
The a priori expectations are:
g₁ >0, g₂ >0, g₃ >0, g₄ >0, g₅ >0

The level of beneficiaries’ satisfaction with the NAPEP program is used as a proxy for perceiving the success of NAPEP intervention

(ii) Perception of NAPEP success (based on household characteristics)

N₂ = f (educational qualification, gender type, employment type, poverty status)………………(15)

L₂ = ln (N₂/1 – N₂) = c + ∑m₁E₁ + ∑m₂E₂ + ∑m₃E₃ + u……………………………………(16)

L₂ is log of the odds ratio
N₂ is dummy perception variable (similar to N₁ above)
E₁ represents dummy variable (E₁₁, E₁₂, and E₁₃) indicates level of educational attainment
E₂ stands for binary variables (E₂₁, and E₂₂ ) for gender type
E₃ stands for dummy variables (E₃₁, E₃₂, E₃₃, and E₃₄) for employment category
u is as previously defined
The a priori expectations are:
m₁ >0 or <0, m₂ >0, m₃ >0 or <0

The multivariate relationship could be written more explicitly as:

L₂ = Ln (N₂/1 – N₂) = c + α₁E₁₂ + α₂E₁₃ + α₃E₂₁ + α₄E₃₂ + α₅E₃₃ + u…………………………………… (17)

4. Empirical Analysis
4.1 Impact of NAPEP on Poverty Reduction.

The results of the three models examined in this sub-category are shown in Tables 1, 2, and 3. The regressors in the above model are clearly distinguishable into two groups: the control variables and the treatment (participation) variable. The variable “P” is the treatment variable which captures respondents participation in NAPEP programmes. All other variables aside P are the control variables. Thus, our primary concern is on the sign and significance of the treatment variable, P.

The empirical investigation reveals that the coefficient of the participation or treatment variable failed to pass the 1%, 5% or10% test of statistical significance. The respective probabilities in the three tables are 0.6035, 0.5018 and 0.4030. The interpretation of this outcome is quite clear - the project intervention of
the National Poverty Eradication Project (NAPEP) have made no statistically significantly impact on the welfare of project beneficiaries in Imo State of Nigeria. The adjusted $R^2$ for the three models are low, with the following values 0.35, 0.33, and 0.19. This trend is expected since almost all the independent variables in the model are control variables. The Durbin-Watson statistics are respectively of the following order: 1.9050, 1.8460 and 1.7302. These values are high and there is unlikely to be any problem of serial correlation. Since we are dealing with control variables and treatment variable, P, the F-statistic which measures the overall level of significance of the model is not particularly important here. However, the F-statistic was found to be quite significant for the three regression equations at the 1% level.

Table 1  Regression Results for Model 8

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Coefficients</th>
<th>Regressors</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant term, c</td>
<td>11.06818*** (0.0000)</td>
<td>C_{11}</td>
<td>0.235831 (0.2166)</td>
</tr>
<tr>
<td>LAGE</td>
<td>-0.210997 (0.2435)</td>
<td>C_{12}</td>
<td>0.031678 (0.7828)</td>
</tr>
<tr>
<td>C_2</td>
<td>0.093432*** (0.0000)</td>
<td>C_{13}</td>
<td>-0.558072*** (0.0000)</td>
</tr>
<tr>
<td>LPCE</td>
<td>0.148689** (0.0159)</td>
<td>C_{15}</td>
<td>0.477687 (0.1055)</td>
</tr>
<tr>
<td>C_5</td>
<td>-0.025152 (0.8460)</td>
<td>C_{16}</td>
<td>-0.072388 (0.8563)</td>
</tr>
<tr>
<td>C_6</td>
<td>0.074134 (0.5148)</td>
<td>C_{19}</td>
<td>-0.143712 (0.3894)</td>
</tr>
<tr>
<td>C_7</td>
<td>0.148113 (0.2595)</td>
<td>C_{20}</td>
<td>0.017155 (0.7526)</td>
</tr>
<tr>
<td>C_8</td>
<td>0.073410 (0.6102)</td>
<td>P</td>
<td>-0.063905 (0.6035)</td>
</tr>
</tbody>
</table>

** Significant at 5 Percent  ***Significant at 1 Percent

$R^2 =0.352164;  F= 0.000000;  DW = 1.905020;  $  Figures in parentheses stands for the probability values
Table 2 Regression Results for Model 9

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Coefficients</th>
<th>Regressors</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant term, c</td>
<td>11.85094*** (0.0000)</td>
<td>C13</td>
<td>-0.584483*** (0.0000)</td>
</tr>
<tr>
<td>LAGE</td>
<td>-0.123143 (0.5005)</td>
<td>C14</td>
<td>-0.170560 (0.5412)</td>
</tr>
<tr>
<td>C2</td>
<td>0.093905*** (0.0000)</td>
<td>C16</td>
<td>-0.477512 (0.1573)</td>
</tr>
<tr>
<td>LPCE</td>
<td>0.120695* (0.0515)</td>
<td>C17</td>
<td>-0.221661 (0.6233)</td>
</tr>
<tr>
<td>C4</td>
<td>-0.046204 (0.8077)</td>
<td>C19</td>
<td>-0.033830 (0.8316)</td>
</tr>
<tr>
<td>C5</td>
<td>-0.096620 (0.3759)</td>
<td>C20</td>
<td>0.017155 (0.8306)</td>
</tr>
<tr>
<td>C8</td>
<td>0.039577 (0.7679)</td>
<td>P</td>
<td>-0.063905 (0.5018)</td>
</tr>
<tr>
<td>C9</td>
<td>0.008674 (0.9438)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at 10 Percent  ***Significant at 1 Percent

$R^2 = 0.325418  \quad F = 0.000000  \quad DW = 1.845956$

Figures in parentheses stand for the probability values

Table 3 Regression Results for Model 10

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Coefficients</th>
<th>Regressors</th>
<th>Coefficients</th>
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<tbody>
<tr>
<td>Constant term, c</td>
<td>10.31893*** (0.0000)</td>
<td>C5</td>
<td>-0.223475* (0.0536)</td>
</tr>
<tr>
<td>LAGE</td>
<td>-0.018451 (0.9243)</td>
<td>C8</td>
<td>0.122739 (0.3796)</td>
</tr>
<tr>
<td>C2</td>
<td>0.093905*** (0.0000)</td>
<td>C9</td>
<td>0.031981 (0.8087)</td>
</tr>
<tr>
<td>LPCE</td>
<td>0.177373*** (0.0078)</td>
<td>P</td>
<td>0.081730 (0.4030)</td>
</tr>
<tr>
<td>C4</td>
<td>-0.209713 (0.3010)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant at 10 Percent  ***Significant at 1 Percent

$R^2 = 0.191394  \quad F = 0.000000  \quad DW = 1.730221$

Figures in parentheses stand for the probability values

4.2 Assessing the Perception of NAPEP Beneficiaries

The analysis under this heading is sub-divided into two: the first part relate to the perception of NAPEP success by project participants using selected performance variables as regressors. The second part of the analysis examined the impact of certain household variables on the perception of NAPEP’s success.
4.2.1 Perception of NAPEP Success Using Performance Variables.
The results are presented in Tables 4 and 5.

Table 4  Regression Results for Model 13

<table>
<thead>
<tr>
<th>Dependent Variable: N,</th>
<th>Coefficients</th>
<th></th>
<th>Coefficients</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant term, C</td>
<td>-2.132936 (0.2967)</td>
<td>B₁₁</td>
<td>1.089188 (0.1889)</td>
<td></td>
</tr>
<tr>
<td>B₁₁</td>
<td>0.563685 (0.4221)</td>
<td>B₂₁</td>
<td>0.744997 (0.4030)</td>
<td></td>
</tr>
<tr>
<td>B₂₁</td>
<td>0.943517 (0.6286)</td>
<td>B₅₁</td>
<td>1.304317* (0.0705)</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at 10 Percent

LR statistic (5 df) 15.00394  McFadden R-squared 0.153717  Probability (LR stat) 0.010346

Figures in parentheses stand for the probability values of each variable

Model 13 is the estimated counterpart of equation 13 in session three. As could be seen from Table 4, B₅₁ is statistically significant at the 10% level. All other variables, namely: new business techniques acquired B₁₁, enhanced income B₂₁, improved living standard B₃₁ and project continuity B₄₁ are not statistically significant at 10% or better levels. Now we interpret the statistical significance of the B₅₁ variable. Each slope coefficient in model 13 is a partial slope coefficient and measures the change in the estimated logit for a unit change in the value of the given regressor (holding other regressors constant). Thus, when the event B₅₁ occurs (B₅₁ = 1), that is, a NAPEP beneficiary is of the view that the programme has brought about a general poverty reduction effect, then the estimated logit increases by 1.30 units, suggesting a positive relationship between the two.

All variables have positive signs in line with a priori expectations. Although only one of the regressors has a significant positive impact on the logit, together all the regressors have a significant impact on the perception of NAPEP success as the likelihood ratio (LR) statistic is about 15.00, with a small p value of 0.0104. The McFadden R² is 0.1537. Measures similar to the conventional R², called pseudo R² are available and the McFadden R² is one of them. Gujarati (2003) cautioned that one should not overplay the importance of the goodness of fit in models where the regressand is dichotomous as its usefulness is limited. The count R² was computed from the table of predicted probabilities:

\[
\text{Count } R^2 = \frac{\text{Number of correct predictions}}{\text{Total number of Observations}}
\]

If the predicted probability is greater than 0.5 we classify that as 1, but if it is less than 0.5 we classify that as 0. The number of correct observations is 106. Therefore, the count R² is 0.883. Additionally, the computed average predicted probabilities (fitted values) for all the observations is equal to 0.857. Therefore, using the predictive power of model 13, we conclude that there is an 86% chance that any randomly selected NAPEP participant will perceive NAPEP as a successful poverty reduction institution.

The regression results for model 14 are presented in Table 5. Regression results in model 14 are the estimated counterpart of equation 14 in session three. Only the B₄₁ variable is statistically significant at the 10% level. The B₄₁ variable stands for “project continuity.” Therefore, when the event B₄₁ occurs (B₄₁=1), the estimated logit increases by 1.35, indicating a positive relationship between the view of a beneficiary that there should be project continuity and the perception that NAPEP is successful. The other two regressors, B₁₁ and B₂₁ are not statistically significant at 10% or better levels. The table of predicted probabilities is available on request from the authors.
significant. However, collectively, all the regressors have a statistically significant impact on the binary dependent variable as shown by LR statistic with a p-value of 0.0708. The McFadden $R^2$ is 0.0721.

Table 5  Regression Results for Model 14

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Coefficients</th>
<th>Regressors</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant term, C</td>
<td>-1.580779 (0.3383)</td>
<td>B$_{21}$</td>
<td>1.523874 (0.3268)</td>
</tr>
<tr>
<td>B$_{11}$</td>
<td>0.908007 (0.1500)</td>
<td>B$_{41}$</td>
<td>1.345543* (0.0717)</td>
</tr>
</tbody>
</table>

* Significant at 10 Percent  
LR statistic (3 df) 7.033222  
McFadden R-squared 0.072056  
Probability (LR stat) 0.070846  

Based on the predicted probabilities$^3$, we compute the count $R^2$ as 0.875, given that the number of correct predictions is 105. The average predicted value is 0.857. Thus, model 14 predicts on the average that a NAPEP participant is more likely to applaud NAPEP as successful on the basis of project continuity with a probability of 0.857. All the regression coefficients have priori positive signs.

4.2.2 Perception of NAPEP Success Based on Household Characteristics

The regression results appear in Table 6. The coefficient of two variables, $E_{12}$ (primary/secondary education and $E_{13}$, tertiary education) were statistically significant at the 5 percent level, while the other regression coefficients were not significant even at the 10 percent level. Consequently, NAPEP beneficiaries with basic and advanced education will most likely perceive NAPEP activities as successful in comparison to those who are illiterate. All the estimated coefficients had the right signs (both positive and negative) as predicted from outset or according to a priori expectations. The likelihood ratio statistic indicates that the joint impact of the explanatory variables on the logit is a significant one. The McFadden $R^2$ is 0.1066.

Table 6 Regression Results for Model 17

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Coefficients</th>
<th>Regressors</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant term, C</td>
<td>5.035315*** (0.0005)</td>
<td>$E_{21}$</td>
<td>0.016987 (0.9756)</td>
</tr>
<tr>
<td>$E_{12}$</td>
<td>-2.347924** (0.0121)</td>
<td>$E_{32}$</td>
<td>-0.984606 (0.3483)</td>
</tr>
<tr>
<td>$E_{13}$</td>
<td>-1.934195** (0.0448)</td>
<td>$B_{33}$</td>
<td>-1.244274 (0.2409)</td>
</tr>
</tbody>
</table>

** Significant at 5 Percent  
*** Significant at 1Percent  
LR statistic (5 df) 10.81386  
McFadden R-squared 0.106593  
Probability (LR stat) 0.055198

The number of correct prediction$^3$ amount to 105 and the count $R^2$ equals 0.875. The average predicted probability of 0.850 shows that there is an 85% chance that any randomly selected beneficiary possessing the following combination of characteristics (basic or advanced education; gender – male; and involved in paid employment or personal business) will perceive NAPEP intervention as successful.

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2, 3. The tables of predicted probabilities are available on request from the authors.
4.2.3. Headcount Index (HI)

\[ HI = \frac{H}{N} = \frac{50}{120} = 0.416 \]

Where,
H = number of NAPEP participants whose income fall below the absolute poverty line
N = total number of NAPEP participants covered by the survey.

The headcount index of approximately 0.42 indicates that only 42 percent of NAPEP beneficiaries in the cross-sectional sample are actually poor or below the poverty line. The remaining 58 percent of NAPEP participants have income above the absolute poverty line.

4.3 Discussion of Findings

The first objective of this paper relates to a quantitative assessment of the impact of the National Poverty Eradication Programme (NAPEP) on the welfare of project beneficiaries. In other words, the aim is to find out whether NAPEP programmes have contributed to poverty reduction among participants in Imo state of Nigeria. The results of econometric analysis clearly indicates that the impact of NAPEP on the welfare of project participants is not statistically significant, that is, NAPEP interventions have not led to a significant reduction in poverty among its beneficiaries. A number of reasons could be responsible for this.

The first reason is that NAPEP seems to be closer on the continuum of project targeting to the universalistic approach rather than perfect targeting. NAPEP seems to have targeted the less poor or the affluent in Imo state instead of the core poor. The implication of this fact is that when most of NAPEP beneficiaries are above the poverty line and others are not too far below the line, the impact of the NAPEP programme on poverty reduction will hardly be observed. A second plausible reason for the less than expected performance of NAPEP is political patronage. Many of the project beneficiaries appear to have been chosen on political ground to reward party loyalists.

Furthermore, the study assessed the perception of project participants on whether NAPEP is a successful intervention or not. The binomial analysis revealed that on the average, there is 86% chance that any randomly selected NAPEP participant will perceive the intervention agency as successful. In other words, there is a probability of 0.857 that any given beneficiary of NAPEP intervention will applaud the programme as successful. Here, we see an interesting divergence between the results of the quantitative impact evaluation of NAPEP’s effect on poverty and the quantitative perception analysis. The former is an objective analysis while the latter is a subjective analysis. The impact evaluation does not depend on personal feeling but perception analysis does. Most beneficiaries seem to have applauded NAPEP because of the immediate gains of project participation.

Moreover, a supplementary analysis shows that the headcount index is 0.42. This is a move away from perfect targeting. The impact of NAPEP on poverty will be enhanced if the bottom segment of the population is fully targeted.
5. Summary and Conclusion
There has been a plethora of poverty alleviation projects in Nigeria since 1973 when the National Food Production Programme was launched. However, quantitative programme evaluation has been lacking. Available empirical studies on poverty reduction in Nigeria (NAPEP and others) suffer from bias because of failure to account for the problem of counterfactual in research design. Baker (2000) posits that in developing countries, there is little experience with applied research and programme evaluation. Consequently, this paper is an attempt to tackle this challenge and widen the horizon of knowledge and experience in evaluating the impact of development interventions in Nigeria. The methodological rigour involve in the study is an effort towards correcting the difficulty associated with bias.

In conclusion, our findings indicate two divergent outcomes. On the one hand, the quantitative evaluation shows that NAPEP’s intervention in Imo state of Nigeria has not resulted in a statistically significant reduction in poverty among project beneficiaries. On the other hand, the quantitative perception analysis indicates otherwise.

We recommend that NAPEP interventions should be directed mainly at the core poor who constitute a dominant segment of the Nigerian society. In other words, project targeting should be focused more on the core poor (perfect targeting) rather than the well-to-do in the society. Furthermore, NAPEP should ensure that its projects are carefully supervise at all times in other to guarantee proper implementation and impact positively on poverty reduction.
References


