

Exploring the Connection Between Educational Investment and Economic Development in Odisha

Naina Sahoo¹, Kalpana Sahoo²

¹Ph.D. Scholar, Dept. of Economics, Rama Devi Women's University, Bhubaneswar

²Assistant Professor, Dept. of Economics, Rama Devi Women's University, Bhubaneswar

ABSTRACT

Education is the basic necessity for mankind to live a decent life with dignity as it encourages good ideas, habits, values and awareness towards all types of evils like terrorism, corruption and disease. The achievement of several Sustainable Development Goals (SDGs), such as improving gender equality, economic growth, and the decrease of poverty and hunger, depends on education. A good education can assist individuals in ending the cycle of poverty. It contributes to achieving gender equality and reducing disparities. A better future for future generations is possible by making high-quality education accessible to all. It inspires advancement and brings about a revolution in the concepts required for the nation's advancement. In this context, the present study tries to assess the contribution of education on economic development of Odisha. First, the unit root test was used in this study to check the stability of the variables. Using annual time series data from 1991 to 2022, the study uses the Ordinary Least Square (OLS) test with the statistical software E-views to investigate the interlinkage between educational investment and Odisha's economic progress. According to the results of the basic OLS test, over the study period, education significantly influenced Odisha's economic development. The study comes to the conclusion that education is crucial for emerging economies like Odisha, as without it, the state's economy would not exist or be able to grow.

Keywords: Educational investment, Economic Development, OLS test, Odisha

1. INTRODUCTION

1.1 Background

The entire development of people and communities is greatly influenced by education. Encouraging economic growth, social stability, and human development, it is largely acknowledged as a fundamental human right. The United Nations developed the Sustainable Development Goals (SDGs) in 2015, emphasizing the importance of education in accomplishing more general developmental goals like reducing poverty, enhancing health, promoting gender equality, and spurring economic growth. The potential of education to promote critical thinking, creativity, and resilience in people is clear evidence of its transformative power. It gives individuals the values, information, and abilities needed to contribute positively to the political, social, and economic realms of society. Education has a major positive impact on community well-being through increasing economic opportunities, decreasing gender inequities, and raising health awareness. Education is very important in developing economies like

Odisha. The state, which is renowned for its abundant natural riches and rich cultural legacy, is confronted with a number of developmental obstacles, including as underdevelopment in rural regions, unemployment, and poverty. A broad strategy is needed to address these issues, and education is a crucial part of the plan.

1.2 Objectives

This study aims to examine the interlinkage between educational investment and economic development of Odisha. This study has used annual time series data from 1991 to 2022 to determine how state PcGDP (Per capita Gross Domestic Product) is affected by educational investment. In particular, the study uses Unit Root tests and Ordinary Least Squares (OLS) techniques to evaluate the extent to which educational investment boosts economic development of Odisha economy.

1.2.1. Research Questions

- Does the state's educational investment have any significant impact on Odisha's PcGDP?
- Is there any consistent long-term correlation exist between economic development and educational investment in Odisha?
- What policy suggestions may be made to strengthen the contribution of educational investment towards development of the Odisha economy?

1.3 Significance

Education is not only a basic need, but also a driver of social advancement and an essential element of sustainable development. Education has more importance than only empowering the individual; it also has wider economic and social advantages.

Economic Development: Education improves human capital, and productivity is largely dependent on human capital. A workforce with more education is better prepared to embrace new technology, increase productivity, and spur innovation. Consequently, increased economic output will lead to higher economic development. The importance of investing in education for economic prosperity has been highlighted by the numerous studies that have demonstrated a positive association between economic growth and levels of education.

Poverty Reduction: One highly powerful tactic for breaking the cycle of poverty is education. It gives people the abilities and information required to take advantage of better employment prospects and raise their earning potential. People with higher levels of education also have a higher chance of finding steady work, making more money, and improving their families' and communities' financial situation. Education not only tackles poverty but also related problems including malnourishment, ill health, and substandard housing.

Health Improvement: Education encourages healthier habits and raises health awareness. People with higher levels of education are also more likely to lead healthy lives, seek medical attention when necessary, and make decisions that will improve their own and their family' health. Additionally, education raises life expectancy, lowers the frequency of communicable diseases, and improves mother and child health outcomes.

Social cohesiveness and Stability: By encouraging virtues like civic duty, tolerance, and respect, education helps to create social cohesiveness and stability. It fosters societal cohesion and lessens the possibility of conflict by assisting people in comprehending and appreciating other points of view. By giving people the information and abilities they need to engage in politics successfully, education also

plays a crucial part in the development of democratic societies.

Environmental Awareness: By bringing attention to environmental problems and encouraging sustainable actions, education helps to maintain a healthy environment. People with higher levels of education are more likely to recognize the significance of minimizing waste, protecting the environment, and slowing down climate change. In addition, acts that promote sustainable development are encouraged and a sense of responsibility towards future generations is fostered through environmental education. This study emphasizes the significance of education as a key factor in the economic and social development of Odisha in light of these numerous advantages. The research offers important insights into the role of education in promoting sustainable development and makes policy recommendations to improve its efficacy by assessing the impact of public spending on education.

In this context, the present study tries to examine the impact of education on economic development of Odisha. This study has made a preliminary attempt to test whether education sector has any significant impact on Odisha economy with the help of certain selected macroeconomic variables. Data on the selected variables like PcGross Domestic Product (PcGDP), Public Expenditure on Education (PEE), Public Expenditure on Agriculture and allied activities (PEA) and Population growth rate (Popu) have been used from the period 1991 to 2022. Here PcGDP is used as the proxy of the economic development of Odisha economy. Public expenditure on education is used to measure the impact of education sector in Odisha economy. There are some other indicators like gross enrollment ratio, and the enrollment of all primary, secondary and tertiary sectors can be used as a proxy of educational development status but due to unavailability of the time series data, here only the government expenditure on education is used. The remaining part of this paper is organized into five sections including the present one. Section 2 discusses the literature review. Section 3 reports data sources and model specification. Section 4 presents the analysis of the empirical results and discussion. Section 5 presents the conclusion.

2. LITERATURE REVIEW

Education is a lifelong process. Twentieth century has witnessed the miracles of Human Resource Development (HRD) activities reflected through increase in GNP and overall productive activities. The importance of education in economic development is well accepted by several researchers, economist, policy makers, Constitution of India which is clear from the various national education policies and the five year plans of India. The national policy on education, 1986, which was modified in 1992 predicted free and compulsory education for all the children up to the age of 14 years before 21st century. The 93rd constitutional amendment of Indian constitution made education as a fundamental right for its citizens.

Education is an inseparable part of the development process of the modern society. No one can deny that education is one of the most important determinant of both economic growth and development process of an economy. Odisha is considered as a developing economy. One of the major reasons which contribute to its developing status is its underdeveloped education sector and large number of illiterate people. Increasing the quality of education—measured by student performance on international assessments—is significantly associated with higher rates of economic growth, according to **Hanushek and Woessmann (2008)**, who provide comprehensive evidence that education enhances human capital, which in turn drives economic growth.

Additionally, **Barro (1991)** supports this view by demonstrating that countries with higher levels of educational attainment experience faster rates of economic growth, finding that an increase in average

years of schooling in the population is positively correlated with economic growth rates. The Sustainable Development Goals (SDGs) of the United Nations emphasize the critical role that education plays in attaining sustainable development. The fourth goal is to provide high-quality, inclusive, and fair education while encouraging possibilities for lifelong learning for all. Achieving the other SDGs, such as those pertaining to gender equality, economic growth, and health, depends on education, according to UNESCO (2015). The study highlights how education fosters economic growth, lessens inequality, and gives people more power.

Schleicher (2018) offers more proof of the contribution of education to the SDGs' accomplishment. He draws attention to the fact that nations with greater levels of educational attainment typically have stronger economies, more stable and inclusive societies, and better health outcomes. The analysis of Schleicher emphasizes how crucial it is to fund education in order to meet more general goals for sustainable development. Numerous studies have looked into how public spending on education affects economic growth. In their 2002 study, **Gupta, Verhoeven, and Tiongson** investigate how public investment affects education in poor nations. According to their findings, better educational performance lead to a considerable increase in public spending on education, which in turn accelerates economic growth. They contend that improving educational and economic success depends on the efficient use of public monies for education.

Baldacci, Clements, Gupta, and Cui (2008) investigate the relationship between social spending, which includes education, and economic growth in low-income nations in a similar manner. Their research shows that public education spending boosts labor productivity and human capital, which in turn has a favorable effect on economic growth. The authors suggest that in order to promote sustainable economic development, governments should give priority to spending on education. One effective strategy for reducing poverty is education. Research by

Psacharopoulos and Patrinos (2004) shows that education considerably raises personal incomes, which contributes to the decrease of poverty. According to their meta-analysis, additional years of education significantly raise income levels in emerging nations, where the benefits of education are especially strong. According to the **World Bank (2018)**, every extra year of education increases a person's income by 10% on average, underscoring the importance of education in reducing poverty. According to their findings, education lowers poverty at the macroeconomic level by boosting both individual earnings and overall economic growth.

3. METHODOLOGY

The present study makes use of simple econometric methods for its empirical investigation. This study examines the relationship between educational investment made by the govt. and Odisha's PcGDP using annual time series data from 1991 to 2022. The Unit Root test and the Ordinary Least Squares (OLS) techniques are the two main statistical tools used in the empirical investigation of this study.

3.1 Data Collection

Data on PcGDP and educational investment made by the govt. in Odisha from 1991 to 2022 are taken from the Reserve Bank of India, the Economic Survey of Odisha, and other pertinent government publications. The annual values for both variables are included in the dataset, which facilitates a thorough examination throughout the study period.

3.2 Unit root test

In the case of time series data, one ought to confirm that the variable is stationary before applying the OLS technique, as non-stationary time series can result in false regression findings. In order to examine the impact of education on Odisha economy, Ordinary Least Squares (OLS) technique is used. Our data involves time series, so in order to prevent erroneous regression results, the study must use unit root tests, namely the Dicky-Fuller (DF) and Augmented-Dicky Fuller (ADF) tests, to evaluate the stationarity property of the variables. Among three unit root tests only the ADF test satisfies the stationary property of all the variables (see table-1).

3.3 OLS Test

Following the Unit Root test, an OLS regression analysis was performed to examine the impact of education on economic development of Odisha. The aforementioned equation serves as the fundamental model to illustrate how education affects Odisha's economic development, with the aid of the available literature research and specific variables. Here PcGDP is taken as the indicator of economic development. The OLS regression model was specified as follows:

$$(\text{PcGDP})_t = \alpha_0 + \alpha_1 \text{PEE}_t + \alpha_2 \text{PEA}_t + \alpha_3 \text{POPU}_t + u_t \quad \text{----- (1)}$$

Where:

- PcGDP_t is the Per-capita Gross Domestic Product of Odisha in year t ,
- PEE is the Public Expenditure on Education in year t ,
- PEE is the Public Expenditure on Education in year t ,
- α_0 is the intercept,
- α_1 is the coefficient for public expenditure on education,
- α_2 is the coefficient for public expenditure on Agriculture
- α_3 is the coefficient for annual growth rate of population
- u_t is the error term.

The regression results provide insights into the strength and significance of the relationship between education expenditure and economic development.

4. RESULT AND ANALYSIS

The quantitative analysis and discussion of the empirical results are presented in this part. An elementary OLS regression analysis forms the basis of the test result. The current study looked at the time series data's stationary property before applying the regression technique. After that the trend analysis of educational investment by government and economic development has been shown in the following diagram-1. Next it has used the simple regression techniques to find the impact of education on Odisha economy during the study period. Unit root test is a pre-requisite of testing long run relationship between two or more time series data (Granger, 1981). Dickey-Fuller (ADF) and Augmented Dickey-Fuller (ADF) tests are widely employed in empirical research. The criterion of selection for unit test is that the absolute value of the test statistics must be higher than the critical absolute value. The test result suggests that all the variables are stationary at their first difference without trend and having only the intercept in ADF test. The following table 1 shows the results of unit root test.

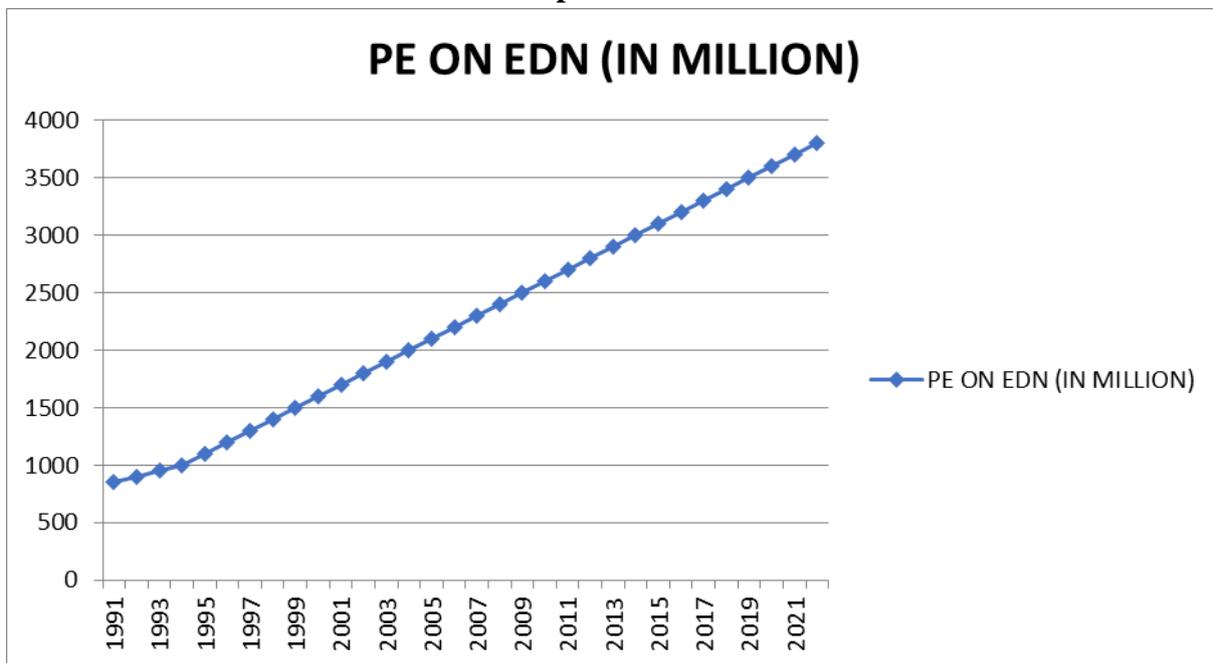
Table 1-Unit Root Test Result

Variables	DF		ADF	
	Without Trend	With Trend	Without Trend	With Trend
PcGDP	3.45*	0.26	3.75*	0.26
PEE	3.31**	0.78	3.61**	0.78
PEA	3.18*	1.25	4.58*	1.25
POPU	4.8*	2.86	5.35*	-0.017

Notes: -: * and ** indicate significance at 1% and 5% level respectively.

Source: Author’s Calculation (using E-views software package)

4.1. Chart 1- Trend of Public Educational Expenditure



Source: Author’s Calculation

Over the course of the era, the graph shows a steady and noteworthy increase in public spending on education. Around 1991, the expenditure begins at a smaller basis, increases yearly, and by 2022, it has reached over \$3500 million. From the early 1990s, the expense increased at a slow rate. This could be a reflection of the early stages of policy reforms and the government's emphasis on boosting education spending in the wake of India's economic reforms in the early 1990s. The pattern indicates a higher increase after 2000, suggesting a stronger state government commitment to improving education. This time frame most likely represents the effects of numerous educational initiatives and policies that were designed to support the larger national goals by raising literacy rates, enhancing school facilities, and increasing educational outcomes. The steadily rising trend indicates that the state has consistently given funding for education first priority, regardless of any economic difficulties that may have occurred over these years (like the 2008 global financial crisis).

4.2 OLS test Result

Next, we estimated the equation 1 by using the simple Ordinary Least Square (OLS) method. Here we have calculated the simple regression test result to find out the impact of education on economic

development of Odisha during the period of study where PcGDP is taken as the dependent variable. The result of this simple OLS technique is presented in the following table-2. The result of this table 2 is appropriate for our analysis. As the values of both R^2 and adjusted R^2 are nearer to 1 which show the goodness of the fit (Enders, 1995) and the value of Durbin-Watson (DW) statistic is 1.81 which is nearer to 2. The ideal value of the DW statistics should be nearer to 2 (Gujarati, 2004). The result of the OLS technique presented in the following table-2 is used to investigate the impact of education on economic development of Odisha.

Table-2: Simple OLS results
Impact of Education on Economic Development (PcGDP) of Odisha

Dependent Variable: PcGDP		
Variable	Coefficient	t-Statistic
C	6436.3	11.258
PEE	0.6076	3.760*
PEA	2.0140	5.402*
POPU	-4.3143	-4.218*
R-squared-0.93, Adjusted R-squared-0.91, Durbin Watson stat-1.81, Akaike Info Criterion (AIC)-22.81, Schwarz Info Criterion (SIC)- 23.31		

Notes: *, ** and *** indicate significance at 1%, 5% and 10% levels respectively.

By observing the values of R^2 , adjusted R^2 and DW statistics, it is clear that the result of the table 2 which is drawn from the OLS technique is considered as good one. The R^2 value or coefficient of determination is used to represent the variation present in the dependent variable is able to capture by the regression analysis. It means the variation present in the PcGDP is capable to explain by the other independent variables taken in this model. Since the estimated regression results meet all the requirements for a decent model, we thus take into consideration the regression findings of table 2 for our study. The estimated regression test result value helps in examining the impact of education on economic development. By putting the regression results of table 2 in equation 1, we will get the equation in the following form:

$$(PcGDP)_t = 6436.3 + 0.6076 PEE_t + 2.0140 PEA_t - 4.3143 POPU_t + u_t \quad \text{----- (1)}$$

The findings of the OLS model point to a significant positive relationship between public education spending and PcGDP. According to the aforementioned regression results, public spending on the agriculture sector had the greatest positive impact on Odisha's PcGDP (a proxy for economic development) during the study period, followed by public spending on the education sector. It indicates both variables positively contribute to the process of development in Odisha. Public expenditure on education sector (PEE) has shown significant positive impact on economic development of India. As education directly helps in increasing the productivity and efficiency of the individuals and ultimately helps in raising their standard of living. The supply side economists like Mundell, Laffer believe that economic growth would eventually lead to a general improvement of peoples' standard of living as trickle down occurs. Trickle down refers to the process by which a portion of the population that has a gain in income spends it on the domestic economy, causing a multiplier effect that creates revenue for the population's poorer segments. The annual growth rate of population has shown statistically significant but negative impact on the dependent variable i.e. PcGDP during the study period. Here also both the

values of R^2 and adjusted R^2 are quite good which indicate that the variations and error term occurred in the calculation of the model, is almost completely explained by the independent variables included in the model.

5. CONCLUSION AND POLICY SUGGESTIONS

The results of the OLS regression study show how significantly public education spending has impacted Odisha's economic development. Based on the quantitative analysis of the relationship between education with economic development, this study concludes that there is a natural and clear cut relationship exists between these variables. Government expenditure on education has shown a significant positive impact on economic development. However the contribution of education sector on development process has been less than satisfactory and there are many opportunities for improvement.

POLICY SUGGESTIONS

The significant impact of education expenditure on GDP highlights the need for strategic investments in this critical sector. To strengthen its position in the processes of growth and development, the education sector need increased funding from the government. Together with the business sector, the government bears the primary duty for delivering an efficient and high-quality educational system. It is true that the contribution of the education sector to the process of development is not satisfactory though significant; the study recommends the following measures to enhance the effectiveness of education system in Odisha:

- **Budget for Education Should Be Increased:** The government should increase budgetary allocation and stimulate more financial assistance to the education sector of India. At least, the government should follow the recommendation of the Kothari Commission's (6% of GDP should invest in education). The government ought to provide the education sector a bigger share of the money. Long-term economic growth depends on improved student performance, teacher quality, and educational infrastructure, all of which can be achieved with more investment.
- **Emphasis on High-Quality Education:** Funding should be allocated to both expanding educational opportunities and raising educational standards. This covers curriculum updates, teacher preparation, and integrating technology into the classroom.
- **Encourage Vocational and Technical Training:** Greater expansion of vocational and technical training programs is necessary to bring education into line with industry demands. Students will gain directly applicable skills from this, improving their employability and contributing to economic production.
- **Monitor and Evaluate:** To determine whether educational spending is cost-effective, put in place strong monitoring and evaluation systems. Data-driven insights can aid in bettering educational outcomes and allocating resources optimally.
- **Public-Private Partnerships:** Promote partnerships between the public and private sectors to improve educational opportunities and infrastructure. Innovative teaching methods and public support can be supplemented by private investments.

By implementing these recommendations, Odisha can harness the full potential of education to drive economic growth and achieve its development goals. The government should adopt planned strategies in the education sector after considering its entire 100 falls present in the current system. The government should adopt a genuine effort to fight against corruption present in education system which helps to

maintain transparency, morality, accountability in the education system. The study comes to the conclusion that education is crucial for an emerging economy like Odisha because without it, the economy cannot exist or grow. A developing economy has to prioritize the education sector, especially in the early phases of economic growth. To attend a higher level of growth with desire level of development, education sector should develop simultaneously with other sectors like agriculture, industry and other service sectors.

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