Ilkogretim Online - Elementary Education Online, 2021; Vol 20 (Issue 1): pp. 6412-6422
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2021.01.663

Indian Educational Expenditure, Educational Achievement And Joblessness: An Empirical Study

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ABSTRACT: Examining the relationship between public spending on education, secondary school education attainment, and the rate of unemployment in India from 1987 to 2017 is the main goal of this article. The long-term association between the variables is discovered using the autoregressive distributed lags (ARDL) bound testing approach. A block exogeneity test based on a vector error correction model is used to look for causal connections. The empirical results reveal that education levels proxied by enrollment rates ratio at secondary level of schooling negatively affects rate of unemployment in long run and in short run. In contrast, public spending on education is ineffectual in influencing both academic achievement and the unemployment rate. This is the first empirical investigation on the link between public education expenditures, educational achievement, and unemployment in India.

KEYWORDS: Educational Expenditure, Unemployment, Educational Achievement, Public expenditure, ARDL, India

INTRODUCTION:

Progress in social and economic conditions does not follow immediately from progress in economic conditions, as has been demonstrated repeatedly since World War II. As a result, governments in emerging countries are deeply concerned about the issue of unemployment. Unemployment can be reduced by using the "human capital" of the people, which includes their abilities and skills [1]. Conventional wisdom holds that obtaining a college degree increases one's employability by teaching students' valuable skills. Individuals' labour market outcomes benefit from increased educational attainment in a variety of ways, not the least of which is enhanced access to jobs with better working conditions and higher compensation. As a result, from a theoretical standpoint, the ability to generate work is directly related to one's level of education [2]. To yet, however, empirical examinations into the relationship between educational attainment & unemployment have produced mixed findings. Fasih (2008) points out that without both labour and nonlabor policies are in place to promote the demand for these skills, education has little impact on the labour market standing of those who obtain them. Furthermore, if it takes many years of study to acquire these basic abilities, the system is

exceedingly inefficient and may not deliver optimal labour market outcomes. Collins (2009) also points out that post-secondary education has minimal effect on reducing unemployment in Australia, even after accounting for the benefits of academic success [3]. According to Aliprantis and Zenker (2011), on the other hand, higher levels of education are associated with lower rates of unemployment over time. High levels of education are linked to higher employment rates and lower unemployment risk, according to the Organization for Economic Co-operation and Development (OECD).

Government spending on education is an important issue if educational attainment increases one's employment prospects to a significant degree. Several arguments have been put out in the literature to support government involvement in the provision and financing of education. To begin, a large corpus of theories and empirical studies has examined the role of human capital in understanding global growth rates that differ significantly among countries. Differences in productivity are strongly linked to education, according to research. For the second, education is seen as having both intrinsic and instrumental benefits [4]. Education as a private product has a direct impact on the future earnings of people who obtain it. The stock of human capital & productivity in the economy rises as a result of a more educated workforce. Market failure may occur due to the many externalities in education, as the advantages are not limited to a single buyer, as is the case with private commodities. The market's outcomes reflect a lack of educational resources when private and social advantages diverge. As a result, the state is widely acknowledged as playing a crucial role in ensuring that educational opportunities are distributed equally across the entire population [5]. This is especially important in developing countries, where poverty, inequality, and market flaws are all common occurrences. Conventional credit market procedures are inefficient since education is both a consumer item and a capital good. To maintain generational disparities, educational attainment must be associated with family income and wealth. In addition, this quality warrants public involvement in the provision & financing of education from the perspective of equity.

Theoretically, public education is justified, but the extant empirical evidence shows no consistency in the returns on public spending on education in terms of educational achievement and employment generation. According to Verhoeven, Gupta, and Tiongson (1999), ordinary least squares (OLS) and two-stage least squares (2SLS) methodologies were used to estimate the influence of education investment on secondary school enrolment in 50 developing and transition nations [6]. Using a vector error correction model (VECM) over the period 1976–2002, Fedderke et al. (2006) found that a rise in government expenditure leads to long-term output growth and employment in South Africa. Grimaccia and Lima (2013) found that in nations where education investments have been greater, employment rates have also been higher, on average, over the past decade [7]. According to Urhie et al. (2014), higher national wealth, public education spending, and educational achievement all go hand in hand. According to Zafer et al. (2014), the long-term effects of US education investment on unemployment rates can be

evaluated using panel data regression for 50 states over a period of 25 years. An examination of government education spending and student achievement in Nigeria from 1970 to 2013 by Obi et al. (2016) shows that public education spending has a positive and considerable impact on student achievement in that country. Over a panel of 17 African nations, Onuoha et al. (2019) similarly indicate a negative elasticity of employment rate compared to government investment on education for the period 2000–2017. No correlation was discovered between educational achievement and public spending on education by Anand and Ravallion (1993). A study by Urhie (2015) based on UNESCO data for various socioeconomic categories found that public investment on education has a modest link with educational achievement. Students' PISA scores and the percentage of the unemployed with postsecondary education are two output variables that Sonje et al. (2018) found to be inefficiently influenced by public spending on education.

Contradictory findings about the impact of public investment on educational outcomes and their consequences for the unemployment situation of a country were highlighted in a brief literature review. Because of the persistently high level of unemployment, emerging countries must conduct additional research into the relationship between public education spending, educational achievement, and unemployment. Research into the aforementioned issues can be done in India, which is a fascinating country [8]. Currently, the Indian economy is plagued by a high rate of joblessness, which is a major concern. At a time when India's demographic dividend is at its height, it is critical that employment growth take precedence over GDP growth. An option is to enhance public education spending, which can help people achieve their educational goals and increase their chances of finding work. Despite the importance of the problem, there is little research that systematically examines the influence of public spending on education on India's unemployment rate. Many factors have been examined in India's empirical research on public education expenditures, including trends in the amount spent, state-level disparities in spending as well as differences in educational achievement [9]. No research has been done in India to far that looks at the long-term relationship and causal links between public expenditure on education, academic achievement, and unemployment. This study aims to establish a causal link among public education spending, educational attainment, and India's unemployment rate from 1987 to 2017. As the first empirical study to focus on the relationship between public education spending, educational attainment, and unemployment in India, this study adds to the body of knowledge in the field. For policymakers, this study's findings could help them better understand how public investment in education affects educational attainment & employment in a country.

A LOOK AT INDIA'S UNEMPLOYMENT RATE, EDUCATION SPENDING, AND EDUCATIONAL ATTAINMENT:

Because of India's rapid population growth during the previous four decades, an increasing number of people have entered the workforce. Growth in the economy was

also impressive at the same time. Economic growth and labor-intensive industries were thought by policymakers to be important in creating jobs for the general public. Planners' numerous predictions for future growth, on the other hand, fell far short of actually creating enough new jobs to meet the soaring demand. In this way, the number of people without jobs grew steadily until it reached colossal proportions. Seasonal and disguised unemployment are common in rural areas. Disguised unemployment in India may be attributed to overcrowding in agriculture as a result of rapid population increase and a lack of alternative employment possibilities. Industrial and educational unemployment are both prevalent in the urban area. Unemployment in the industrial sector has risen over the previous three decades due to a poor growth rate in organised manufacturing employment. In addition, the population of cities has expanded faster than that of rural areas due to the influx of people seeking work in urban areas.

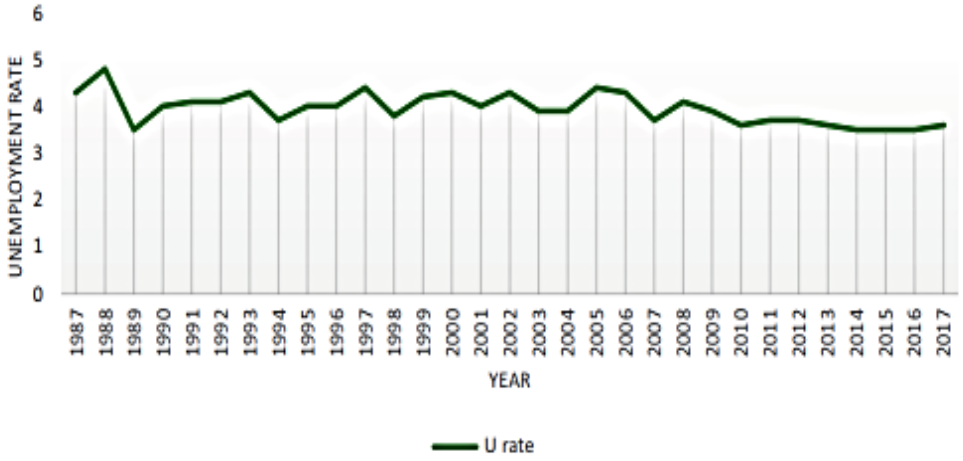

Figure 1. Indicators of India's labour market stagnation (data collected from https://www.jstor.org/stable/23391158)

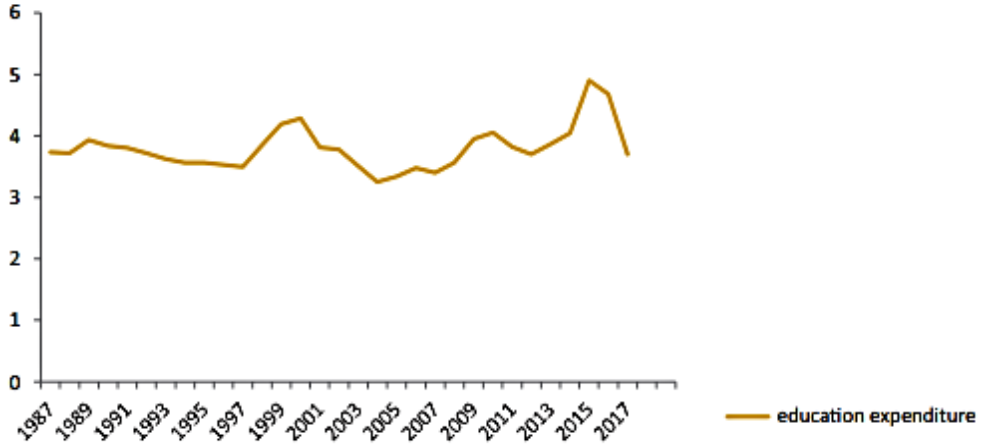

Figure 2. India's educational spending trends (data collected from https://www.jstor.org/stable/44166228)

Figure 1 depicts the changes in unemployment in India during the last three decades. Over the past three decades, the unemployment rate has hovered between 3% and 5%, according to the trend line of the unemployment rate. Figure 2 depicts the most important developments in education spending. In 1998–1999, the expenditure was 3.21 percent; in 2015, it was 4.9 percent; and in 2014–2015, it was 6 percent – the year of the election at the centre. A decrease of 5.44 percent in 2015 has been replaced by an increase of 3.7 percent in 2017. It is shown in Figure 3 that secondary school enrolment is an indicator of educational attainment trends. From 39.35 percent in 1991 to a peak of 45.43 percent in 2001, secondary enrolment grew steadily over the years, reaching an all-time high of 75.20 percent in 2017. As of now, all children in India have a fundamental right to elementary school education. In contrast to this, current policy debates have placed greater emphasis on the expansion of secondary-level education. As a result of this strategy, there has been an increase in secondary school enrolment. Over the course of three decades, the pattern has been both large and stunning. Figures 1–3 juxtaposed show that public education spending, educational attainment, and the unemployment rate have not moved in lockstep over the last three decades.

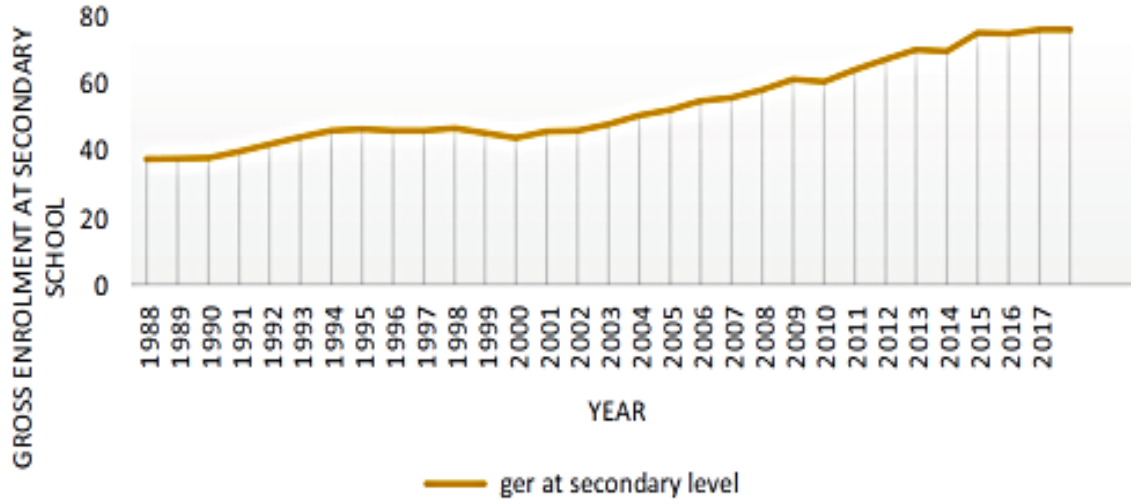

Figure 3. India's secondary school enrolment trends over time (data collected https://www.tandfonline.com/doi/abs/10.1080/02188790802267332).

METHODOLOGY AND DATA IN ECONOMETRICS:

Annual time series data from 1987 to 2017 were used in this investigation. The International Labor Organization's ILOSTAT collects data on the country's unemployment rate, which is expressed as a percentage of the total labour force. The secondary GER (gross enrolment ratio) is a proxy for educational achievement. GER is a measure of the proportion of the total population of school-age children who are enrolled in a particular level of education, independent of age. For the central government, "Statement Indicating Public Expenditure on Education," provided by the Department of Higher Education, is used to calculate education spending as a percentage of GDP; for secondary school education, the data comes from the Institute of Statistics, UNESCO.

To ensure that all of the time series are stationary, an augmented Dickey–Fuller (ADF) unit root test is run on each one. Methods for assessing the long-term association between variables have been proposed in the literature. An autoregressive distributed lag (ARDL) boundaries test devised by Pesaran et al. is used in this investigation (2001). The Engle and Granger (1987) cointegration test and the Johansen and Juselius (1990) maximum-likelihood-based approach and cointegration procedures have certain econometric advantages over this approach. To begin with, Engle and Granger (1987) method's endogeneity and inability to test hypotheses on estimated coefficients in the long run are avoided. For long-term and short-term parameters, all variables are assumed to be endogenous in the ARDL approach (Khan et al., 2005). Modeling the ARDL with the right lags, according to Pesaran and Shin (1999), corrects both the serial correlation and the endogeneity problems. Another benefit of using unit roots instead of I (0) or I (1) regressors is that there is no longer a burden on the econometric methodology to determine which variables should be integrated first and to test for unit roots beforehand. This means that the test for existing relationships between variables at different levels can be applied regardless of which regression models are used. Of primary importance, as Narayan (2004) argues, is that the limits testing approach vastly outperforms multivariate cointegration in small sample properties. Narayan (2004) established a set of crucial values for the model using GAUSS, which may be employed with limited sample data (as in this study).

Specification for assessing long-run relationships between unemployment, state spending on educational attainment, and educational attainment is as follows:

$$\begin{aligned}\mathrm{UNEM}_t = {} & A_0 + A_1\mathrm{UNEM}_{t-1} + B_0\mathrm{EDUX}_t + B_1\mathrm{EDUX}_{t-1} + C_0\mathrm{GER}_t + C_1\mathrm{GER}_{t-1} \\ & + D_0\mathrm{GDP}_t + D_1\mathrm{GDP}_{t-1} + u_t\end{aligned} \quad (1)$$

Public spending on education, GDP growth, and the unemployment rate (UNEM) are all regarded to be correlated with the rate of unemployment (GDP). The OLS is used to estimate equation (1) as the first step in the limits testing technique. The F-statistic is used to detect long-term relationships between the underlying variables (Wald test). If the F-statistic value surpasses the upper critical value limit, there is a long-term association. The selected ARDL model's long-run coefficients are computed when there is a long-run relationship. The ARDL model must be re-parameterized into ECM form in the third stage. ECM is used to measure the long-term equilibrium adjustment speed. After estimating the ECM model, the parameter stability is evaluated using the CUSUM and CUSUMSQ tests, which sum the recursive residuals. If a set of variables is cointegrated, then an error corrective representation of the data exists, according to the Granger core principle, which asserts that short-term dynamics of system variables are influenced by deviations from long-term equilibrium. Changes in other different explanatory variables suggest short-term causal consequences. The lagged error correction term, which measures the degree of disequilibrium in a cointegration

relationship, hints at a long-term partnership (ECT). For both short- and long-term Granger causality tests, the VECM is useful. To put it another way, the VEC model is as follows:

$$\Delta y_{1t} = \mu_1 + \gamma_1 z_{t-1} + \sum_{i=1}^{p-1} \theta_{1i} \Delta y_{1t-i} + \sum_{i=1}^{p-1} \delta_{1i} \Delta y_{1t-i} + \varepsilon_{1t} \quad (2)$$

$$\Delta y_{2t} = \mu_2 + \gamma_2 z_{t-1} + \sum_{i=1}^{p-1} \delta_{2i} \Delta y_{2t-i} + \sum_{i=1}^{p-1} \theta_{2i} \Delta y_{1t-i} + \varepsilon_{2t} \quad (3)$$

The cointegrating vector is z_{t-1}, and the ECT is z_{t-1}. It is assumed that the short-term parameters and t are stationary random processes with zero mean variance, and p is the lag length. Granger causality in the VECM can be tested by examining the relevance of each lagged endogenous variable's coefficients in that equation's short-term Granger causality. Both combined F and Wald 2 tests can be used to examine the short-term significance of sums of each lagged explanatory variable (θ's and δ's). In addition, the significance of the t-tests of the lagged ECT suggests a long-term causal relationship. However, the nonsignificance of the t-statistics & joint F or Wald 2 tests in the VECM suggests that the dependent variable is econometrically exogenous.

EMPIRICAL RESULTS:

Econometric analysis of unemployment, government spending, and gross domestic product (GER) is the emphasis of this section. Cointegration analysis begins with a look at the unit roots of the series in question. Table 1 shows the results of the unit root testing. To the exclusion of GDP, all the series' test statistics in Table 1 are above the critical values at conventional significance levels of significance. A unit-root hypothesis cannot be refuted for any other series, save GDP. UNEM, EDUX, and GER, on the other hand, are all stationary. While another series are integrated of order 1, GDP is stationary at its own level. The KPSS test, developed by Kwiatkowski et al., is used to ensure the results are stable (1992). Both ADF and the KPSS tests show that the null hypothesis of stationarity is rejected for any and all series except for GDP at 5% significance levels. Since GDP is I (0), the rest of the series are I according to the KPSS test (1).

(a) Results of ADF unit root test

Variable	Lag (based on SIC)	*t*-statistic	Critical values at 1%	Critical values at 5%	Critical values at 10%
UNEM	2	−0.8199 (0.7978)	−3.6891	−2.9718	−2.6251
Δ UNEM	1	−8.1732 (0.0000)	−3.6891	−2.9718	−2.6251
EDUX	0	−2.3861 (0.1539)	−3.6701	−2.9639	−2.6210
Δ EDUX	2	−4.3786 (0.0019)	−3.6998	−2.9762	−2.6274
GER	0	0.8206 (0.9927)	−3.6701	−2.9639	−2.6210
Δ GER	0	−5.2805 (0.0002)	−3.6793	−2.9677	−2.6229
GDP	0	−4.5270 (0.0013)	−3.6891	−2.9718	−2.6251
Δ GDP	2	−5.555 (0.0001)	−3.6998	−2.9762	−2.6274

(b) Results of KPSS Test

Variables	Bandwidth (based on Bartlett Kernal)	LM statistics	Critical value at 1%	Critical value at 5%	Critical value at 10%
UNEM	4	0.528506	0.73900	0.46300	0.34700
Δ UNEM	8	0.183300	0.73900	0.46300	0.34700
EDUX	2	0.531953	0.73900	0.46300	0.34700
Δ EDUX	13	0.248222	0.73900	0.46300	0.34700
GER	4	0.689593	0.73900	0.46300	0.34700
Δ GER	3	0.236407	0.73900	0.46300	0.34700
GDP	1	0.392396	0.73900	0.46300	0.34700
Δ GDP	13	0.248222	0.73900	0.46300	0.34700

Table 1. The ADF unit root test results (data collected from https://www.tandfonline.com/doi/abs/10.1080/02188790802267332)

There is no evidence that any of the series under discussion is I (2), and so, the ARDL bounds testing approach can be used to examine the data. Because the data are annual, we follow Pesaran & Shin (1999) & Narayan (2000) in using an ARDL model with a maximum order of delays of 2. (2004). The best number of lags to include in the model is determined using the Akaike information criterion (AIC). Table 2 displays the cointegration test's estimated F-statistics.

	Critical values					
F-statistic = 10.1519 (*N* = 30)	$\alpha = 0.01$		$\alpha = 0.05$		$\alpha = 0.10$	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	5.333	7.063	3.710	5.018	3.008	4.150

Table 2. Cointegration results from the ARDL bound test (data collected from https://www.tandfonline.com/doi/abs/10.1080/021887908022673320

F-statistic exceeds the upper critical value of 7.063 at the 1% level of significance, according to the results. There is a long-term association between the variables, hence we reject the null hypothesis of no such relationship. The model's long- and short-term coefficients are shown in Tables 3 and 4. Table 3 suggests that public education spending has a positive long-term coefficient, but this is just a modest statistical significance. In the short term, the coefficient becomes trivial. These findings show that education spending

by the government as a tool to tackle India's unemployment problem is unsuccessful. The GDP growth coefficient is also negligible in the long and near term, indicating that India's economic growth is jobless.

Variables	Coefficients	*t*-statistic	Probability
EDUX	0.09245	−1.8217	0.0805
GER	−0.01496	−4.5614	0.0001
GDP	0.0062	0.2695	0.7897
R^2	0.4483	D.W.	2.0646
Adj R^2	0.36011	Heteroskedasticity	$F = 0.343$ (p val = 0.56)
F-statistics	5.0801 (p val = 0.0038)	Ramsey's reset	0.1841 (p val = 0.632)

Table 3. The long-term coefficients calculated using the ARDL technique (data collected from https://link.springer.com/article/10.1186/s40854-020-00196-z).

Finally, the stability of coefficients was investigated using the CUSUM and CUSUMSQ tests. According to the graphs in Figure 4, the CUSUM and CUSUMSQ test statistics are steady over time, which indicates that the parameters in the model have not changed.

Variables	Coefficients	*t*-statistic	Probability
EDUX	−0.1148	−1.1858	0.2468
GER	−0.0185	−3.0917	0.0048
GDP	0.0077	0.3169	0.7539
ECT	−1.2417	−6.7439	0.0000

Table 4. From the ARDL technique, short-term coefficients (data collected from https://link.springer.com/article/10.1186/s40854-020-00196-z).

As a result of the growth in secondary enrolment, the government is more likely to invest money on education, as evidenced by the unidirectional causality. In addition, we find no correlation between GDP growth and unemployment in India, which once again demonstrates the jobless character of economic progress in the country. Another interesting finding is that, while GDP does not directly cause gross enrolment, gross enrolment does directly cause GDP, indicating that a country's ability to thrive economically relies heavily on its human capital, or the number of educated workers.

CONCLUSION:

An investigation into the relationship between education expenditure, educational attainment, and the unemployment rate in India from 1987 to 2017 is the focus of this paper. The study specifically aims to answer the question of whether or not public education spending can improve the country's educational achievement and employment

situation. Toward this goal, the study applies ARDL limits testing approach with block exogeneity test. The study uses ARDL bounds testing to find a long-term association between the unemployment rate, public education spending, and GER at the secondary level. Public education spending and GDP growth have little effect on the unemployment rate, as shown by the model's long-term coefficients. However, in India, the GER at the secondary level has a negative impact on the unemployment rate (see chart). The sole factor that has an impact on the unemployment rate at the secondary level, according to the causality analysis, is GER. Not only is increasing India's total enrolment critical for reducing unemployment, but it is also essential for the country's overall economic growth. In terms of policy implications, the results show that the emphasis must be concentrated on obtaining universal secondary education for all. The illiterate and near-illiterate workers in the workforce could be enticed to enroll in school by inventive ideas for operating special adult education programmes followed by apprenticeship programmes.

According to the lack of correlation between educational attainment and unemployment, the government's role does not end with providing a particular portion of its budget to education. The government's ineffectiveness lacks influencing GER & unemployment must be addressed. Its causes must be identified and relevant action strategies must be devised. The government must conduct a thorough review of the educational costs it incurs. The components of education that have merely subsumed the budget expenditure to failures should be withdrawn from large budget allotment, and these parts should be channelized in the path of productive school-level education. In order to prevent public employees from squandering public funds, the government should make efforts to improve expenditure efficacy by increasing oversight of the spending of funds. Rather of relying solely on public funds, the government should coordinate its efforts with those of the private sector to help reduce unemployment.

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