

Compulsory Primary Education

Act – 1990 in Bangladesh

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Abstract

Compulsory education act does not always ensure 100% participation rate especially in developing countries where poverty is severe. This is the fact for Bangladesh where 'Compulsory Primary Education Act -1990' has been introduced in 1990 but still a mass of children are out of school. Why it happened is the basic research question which is analysed in this chapter. Using the empirics and published literatures, I have tried to find out the reasons of failure in implementing 'Compulsory Primary Education Act -1990' in Bangladesh. I have identified that the opportunity cost of attending school is the fundamental reason of this failure. After indentifying the reason, I have developed a model which validates this reason and have shown how opportunity cost affects school attendance. The model also has proved the perfect type of educational system (public, private and dual) which is more beneficial for the society. The wage earnings evolution as well as wealth distribution in public and private education system have also been derived theoretically and the results have been simulated at the same time.

Key Words: Compulsory Education; Opportunity Cost; Public, Private and Dual Education System; Education Finance; Wealth Distribution.

Prelude

'A literate enemy is better than an illiterate friend' – the proverb highlights the significance of education since the ancient period. It is now a proven truth that education not only enriches an individual's intellectual ability, working capability and personal humanity but also improves societal productivity, communal relationship, social norms and values. Because of huge externality effects of education on individual and on social wellbeing, it is considered as a merit good not as a private good. 'Everyone has a right to education' like food and shelter in any country around the world -the Universal Declaration of Human Rights makes education a basic need for an individual. At present, it is no more an elitist need in any society. So every government should be responsible to ensure meeting up this need for it's citizens. Considering the importance of education, all developed countries around the world have made up to a certain level of education free and compulsory for all of their residents at a very early stage of their development such as Japan, the most developed country in Asia, had high levels of education before they advanced towards industrial development (Sen. A., 1999). While most of the developing countries are far behind to introduce free and compulsory education up to a basic or at least minimum level because of not only constraint of resources but also abundance of short-sighted and corrupted policy makers, the government of the People's Republic of Bangladesh has introduced compulsory, universal primary education by 'The Primary Education (Compulsory) Act, 1990' (The Bangladesh Gazette, Act No. 27 of

1990) which piloted partially in 1992 and has been implemented fully from 1993 (Bangladesh Country Report, 2009). But still the country is struggling to achieve universal primary education for all of her primary age population. In this paper, I would like to answer the research question – **why has the government of Bangladesh failed to successfully implement universal primary education for the last seventeen years?**

Analytical Framework

To answer this question, at first, I am going to dissect the basic education system, by which I mean not only five years of primary education but also five more years of secondary education, of Bangladesh by using published literatures and data; secondly, I have constructed a model that explains and solves the fundamental problems of achieving compulsory primary education objective; and at last, I have simulated the results derived from the model to comment on the research question.

Data Sources

The data used in this study covers the period from 1973 to 2003-4. Most of the education related data such as student enrolment, number of teachers, number of institutions, expenditure on different levels of education are collected from the Statistical Year Book of Bangladesh 1979, 1980, 1984, 1990, 1995, 2000, 2005 and 2008 publications. In the Statistical Year Book of 2000, public education expenditure for primary,

secondary or tertiary levels of education are not reported separately; as a result, I have used the data of public education expenditure for secondary level till 1994-95 but fortunately I have got the public education expenditure data for primary level from the working paper of Rahman A. et.al (2005). The data about age specific population are collected from Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects. The data for GDP at local currency are collected from the World Data Bank. Information about educational objectives and achievement is collected from the different Five Year Plans, such as 1st Five Year Plan – Chapter XIV, 2nd Five Year Plan – Chapter XVI, 3rd Five Year Plan – Chapter XIV, 4th Five Year Plan – Chapter XV and 5th Five Year Plan – Chapter XX. Objectives of the different ‘National Education Commissions’ report are collected from the website of the Ministry of Education, The Government of the People’s Republic of Bangladesh.

Definitions of data series

Using these official data, I have constructed the variables which I have used to draw different graphs/figures. The definitions of variables are given as follows-

Percentage of enrolment in Primary (or Secondary) Level =

$$\left(\frac{\text{Total primary(secondary) level enrolment in the year-t}}{\text{Total age specific population in the year-t}} \right) \times 100$$

$$\text{Teacher-student ratio} = \left(\frac{\text{Total enrolment in the year-t}}{\text{Total number of Teacher in the year-t}} \right)$$

$$\text{Average student per school} = \left(\frac{\text{Total Enrolment in the year-t}}{\text{Total number of school in the year-t}} \right)$$

$$\text{Public Expenditure per student} = \left(\frac{\text{Total Education Expenditure in the year-t}}{\text{Total number of Enrolment in the year-t}} \right)$$

$$\text{Educational expenditure as percentage of GDP} = \left(\frac{\text{Total Education Expenditure in the year-t}}{\text{GDP in local currency in the year-t}} \right) \times 100$$

$$\text{Primary (Secondary) education expenditure as percentage of total educational expenditure} = \left(\frac{\text{Primary(Secondary) education Expenditure in the year-t}}{\text{Total Education Expenditure in the year-t}} \right) \times 100$$

Using these series of data, I have tried logically and empirically, to analyse the causes of failure in implementing compulsory primary education in Bangladesh.

Literature Review

The literature I have followed to construct my model is Biggs, M.L and Dutta, J.'s paper published in *National Institute Economic Review*, 1999 titled 'The distributional effects of education expenditure'. My model differs from their model at least in three aspects. Firstly, they have considered one education variable while I have considered two levels of education variables viz. Basic level and skilled level. Secondly, they have followed the cost of education in terms of opportunity cost of consumption while I have used two constant costs of basic education and skilled education separately. Thirdly, I have assumed opportunity costs of attending basic and skilled level of education in my model what they have

ignored. Therefore, my findings are more realistic and relevant for explaining educational decision of a household in developing country and developed country as well.

Samarrai, S. Al (2007) monograph discusses education finance trends for Bangladesh. Using 1990 to 2006 data, the author has argued that Bangladesh government has made substantial increase in primary education financing but it is still low compared to other countries in the region and countries at similar levels of development. The author also says that the impact on education outcome at primary level is still insignificant compared to the increase in government funding. Ahmed A. U and Ninno C.del (2002) evaluate food for education programme in Bangladesh. Using primary data collected in school, household, community, and food grain dealer surveys; they show that introduction of this program has increased primary school enrolment, promoted attendance, and reduced dropout rates despite the fact that the quality of education, however, remains a problem. They have also found that the increase in enrolment is greater for girls than for boys. It is because the opportunity cost of a girl in rural area is lower than the boys, which is not mentioned in their discussion. Their findings have helped me to resolve that the opportunity cost of education plays an important role for establishing compulsory basic education in a developing country like Bangladesh and I have tried to incorporate this in my model.

Basic (Primary and Secondary) Education Scenario of Bangladesh

Bangladesh has achieved independence in 1971 after nine months of liberation war. The Bangladesh Constitution, Part II dealing with Fundamental Principles of State Policy requires the State "to secure to its citizens the provision of basic necessities of life, including food, clothing, shelter, education and medical care;" (Article 15) and Article 17 as quoted in paragraph 8 above speaks of "establishing universal system of education and extending free and compulsory education to all children ... and removing illiteracy.". The two Articles of the Constitution are taken to recognize education as a basic right of every citizen (Bangladesh Country Report, 2009). In the year 1990, the parliament has passed 'The Primary Education (Compulsory) Act, 1990' and the law has been implemented since 1993. So, the country has observed more than 17 years of compulsory primary education regime, which would have been more than enough time to eradicate illiteracy, at least among young generations, from the country if the country had established a foresighted, compulsory, universal basic education system, which would pull up the socio-economic status of the country. The policy makers have failed to do so due to political instability, resource scarcity and shortage of national integrity. During the last 39 years, Bangladesh has been ruled by Awami League (AL) government around three years, military administrators and caretaker administrators around thirteen years, some forms of elected political governments around twenty three years. During these 24 years of elected political governments, Awami League (AL), Bangladesh Nationalist Party

(BNP) and Jatio Party (JP) ruled only three years (1972-1975), two years (1979-81) and five years (1986-90) respectively with absolute majority in the parliament and for the rest of the time either the BNP shared with the JP and Jamat-e-Islam Bangladesh (JIB) or the AL shared with the JP and the JIB to form the government. Due to the lack of integrity among the political parties and policy makers about education system, the governments have created at least nine education commissions during the last 39 years to develop education policy for the country. The table-D5.1 (in appendix) briefly summarises the basic objectives of these nine education commissions¹. Even though there have been nine education commissions formed till date but the first and the last reports have nearly similar objectives and all the other reports have a huge diversity in their objectives. As a result, the people of Bangladesh have not been able to receive a sound, secular, modern, adoptable, realistic, flexible and foresighted education policy yet. Almost all successive governments in Bangladesh, whether for political motives or real attempts at getting it right, have always advanced legitimate explanations for embarking upon one reform programme or the other.

In Table-D5.2 (in appendix), I have summarised the objectives and achievements of different five years plans in primary level of education. Reviewing the different five years plans of Bangladesh, one can easily realise that none of the plans has been implemented successfully to achieve the targeted objectives. Evidently the ineffectual manner by

¹ The reports of all these commissions are not publicly available.

which the policies were implemented ensured that educational planning was social-demand oriented rather than manpower development oriented (Mahmud, 2003; Sen, 2002).

The following figure-1.1 shows the percentage of enrolment in primary and secondary level of education among 5-9 years and 10-14 years age group population. The important issue in this figure is that the gap between enrolment in primary and in secondary level. In the year 1973-74, the percentage of enrolment in primary level is more than 70% of total age group population while it is less than 20% in secondary level of education. In the year 2003-04, the enrolment in primary level is more than 100%² but is less than 50% in secondary level. These empirics have at least two important explanations; the first one is - drop-out rates between primary and secondary level are more than 50%. The increasing trend of enrolment in secondary level indicates that households would prefer to send their children into the secondary level of education but they could not be able to continue children's education because of economic and social constraints.

² Enrolment rate is more than 100% of age group population, because due to migration from rural to urban area students are not cancel initial enrolment, student might enrol government school at the same time NGO operated non-government primary school, total population is projected number but actual population might be higher than that.

Figure 1.1: Percentage of Enrolment in Primary and Secondary Level



Figure-1.2 shows the teacher-student ratio in primary and secondary levels of education. In the years 1973-74, teacher-student ratio in primary level was 1:50 and 1:20 in secondary level of education. In the years 2003-04, the ratio is 1:52 and 1:29 respectively. These empirics imply that there is student congestion problem in primary level of education but student storage problem in secondary level of education. It is assumed that the standard teacher-student ratio is 1:35 to maintain quality of education in basic level (primary and secondary) of education. Therefore, the quality of primary education in Bangladesh is poor; as a result, the quality of secondary level of education is also poor because primary education is considered as the foundation of secondary and tertiary level of education.

Figure 1.2: The Teacher-Student ratio in Primary and Secondary Level

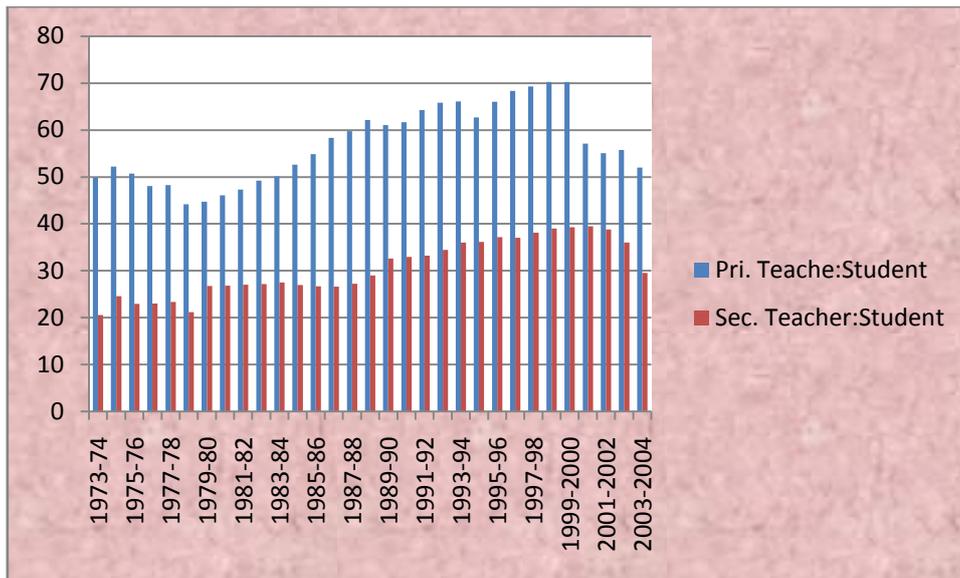


Figure- 1.3 shows the average number of student in a primary school and a secondary school. In the years 1973-74, both a primary school and a secondary school had nearly 200 students on average, while in the years 2003-04, a primary school had on an average more than 400 students and more than 200 students in a secondary school. These data indicate that households are more interested to send their children in primary level of education than secondary level of education. The reasons behind this increasing preference for primary education are: primary education is compulsory by the constitutional law of 1990; the opportunity cost of attending primary education is lower than the secondary education; the government and the NGOs provide huge financial incentives to catch primary age group population such as free school, educational materials, cash incentive or food incentive etc. On the other hand, 10-14 age group population in secondary level of education do not get any such types of incentive from the government or

NGOs. It is important to understand that both primary and secondary levels of education should be paid equal weight for educational development of a society.

Figure 1.3: Primary and Secondary Students per School

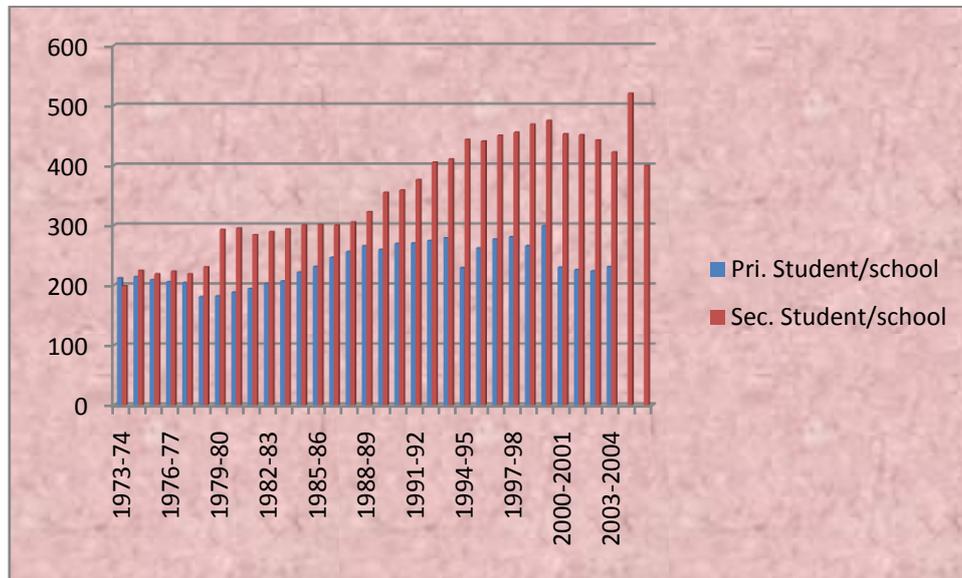


Figure-1.4 shows primary and secondary education expenditure per student. In the years 1973-74, public education expenditure per student both in primary and secondary levels of education were 50 Taka and 57 Taka respectively. In the years 1994-95, the values were 560 Taka and 134 Taka respectively. These data reflect the government attitude towards primary and secondary levels of education, which implies government encourages primary education by reducing budget from the secondary education. From the following two figures also, we can draw similar conclusion.

Figure 1.4: Primary and Secondary Levels Public Expenditure per Student

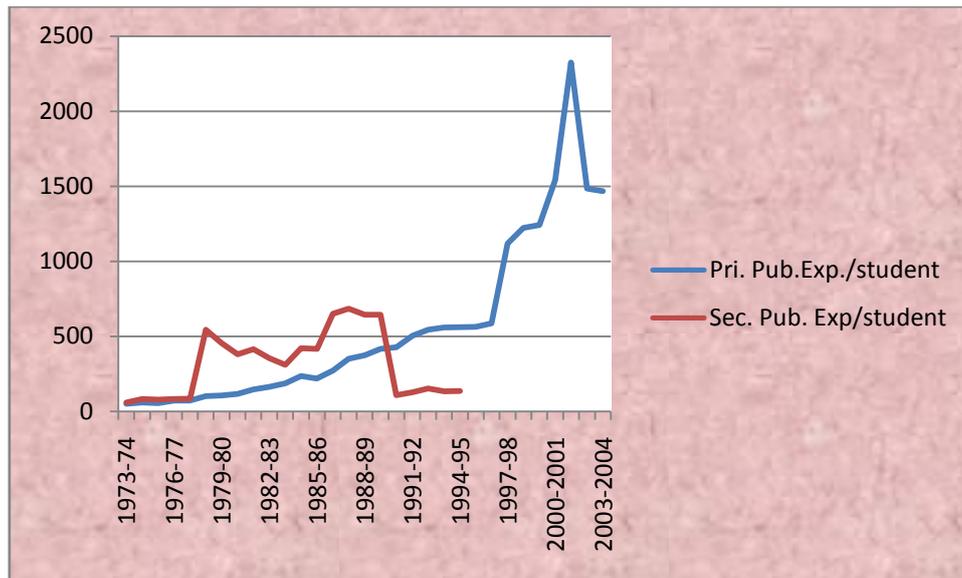


Figure-1.5 shows public educational expenditure at primary and secondary levels as percentage of GDP. In the years 1973-74, primary education expenditure was around 0.62% of GDP while secondary education expenditure was 0.14% of GDP. In the years 1979-80, the share of secondary level education expenditure exceeded primary level. After the years 1979-80, public education expenditure as percentage of GDP at secondary level is continuously declining while it is inclining at primary level. These empirical findings indicate that the government is putting maximum weight for ensuring compulsory and universal primary education and is neglecting the secondary education system.

Figure 1.5: Primary and Secondary Levels Education Expenditure as percentage of GDP

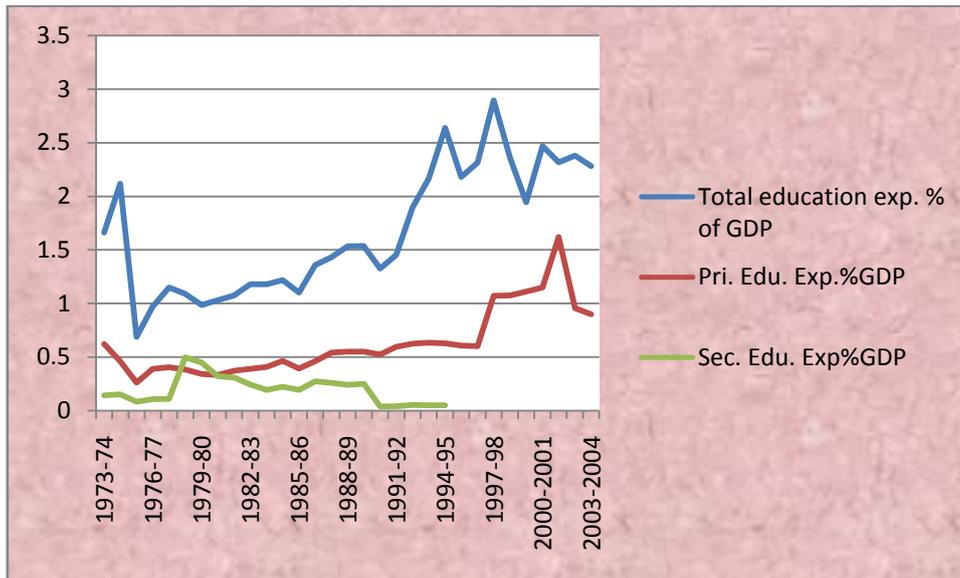


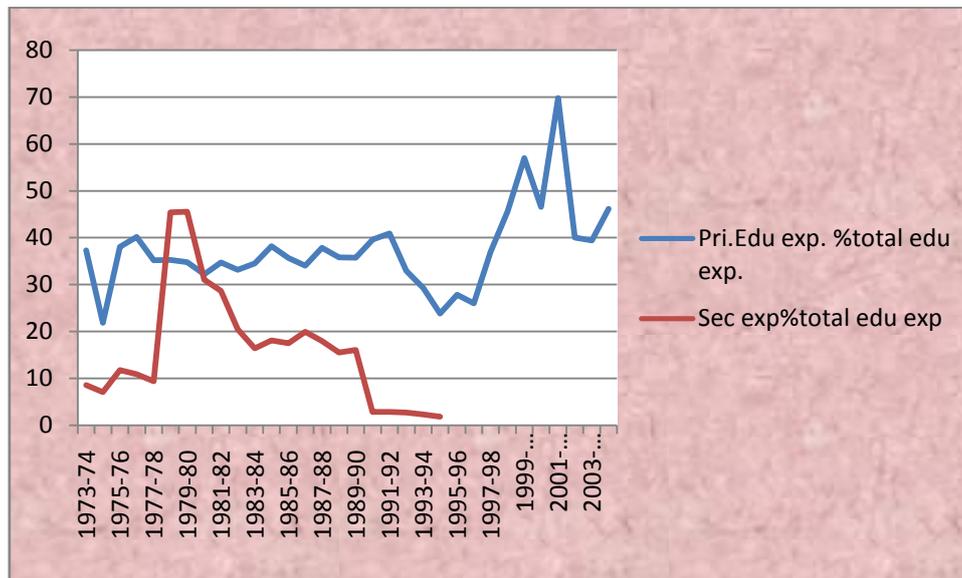
Figure-1.6 shows public expenditure at primary and secondary levels as percentage of total public education expenditure. These data imply that budget allocation for primary level is more or less stable during the last 35 years but for secondary level, it is declining very rapidly. It is very unfortunate to see that in the 1994-95 budget, allocation for secondary level of education was only 1.82% of total public education expenditure while for primary sector, it was 23.80%.

Analysing all these empirics, I have summarised the following features about the basic education level of Bangladesh since her independence.

First, the government of Bangladesh has considered primary education as the basic element of human right and therefore, introduced

compulsory, universal primary education for all population of the age group of 6-10 years by law.

Figure 1.6: Primary and Secondary Levels Public Education Expenditure as percentage of Total Education Expenditure



Second, on an average, one third of the total education budget has been allocated for primary education during the last fifteen years to implement the primary education (compulsory) act 1990. But still in reality, primary education is very vulnerable. According to the data of the Directorate of Primary Education (2008), there are at least four different types of primary educational institutions viz : out of 82218 total primary educational institutions- 37672 are Government Primary Schools, 20083 are Registered Non-Government Primary Schools , 966 are Non-Registered Non-Government Primary Schools and 23497 are Other Primary level Institutions (Basically Religious unorganised institutes). Similarly, out of 365925 primary school teachers- 182899 are in

Government Primary Schools, 76875 are in Registered Non-Government Primary Schools, 2460 are in Non-Registered Non-Government Primary Schools, and 103691 are in Other Primary level Institutions. The academic curriculum for different types of primary institutions is also significantly different. That means, the pupils of primary level have not got uniform, and universal primary education yet.

Third, the enrolment of students in these types of institutions is 9537571 in Government Primary Schools, 3472799 in Registered Non-Government Primary Schools, 99564 in Non-Government Primary Schools and 2891671 in Other Primary level Institutions. 'Academicians and researchers think that to reach universal primary education target, the government will have to recruit 700000 (seven hundred thousand) new teachers - preferably trained - and build 30,000 (thirty thousands) new schools and 60,000(sixty thousands) new classrooms in existing schools within the next two years (The Daily Star, 2009). All these data imply that the universal primary education for all is still a dream for the country because annual budget allocation for primary level of education does not show the striving of government to achieve the target by the next two years.

Fourth, 'the cohort dropout rate seems to persist at around 50%. It was 47.2% in 2005, 50.5% in 2007 and has come down somewhat to 49.3% in 2008'. To reduce drop-out rate, the government has introduced 'Primary School Stipend Programme' which covers 4.8 million or 40% of

the enrolled children of rural poor families to enable them to enrol and maintain attendance in school (Dhaka, Bangladesh Country Report, 2009). That means 60% of rural primary student is still out of stipend coverage. Thus, the opportunity cost of attending school for this 60% rural student induce them to drop-out from the compulsory primary level of education.

Fifth, the government's contribution in secondary level of education is significantly declining. 'There are 317 Government managed secondary schools and 18,453 private High Schools, which receive teachers' salary from the Government' (Bangladesh Country Report, 2009). From figure-5, we see that while both the total education expenditure as percentage of GDP and the primary education expenditure as percentage of GDP are increasing, public secondary education expenditure is decreasing dramatically. As a result, the enrolment rate between primary and secondary level falls more than 50%. The demand for secondary level of education is continuously becoming a privately financed good and going beyond the reach of poor rural household. Since, almost all pupils in secondary level are taught by private school, the quality of secondary education differs significantly among the pupils. It implies that secondary education system is more vulnerable in Bangladesh. Almost all developed countries in the world, primary and secondary level of education together are considered as basic education for their citizens. All these features imply that the basic education system is very vulnerable and there is a

crying need to develop a suitable and implementable education system, at least in basic level, to rebuild the country.

In the following section of this research, I have developed a model to explain the failure of introducing compulsory education act in Bangladesh.

Model for the Distributional Effects of Educational Expenditure

Assume that the wage earnings of an individual depend on 'basic level of education,' 'skilled level of education' and 'ability'. Ability varies across individuals; as a result, having the same level of both basic education and skilled education, individuals' wage earnings differ. Also assume that the relationship among these variables is log-linear, that is why education elasticity of wage earnings is constant.

$$\ln W_t^h = \alpha \ln B_t^h + \beta \ln S_t^h + \ln A_t^h \text{ --- 1.1}$$

Where, W_t^h is the lifetime income of an individual; B_t^h is his/her level of basic education and S_t^h is the level of skilled education and A_t^h is ability of an individual h .

The evolution of ability across generation can be partly inherited from parents and the rest is random. It is good to assume that ability covers a broad set of characteristics which allow an individual to obtain better job and to earn higher wages, to access to family networks and

contact, as well as physical or intellectual traits and luck in the market.

The evolution of ability equation is –

$$\ln A_t^h = \rho \ln A_{t-1}^h + U_t^h; U_t^h \sim i. i. d N(\mu, \sigma^2) \text{ --- 1.2}$$

Where, the random term, U_t^h , is identically and independently distributed with mean μ and variance σ^2 . Here, h , is interpreted to be a family name; so A_t^h is the ability of generation, t in family, h . It is assumed that the distribution of ability is exactly replicated among the population and $|\rho| < 1$ to make sure that the distribution of ability is stationary. Thus the ability distribution is also normally distributed as follows-

$$\ln A \sim N(m_a, V_a) \text{ --- 1.3}$$

Where, the mean of ability distribution is - $m_a = \frac{\mu}{(1-\rho)}$.

The variance of the ability distribution is , $V_a = \frac{1}{(1-\rho)^2} \sigma^2$.

Assume that a typical family consists of two generations, parent and a child at time, t . There is no population growth. Family wants to maximise total utility by valuing consumption and child's level of education in both basic and skilled. Family cares about both the parent's wage earning and child's opportunity cost of different levels of education. Parents in a family are mentally altruistic about the children's education level but practically behave as individualistic. The family utility function is logarithmic, linear and additive.

$$\text{Max } U^h = (1 - \theta - \delta)\ln C_t^h + \theta \ln B_t^h + \delta \ln S_t^h - - - 1.4$$

Family income is the sum of parents' income and children's income, which is as follows -

$$W_t^h + O_b B_{t+1}^h + O_s S_{t+1}^h - - - - 1.5$$

Where, W_t is the wage earning of generation, t or parent in the family; O_b is the opportunity cost of per unit basic education of generation $t + 1$ or child in the family and O_s is the opportunity cost of per unit skilled education of generation $t + 1$ or child.

Distribution and Education Finance

Although neither fully private nor fully public educational system is realistic, it is better to compare distributional outcomes in fully private and public systems, which turn out to be helpful for intuition. In the first scenario, all levels of education is privately financed and privately provided as well; where families or parents pay for education according to their income and cost of education. Assume that per unit private costs of basic education and skilled education are q_b and q_s respectively which are constant over time and there is no tax in the private education system. In the second scenario, state is monopoly provider of both levels of education, and collects taxes at proportional rate, τ to finance them. The stationary or steady-state distribution of wage earnings varies with the level of public expenditure.

Privately Financed Education

The equilibrium levels of education decision and wage earnings can be found in privately financed education system by maximising the family utility function, subject to budget constraint, as follows-

$$\text{Max } U_{C_t^h, B_{t+1}^h, S_{t+1}^h}^h = (1 - \theta - \delta) \ln C_t^h + \theta \ln B_t^h + \delta \ln S_t^h \text{ --- 1.6}$$

When children are attending either basic level of education or skilled level of education or both levels, family has to bear per unit cost of education directly and per unit opportunity costs of education indirectly. So the budget constraint equation for the family looks like equation-7.

$$W_t^h = C_t^h + (q_b + O_b) B_{t+1}^h + (q_s + O_s) S_{t+1}^h \text{ --- 1.7}$$

Equilibrium consumption is - $C_t^{pri} = (1 - \theta - \delta) W_t^h$

Equilibrium level of basic education is - $B_{t+1}^{pri} = \frac{\theta W_t^h}{(q_b + O_b)}$

Equilibrium level of skilled education is - $S_{t+1}^{pri} = \frac{\delta W_t^h}{(q_s + O_s)}$

Derived results

The equilibrium values of both basic education and skilled education directly depend on the parents wage earnings and family or parent's preference towards education. The richer parents spend more on their children's education; as a result, children's wage earnings also become higher compared to the children of the poorer parents.

The equilibrium values of both basic education and skilled education inversely depend on per unit cost of education and the opportunity cost of attending different levels of education. An increase in the current per unit cost of education reduces equilibrium attendance of children's education level and vice versa. An increase in the current per unit opportunity costs of different levels of education decreases equilibrium attendance of children's education level.

The rate of change in equilibrium level of basic education with respect to direct cost of education is as follows-

$$\frac{\partial B_{t+1}^{pri}}{\partial q_b} = \frac{\partial \left\{ \frac{\theta W_t^h}{(q_b + O_b)} \right\}}{\partial q_b} = - \frac{\theta W_t^h}{(q_b + O_b)^2}$$

The rate of change in equilibrium level of basic education with respect to opportunity cost of education is as follows-

$$\frac{\partial B_{t+1}^{pri}}{\partial O_b} = \frac{\partial \left\{ \frac{\theta W_t^h}{(q_b + O_b)} \right\}}{\partial O_b} = - \frac{\theta W_t^h}{(q_b + O_b)^2}$$

The rate of change in equilibrium level of skilled education with respect to direct cost of education is as follows-

$$\frac{\partial S_{t+1}^{pri}}{\partial q_s} = \frac{\partial \left\{ \frac{\delta W_t^h}{(q_s + O_s)} \right\}}{\partial q_s} = - \frac{\delta W_t^h}{(q_s + O_s)^2}$$

The rate of change in equilibrium level of skilled education with respect to opportunity cost of education is as follows-

$$\frac{\partial S_{t+1}^{pri}}{\partial O_s} = \frac{\partial \left\{ \frac{\delta W_t^h}{(q_s + O_s)} \right\}}{\partial O_b} = - \frac{\delta W_t^h}{(q_s + O_s)^2}$$

Substituting the equilibrium values of the levels of basic education and skilled education in wage earnings equation and ability equation, we get the equilibrium evolution rule for wage earnings within a family in privately financed education system.

or, $\ln W_{t+1}^{pri}$

$$\begin{aligned} &= \alpha(1 - \rho)\ln\theta + \beta(1 - \rho)\ln\delta \\ &- (1 - \rho)\{\alpha\ln(q_b + O_b) + \beta\ln(q_s + O_s)\} + (\alpha + \beta + \rho)\ln W_t^h \\ &- \rho(\alpha + \beta)\ln W_{t-1}^h + U_{t+1} - - - -1.8 \end{aligned}$$

Decision-1(a): In private education system, the wage earnings of a child inherit ability coefficient, ρ from parent that means wage income of a child of high ability parent will be ρ times higher than that of the children of low ability parent.

Decision-1(b): In private education system, the wage earnings of a child inherit level of education coefficient, $(\alpha + \beta)$ from parent's wage earnings. A child's wage earnings will also be positively related to parent's level of education. A child having parent with both basic and skilled levels of education inherits $(\alpha + \beta)$ times higher wage income compared to a child having a parent without any education.

Decision-1(c): A child obtains better education if her/his parent is richer. Therefore, income mobility across generations within a family in privately financed education system is relatively little but in the long-run income inequality between the rich and the poor is to be high.

Decision-1(d): The wage earning of a child also positively depends on the family's preference to level of basic education and skilled education and negatively depends on both direct cost and opportunity cost of levels of education as well as wage earnings of grandparent.

Decision-1(e): One unit increase in direct education cost of basic education in private system will reduce equilibrium level of basic education, $\frac{\theta W_t^h}{(q_b + O_b)^2}$ amount, which is the same for a unit change in the opportunity cost of basic education.

Decision-1(f): One unit increase in direct education cost of skilled education in private system will reduce equilibrium level of skilled education, $\frac{\delta W_t^h}{(q_s + O_s)^2}$ amount, which is the same for a unit change in the opportunity cost of skilled education.

Now, I am going to deduce the long-run or steady-state distribution of wage earnings across the population by assuming that $\alpha, \beta < 1$ and $|\rho| < 1$. In steady-state, time variation will be eliminated.

$$\ln W_t = \frac{1}{(1-\alpha-\beta)} \left[(\alpha \ln \theta + \beta \ln \delta) - \{ \alpha \ln(q_b + O_b) + \beta \ln(q_s + O_s) \} + \frac{1}{(1-\rho)} U_t \right] \text{--- 1.9}$$

The mean value of steady-state wage earning, when education is privately financed, is –

$$\overline{\ln W} = m(W)_{pri} = \left\{ \frac{1}{(1-\alpha-\beta)} [(\alpha \ln \theta + \beta \ln \delta) - \{ \alpha \ln(q_b + O_b) + \beta \ln(q_s + O_s) \} + m_a] \right\} \text{--- 1.10} \quad \text{where, } m_a = \frac{1}{(1-\rho)} \mu.$$

Variance of steady-state the wage earnings is –

$$\text{Var}(W)_{pri} = \frac{1}{(1-\alpha-\beta)^2} V_a \quad \text{where, } V_a = \frac{1}{(1-\rho)^2} \sigma^2 \text{--- 1.11}$$

The long-run distribution of wage earnings, in the private education system, is log-normal:

$$\ln W_{pri} \sim_{steady-state} N(m(W)_{pri}, \text{Var}(W)_{pri}) \text{--- 1.12}$$

Education as a State Monopoly

Now assume that the levels of education both basic and skilled are provided by the state and financed by taxes, τ , then the equilibrium education choice will be determined from the same family utility function but different budget equation follows.

$$\text{Max } U = (1 - \theta - \delta) \ln C_t^h + \theta \ln B_{t+1}^h + \delta \ln S_{t+1}^h \text{--- 5.6}$$

Family budget constraint is –

$$(1 - \tau)W_t^h = C_t^h + O_b B_{t+1}^h + O_s S_{t+1}^h \text{ --- 1.13}$$

Equilibrium consumption in public education system is-

$$C_t^{pub} = (1 - \theta - \delta)W_t^h(1 - \tau)$$

Equilibrium level of basic education in public education system is-

$$B_{t+1}^{pub} = \overline{B}_{t+1} = \frac{\theta \overline{W}_t(1 - \tau)}{O_b}$$

Equilibrium level of skilled education in public education system is -

$$S_{t+1}^{pub} = \overline{S}_{t+1} = \frac{\delta \overline{W}_t(1 - \tau)}{O_s}$$

The rate of change in equilibrium level of basic education in public system due to a unit change in opportunity cost of education is as follows.

$$\frac{\partial B_{t+1}^{pub}}{\partial O_b} = \frac{\partial \left\{ \frac{\theta \overline{W}_t(1 - \tau)}{O_b} \right\}}{\partial O_b} = - \frac{\theta \overline{W}_t(1 - \tau)}{(O_b)^2}$$

The rate of change in equilibrium level of skilled education in public system due to a unit change in opportunity cost of education is as follows.

$$\frac{\partial S_{t+1}^{pub}}{\partial O_b} = \frac{\partial \left\{ \frac{\delta \overline{W}_t(1 - \tau)}{O_s} \right\}}{\partial O_b} = - \frac{\delta \overline{W}_t(1 - \tau)}{(O_b)^2}$$

Derived results:

The equilibrium levels of education both basic and skilled negatively depend on the opportunity costs of attending education; that means, if the opportunity cost of both basic and skilled level or any one is high equilibrium level of education is low and vice versa. The equilibrium levels of education both basic and skilled are positively related with parent's or family's disposable income. That means, a child from rich parent or family will have higher level of equilibrium education compared to a child from poor family background.

Decision -2(a): Although state provides education at a cost of taxes, τ , collected from the parent's income, the equilibrium level of both basic and skilled education varies among children because of the variation of parents' preference to educate his/her children and the opportunity cost of attending education. These findings are different from the derivation and results of Biggs, M & Dutta, J, (1999). In their paper, equilibrium level of education is equal for all individuals, and the cost of education is financed by the state via collecting taxes, τ , from the parent's income.

Decision -2(b): One unit increase in the opportunity cost for basic education in public system will reduce equilibrium level of basic education $\frac{\theta \bar{W}_t (1-\tau)}{(O_b)^2}$ and One unit increase in opportunity cost for skilled education in public system will reduce equilibrium level of skilled education $\frac{\delta \bar{W}_t (1-\tau)}{(O_b)^2}$.

Decision -2(c): State provided free education does not ensure that all children enjoy the same level of education. It depends on the magnitude of the product of parent's disposable income, educational preference and the magnitude of opportunity cost of education in the family. If the former one is stronger than the latter one, average education will be higher and vice versa. **This result explains why the governments have failed to achieve cent percent primary level educated population after 17 years of implementing compulsory primary education act in Bangladesh.**

The evolution of wage earnings, when education as a state monopoly, is as follows-

$$\begin{aligned}
 \ln W_{t+1}^{pub} &= \alpha(1 - \rho)\ln\theta + \beta(1 - \rho)\ln\delta \\
 &+ (1 - \rho)\{\alpha\ln(1 - \tau) + \beta\ln(1 - \tau)\} - \alpha(1 - \rho)\ln O_b \\
 &- \beta(1 - \rho)\ln O_s + (1 - \rho)(\alpha + \beta)\ln\bar{W}_t + \rho\ln W_t^h + U_{t+1} \\
 &- \mathbf{1.14}
 \end{aligned}$$

Assume that the distribution of wage earnings is log-normal for each generation, which follows the following properties (Biggs, M & Dutta, J. 1999)-

$$\ln(\bar{W}(\tau)) = \overline{\ln W} + \frac{\sigma^2(\tau)}{2}; \ln(1 + cv_\tau^2) = \sigma^2(\tau).$$

In the steady-state, the evolution rule of wage earnings, when education is a state monopoly, is as follows-

$$\begin{aligned}
\overline{\ln W} &= m(W)_{pub} \\
&= \frac{1}{(1 - \alpha - \beta)} \left[\alpha \ln \theta + \beta \ln \delta + (\alpha + \beta) \ln(1 - \tau) - \alpha \ln O_b \right. \\
&\quad \left. - \beta \ln O_s + m_a + (\alpha + \beta) \frac{\sigma^2(\tau)}{2} \right] \text{--- 1.15}
\end{aligned}$$

Variance of steady-state wage earnings, when education as a state monopoly, is –

$$\begin{aligned}
Var(W)_{pub} &= \sigma^2(\tau) \\
&= \frac{1}{(1 - (\alpha + \beta)^2)} \left[V_a + 2 \frac{1}{(1 - \rho)} (\alpha + \beta) cov(U_t, \ln \overline{W}) \right] \\
&\text{--- 1.16}
\end{aligned}$$

If we assume that covariance between random term and mean wage is zero, the variance of wage earnings distribution in publicly financed education system is as follows.

$$Var(W)_{pub} = \sigma^2(\tau) = \frac{1}{(1 - (\alpha + \beta)^2)} V_a \text{--- 1.17}$$

The steady-state wage evolution distribution, when education is fully financed by the state, is as follows:

$$\ln W_t^{pub} \sim N(m(W)_{pub}, Var(W)_{pub}).$$

Comparing the Two Educational Systems

Proposition-1:

Equilibrium levels of education both basic and skilled are lower in private system than public system as long as taxes are not collected at these threshold values $\tau^B \leq \frac{q_b}{(q_b+O_b)}$ and $\tau^S \leq \frac{q_s}{(q_s+O_s)}$ respectively.

Proof: The ratio of equilibrium level of basic education financed privately to the one publicly done is as follows:

$$\frac{B_{t+1}^{pri}}{B_{t+1}^{pub}} = \frac{\frac{\theta W_t^h}{(q_b + O_b)}}{\frac{\theta W_t^h(1 - \tau)}{O_b}} = \frac{O_b}{(q_b + O_b)(1 - \tau)} < 1 \text{ so, } B_{t+1}^{pri} < B_{t+1}^{pub}$$

The equilibrium levels of basic education in private system would be equal to public system when tax for financing basic education satisfies following threshold value.

$$\frac{\theta W_t^h}{(q_b + O_b)} = \frac{\theta W_t^h(1 - \tau)}{O_b}$$

$$\text{or, } \frac{1}{(q_b + O_b)} = \frac{(1 - \tau)}{O_b}$$

$$\text{or, } \tau^B = \frac{q_b}{(q_b + O_b)} \quad \bullet$$

The ratio of equilibrium level of skilled education financed privately to the one publicly done is as follows:

$$\frac{S_{t+1}^{pri}}{S_{t+1}^{pub}} = \frac{\frac{\delta W_t^h}{(q_s + O_s)}}{\frac{\delta W_t^h(1 - \tau)}{O_s}} = \frac{O_s}{(q_s + O_s)(1 - \tau)} < 1 \text{ so, } S_{t+1}^{pri} < S_{t+1}^{pub}$$

The equilibrium level of skilled education in private system would be equal to public system when tax for financing skilled education satisfies following threshold value.

$$\frac{\delta W_t^h}{(q_s + O_s)} = \frac{\delta W_t^h(1 - \tau)}{O_s}$$

$$\text{or, } \frac{1}{(q_s + O_s)} = \frac{(1 - \tau)}{O_s}$$

$$\tau^s = \frac{q_s}{(q_s + O_s)} \bullet$$

Proposition-2:

The distribution of wage earnings is more unequal in the private system than public system.

Proof: The ratio of variance of wage earnings distribution between privately financed system and publicly financed system is –

$$\begin{aligned} \frac{Var(W)_{pri}}{Var(W)_{pub}} &= \frac{\frac{1}{(1 - \alpha - \beta)^2} V_a}{\frac{1}{(1 - (\alpha + \beta))^2} V_a} = \frac{\{(1 + (\alpha + \beta))\}\{(1 - (\alpha + \beta))\}}{\{(1 - (\alpha + \beta))^2\}} \\ &= \frac{\{(1 + (\alpha + \beta))\}}{\{(1 - (\alpha + \beta))\}} > 1 \text{ if } 0 < \alpha, \beta < 1 \end{aligned}$$

$$\text{Var}(W)_{pri} > \text{Var}(W)_{pub} \bullet$$

Dual System of Education:

Now assume that there are both public and private education systems existing in the economy. So parents can educate their children in private system if they like. If private education system is of better quality and family is rich enough to afford the cost of private education after paying taxes, then parents like to choose private education system for their children. A parent must pay taxes proportional to his income because of financing public education but he can choose private education for his child by paying private education cost. That means, parents who choose to send their children in private school have to bear both public education cost and private education cost. On the other hand, parents who send their children in public education system have to pay taxes only. In both cases, parents bear opportunity costs. The equilibrium choices of the families who send their children in public system are as follows.

Equilibrium consumption in dual education system is-

$$C_t^{pub} = (1 - \theta - \delta)W_t^h(1 - \tau)$$

Equilibrium level of basic education in public education in dual system is-

$$B_{t+1}^{pub} = \overline{B}_{t+1} = \frac{\theta W_t^h(1 - \tau)}{O_b}$$

Equilibrium level of skilled education in public education in dual system is-

$$S_{t+1}^{pub} = \overline{S}_{t+1} = \frac{\delta W_t^h (1 - \tau)}{O_s}$$

The equilibrium choices of the families who send their children in private education are as follows.

Equilibrium consumption in dual education system is-

$$C_t^{dual} = (1 - \theta - \delta) W_t^h (1 - \tau)$$

Equilibrium level of basic education in dual system is-

$$B_{t+1}^{dual} = \frac{\theta W_t^h (1 - \tau)}{(q_b + O_b)}$$

Equilibrium level of skilled education in dual education system is-

$$S_{t+1}^{dual} = \frac{\delta W_t^h (1 - \tau)}{(q_s + O_s)}$$

Proposition-3:

Dual education system is always worse than either fully private system or fully public system.

Proof: The equilibrium level of basic education in fully private system, fully public system and dual system are respectively as follows -

Equilibrium level of basic education in fully private system is-

$$B_{t+1}^{pri} = \frac{\theta W_t^h}{(q_b + O_b)}$$

Equilibrium level of basic education in public education system is-

$$B_{t+1}^{pub} = \overline{B}_{t+1} = \frac{\theta \overline{W}_t (1 - \tau)}{O_b}$$

Equilibrium level of basic education in dual system is-

$$B_{t+1}^{dual} = \frac{\theta W_t^h (1 - \tau)}{(q_b + O_b)}$$

Now comparing private vs. dual and public vs. dual we see that equilibrium level of education in either fully private or fully public system is higher than the dual system.

$$\frac{B_{t+1}^{pri}}{B_{t+1}^{dual}} = \frac{\frac{\theta W_t^h}{(q_b + O_b)}}{\frac{\theta W_t^h (1 - \tau)}{(q_b + O_b)}} > 1 \text{ and } \frac{B_{t+1}^{pub}}{B_{t+1}^{dual}} = \frac{\frac{\theta \overline{W}_t (1 - \tau)}{O_b}}{\frac{\theta W_t^h (1 - \tau)}{(q_b + O_b)}} > 1$$

The equilibrium level of skilled education in fully private system, fully public system and dual system are respectively as follows.

Equilibrium level of skilled education in fully private system is-

$$S_{t+1}^{pri} = \frac{\delta W_t^h}{(q_s + O_s)}$$

Equilibrium level of skilled education in fully public system is-

$$S_{t+1}^{pub} = \overline{S}_{t+1} = \frac{\delta \overline{W}_t (1 - \tau)}{O_s}$$

Equilibrium level of skilled education in dual education system is-

$$S_{t+1}^{dual} = \frac{\delta W_t^h (1 - \tau)}{(q_s + O_s)}$$

Now comparing private vs. dual and public vs. dual we see that equilibrium level of education in either fully private or fully public system is higher than the dual system.

$$\frac{S_{t+1}^{pri}}{S_{t+1}^{dual}} = \frac{\frac{\delta W_t^h}{(q_s + O_s)}}{\frac{\delta W_t^h (1 - \tau)}{(q_s + O_s)}} > 1 \text{ and } \frac{S_{t+1}^{pub}}{S_{t+1}^{dual}} = \frac{\frac{\delta \overline{W}_t (1 - \tau)}{O_s}}{\frac{\delta W_t^h (1 - \tau)}{(q_s + O_s)}} > 1 \bullet$$

Choice of School in Dual Education System:

Given the family utility function, we can determine the threshold value of family income to send a child in the private school. These are those whose income and education expenditure follows the following conditions.

For level of basic education, the condition is -

$$\frac{B_t^{pri}}{C(\theta, \delta, q_b, q_s O_b O_s)} \geq B_t^{pub} \text{ or, } \frac{\theta W_t^h (1 - \tau)}{(q_b + O_b)} \geq C(\theta, \delta, q_b, q_s O_b O_s) B_t^{pub}$$

$$\text{or, } W_t^h \geq \frac{C(\theta, \delta, q_b, q_s O_b O_s)(q_b + O_b)}{\theta(1 - \tau)} B_t^{pub} \text{ — 1.18}$$

For level of skilled education, the condition is -

$$\frac{S_t^{pri}}{C(\theta, \delta, q_b, q_s O_b O_s)} \geq S_t^{pub} \text{ or, } \frac{\delta W_t^h (1 - \tau)}{(q_s + O_s)} \geq C(\theta, \delta, q_b, q_s O_b O_s) S_t^{pub}$$

$$\text{or, } W_t^h \geq \frac{C(\theta, \delta, q_b, q_s O_b O_s)(q_s + O_s)}{\theta(1 - \tau)} S_t^{pub} \text{ — 1.19}$$

The threshold value of $C(\theta, \delta, q_b, q_s O_b O_s)$ can be derived by putting the equilibrium values in preference function as follows.

$$C(\theta, \delta, q_b, q_s O_b O_s) \geq \left[\frac{O_b O_s (q_b + O_b)^\theta (q_s + O_s)^\delta}{\theta^\theta \delta^\delta (1 - \theta)^\theta (1 - \delta)^\delta} \right]^{\frac{1}{(1 - \theta - \delta)}} W_t \text{ — 1.20}$$

The threshold value of income choosing private education in a dual education system is $C(\theta, \delta, q_b, q_s O_b O_s) \geq \left[\frac{O_b O_s (q_b + O_b)^\theta (q_s + O_s)^\delta}{\theta^\theta \delta^\delta (1 - \theta)^\theta (1 - \delta)^\delta} \right]^{\frac{1}{(1 - \theta - \delta)}}$. Families with income below this threshold level will choose public school and the other families will choose private school to educate their children.

The evolution equation for wage earnings in the dual education system is as follows.

$$\ln W_{t+1}^{pub} = \alpha \ln B_{t+1}^{pub} + \beta \ln S_{t+1}^{pub} + \rho (\ln W_t^h - \alpha \ln B_t^{pub} - \beta \ln S_t^{pub}) + U_{t+1}$$

$$\text{if } W_t^h \geq \frac{C(\theta, \delta, q_b, q_s O_b O_s)(q_b + O_b)}{\theta(1 - \tau)} B_t^{pub}$$

$$\text{and, } W_t^h \geq \frac{C(\theta, \delta, q_b, q_s O_b O_s)(q_s + O_s)}{\theta(1 - \tau)} S_t^{pub} \text{ — 1.21}$$

Otherwise, the evolution equation for wage earnings in the dual education system is as follows.

$$\ln W_{t+1}^{pri} = \alpha \ln B_{t+1}^{pri} + \beta \ln S_{t+1}^{pri} + \rho (\ln W_t^h - \alpha \ln B_t^{pri} - \beta \ln S_t^{pri}) + U_{t+1} \quad \text{--- 1.22}$$

Decision-3(a): In dual education system, families having income higher than or equal to the threshold income will send their children to private schools and families having income lower than the threshold value will send their children to public school.

Decision-3(b): The threshold value of income for consumption is function of education preference parameters, direct cost of education parameters and opportunity cost of education parameter.

From decision-3(a) and 3(b), we can make the following proposition.

Proposition-4:

Families with higher income group choose private school and the ones with lower income group choose public school.

Proof: In a dual education system, families will choose private school if the utility in terms of consumption derives from the private basic level of education; and private skilled level of education is greater than or equal to the utility from public system. That means the following conditions are satisfied.

$$\frac{B_t^{pri}}{C(\theta, \delta, q_b, q_s O_b O_s)} \geq B_t^{pub} \text{ or, } \frac{\theta W_t^h (1 - \tau)}{(q_b + O_b)} \geq C(\theta, \delta, q_b, q_s O_b O_s) B_t^{pub}$$

$$or, W_t^h \geq \frac{C(\theta, \delta, q_b, q_s O_b O_s)(q_b + O_b)}{\theta(1 - \tau)} B_t^{pub}$$

For level of skilled education the condition is -

$$\frac{S_t^{pri}}{C(\theta, \delta, q_b, q_s O_b O_s)} \geq S_t^{pub} \quad or, \frac{\delta W_t^h (1 - \tau)}{(q_s + O_s)} \geq C(\theta, \delta, q_b, q_s O_b O_s) S_t^{pub}$$

$$or, W_t^h \geq \frac{C(\theta, \delta, q_b, q_s O_b O_s)(q_s + O_s)}{\theta(1 - \tau)} S_t^{pub}$$

These two conditions will be satisfied when the threshold consumption is equivalent to the following value.

$$C(\theta, \delta, q_b, q_s O_b O_s) \geq \left[\frac{O_b O_s (q_b + O_b)^\theta (q_s + O_s)^\delta}{\theta^\theta \delta^\delta (1 - \theta)^\theta (1 - \delta)^\delta} \right]^{\frac{1}{(1 - \theta - \delta)}}$$

The rich families are those whose income exceed this threshold value and the poor are those whose income fall below this value •

Now I am going to derive the time path of wage earnings evolution function for both families who send their children in private school and the ones who send their children in public school. Wage earnings evolution time path for families who choose private school is as follows.

$$\begin{aligned} \ln W_{t+n}^{pri} &= (n. \alpha - \rho^n \alpha) \ln B_t^{pri} + (n. \beta - \rho^n \beta) \ln S_t^{pri} + \rho^n (\ln W_t^h) \\ &+ \frac{1}{(1 - \rho)} U_t \end{aligned} \quad \text{--- 1.23. since, } |\rho| < 1.$$

Wage earnings evolution time path for families who choose public school is as follows.

$$\ln W_{t+n}^{pub} = (n\alpha - \rho^n \alpha) \ln B_t^{pub} + (n\beta - \rho^n \beta) \ln S_t^{pub} + \rho^n (\ln W_t^h) + \frac{1}{(1 - \rho)} U_t - 1.24, \text{ since } |\rho| < 1.$$

Simulation: Opportunity Cost Effect

Now I am going to simulate equilibrium level of basic education and skilled education in fully private, fully public and dual education system to show how the opportunity cost change affects school participation rates. To do this, I have to assume some realistic values of parameters. The realistic values of preference to basic and skilled education lie between 5% and 10%. The standard shares of basic and skilled education in individual's wage earnings lie between 30% and 40% respectively. The Statistical Year Book of Bangladesh -2000 reported that in the year 1997, the monthly average private cost of primary, secondary and higher level of education were respectively Taka 400-600, Taka 600-1000 and Taka 1200 -1500.(P.548). At that time, the minimum income of an individual was Taka 4000 (including fringe benefits). I have, therefore, assumed that the direct cost of education in basic level and skilled level is 10% and 25% respectively. The Prime Minister's Office of the People's Republic of Bangladesh estimated that the average monthly wage of an unskilled and a skilled worker is US\$ 30 and US\$50 respectively without fringe benefits. Thus, I have assumed the ratio of basic level to skilled level of

opportunity cost parameter value to be 1:1.5. I have assumed the opportunity cost parameters and wage parameter values without any unit of measurement. I have also assumed the minimum income of a family to be 10 units.

Table-1.1 shows the simulated result of equilibrium values of basic level of education in different systems of education with different values of basic education parameter, θ and opportunity cost of basic education parameter, O_b . When the opportunity cost of education is the highest, the dual system offers the lowest, public education system ensures the second lowest and private education system guarantees the highest equilibrium education. On the other hand, when the opportunity cost is the lowest, public system offers the highest, private system ensures the second highest and dual system offers the lowest level of equilibrium basic education.

Table -1.1: Equilibrium basic education in different system by changing opportunity cost

O_b	B_{t+1}^{pri}	B_{t+1}^{pri}	B_{t+1}^{pub}	B_{t+1}^{pub}	B_{t+1}^{dual}	B_{t+1}^{dual}
	$\theta = 0.05$	$\theta = 0.10$	$\theta = 0.05$	$\theta = 0.10$	$\theta = 0.05$	$\theta = 0.10$
1	0.4545	0.9090	0.475	0.95	0.4318	0.8636
2	0.238095	0.4761	0.2375	0.475	0.2261	0.4523
3	0.16129	0.3225	0.1583	0.3167	0.1532	0.3065

Table-1.2 shows the simulated result of equilibrium values of skilled education in different systems of education with different values of skilled

education parameter, θ and the opportunity cost of skilled education parameter, O_s . When the opportunity cost of education is the highest, the dual system offers the lowest, public education system ensures the second lowest and private education system guarantees the highest equilibrium education; while, when the opportunity cost is the lowest, public system offers the highest, private system ensures the second highest and dual system offers the lowest level of equilibrium basic education.

Table -1.2: Equilibrium skilled education in different system by changing opportunity cost

O_s	S_{t+1}^{pri}	S_{t+1}^{pri}	S_{t+1}^{pub}	S_{t+1}^{pub}	S_{t+1}^{dual}	S_{t+1}^{dual}
	$\theta = 0.05$	$\theta = 0.10$	$\theta = 0.05$	$\theta = 0.10$	$\theta = 0.05$	$\theta = 0.10$
1	0.333333	0.6667	0.34	0.68	0.283333	0.5667
2	0.181818	0.3636	0.17	0.34	0.154545	0.3090
3	0.125	0.25	0.113333	0.2266	0.10625	0.2125

The simulation results support the proposition-3. From both of the tables, we can say that an increase in the value of preference parameter directly increases equilibrium value of education in all systems.

Simulation: Wage Earnings Distribution:

Now, I am going to simulate the wage earnings path of private and public education systems for 30 successive generations. Assume that the coefficient of correlation between parent's ability and child's ability, $\rho = 0.6$

and expected value of ability, $E(A_t) = 1$. The following figure shows log values of wage path of privately and publicly educated individuals. At initial time period, both the systems generate equal wage earnings but wage earnings of private education system declines more rapidly than public education system.

Figure 1.7: Wage earnings paths of 30 consecutive generation in private and public systems

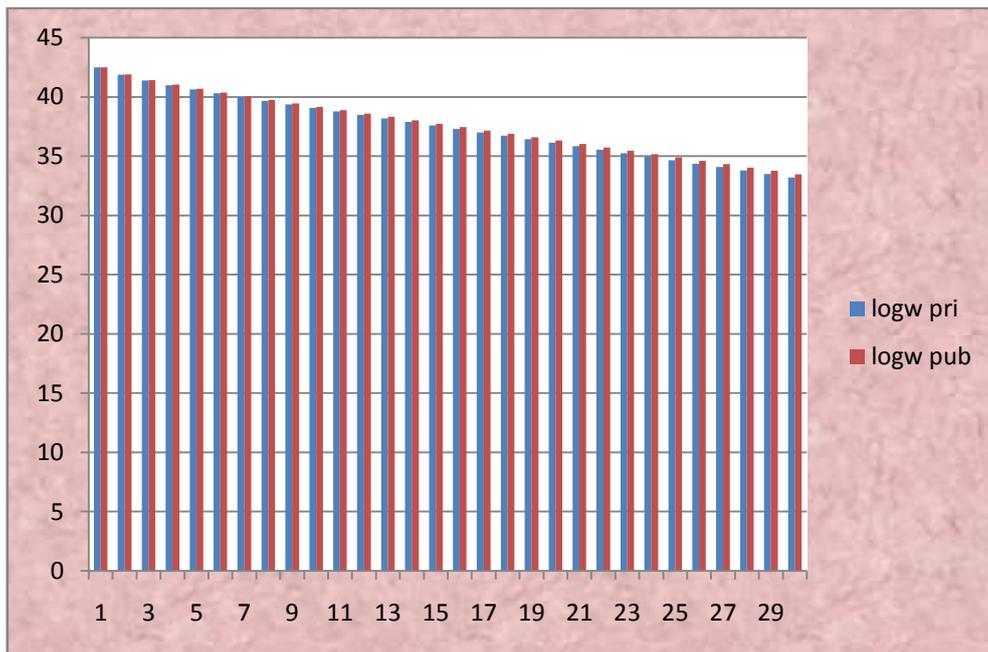


Table-1.3 shows the summary of descriptive statistics for the wage earning paths of both education systems. We see the mean wage earning of an individual, educated from public system, is higher than that of the one from private system and the standard deviation of public system is lower than that of private system. This implies wealth inequality would be lower in public education system compared to private system.

Table - 1.3: Descriptive statistics for the wage earning paths of both education systems

Descriptive Statistics: Wage earnings path of private system		Descriptive Statistics: Wage earnings path of public system	
Mean	37.51426	Mean	37.65601
Standard Error	0.49052	Standard Error	0.475656
Median	37.45007	Median	37.59228
Mode	#N/A	Mode	#N/A
Standard Deviation	2.686688	Standard Deviation	2.605274
Sample Variance	7.218294	Sample Variance	6.787452
Kurtosis	-1.06571	Kurtosis	-1.06169
Skewness	0.110862	Skewness	0.113757
Range	9.289829	Range	9.01825
Minimum	33.19274	Minimum	33.46799
Maximum	42.48257	Maximum	42.48624
Sum	1125.428	Sum	1129.68
Count	30	Count	30

Using mean and variance of 30 generations log of wage earnings, I have simulated 2000 individual's wage earnings both having private and public education by random number generation technique. The following figure- 1.8 and figure-1.9 respectively show the log of wage earning distributions of 2000 privately educated individuals and 2000 publicly educated individuals. Comparing these two distributions, we can say that public system has high kurtosis value than private system. This implies public education system generates less income inequality in the society than the private system, which supports the proposition-2.

Figure 1.8: Log wage distribution in private system

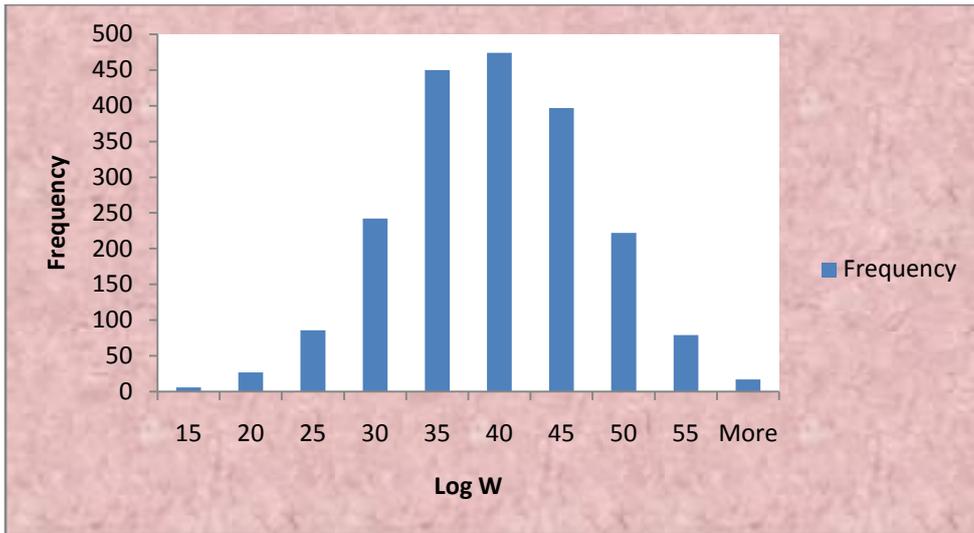
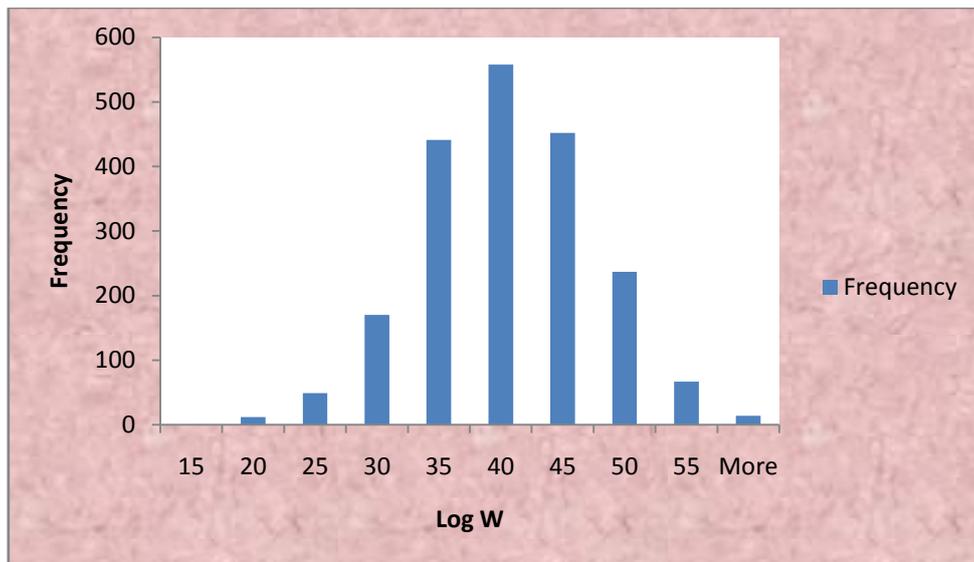


Figure 1.9: Log wage distribution in public system



Conclusion:

In this paper, I have focused on finding out the causes of failure in implementing the 'Compulsory Primary Education Act-1990' in Bangladesh. The descriptive analysis of empirical data suggest that the annual government allocation for primary education is not enough to encourage full time school participation although it is usually one-third of

the educational budget. Since, the opportunity cost of participating in full time school is very high in a less developed country like Bangladesh, I have developed a model to explain how the opportunity cost of education affects school participation rates in an economy; where I have proved that high opportunity cost reduces equilibrium participation and state provided free education does not ensure that all children enjoy the same level of education. It depends on the magnitude of the product of parent's disposable income, education preference and magnitude of opportunity cost of education in the family. If the former is stronger than the latter, average education will be higher and vice versa. I have also proved that equilibrium levels of education both basic and skilled are lower in private system than public system; the distribution of wage earnings is more unequal in the private system than public system; dual education system is always worse than either fully private system or fully public system; families with higher income group choose private school and with lower income group choose public school.

I would like to recommend the policy makers of a country who wants to introduce compulsory education system at any level, either basic or skilled, would need to introduce stipend, which should be equal to the opportunity cost of attending school, for the individual whose either education preference is low or income level is below threshold value. Allocation of more resource in any sector is primary concern of policy makers especially in developing country, that is why policy makers might not be interested in increasing public education expenditure. Research

shows that any increase in public education expenditure is 'Pareto Improvement' for the country (Emran M.M, 2010). That is why I do believe that my recommendation and findings would certainly raise the country's economic status to a better off one.

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