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Education Led Productivity Gap in Bangladesh

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Abstract: *Human capital generates economic growth via productivity is proved by both theoretically and empirically, however, failing to comprehend that fact the government of some countries prioritize other areas over human capital and tend to invest less on education. This study attempts to measure the education led productivity gap in Bangladesh and some selected countries to notify the policymakers of the risk to stability and prosperity posed by the underinvestment in education. Applying the World Bank's new approach of preparing the Human capital index, this study found that Bangladesh enjoys 55% of productivity relative to the benchmark of a complete education. Among Southeast Asian countries, Sri Lanka is doing better than Bangladesh, India, Nepal, and Pakistan, but not up to the level of Japan, Singapore, and Thailand. Generally, countries with better economic growth can enjoy higher education led productivity than economically weak countries.*

Keywords: *Education, Productivity and Economic Growth*

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I. Introduction

After the emergence of human capital theory, it draws enormous attention by economists to explain the role of human capital in economic development in theoretical and empirical research works. The constituents of human capital such as knowledge, skills, and health, that people accumulate over their lives, enabling them to be more productive, flexible, and innovative. Human capital complements physical capital in the production process. 'There is a growing consensus that human capital is an important determinant of productivity, both at the individual and at the aggregate level, and that its role is particularly crucial in today's knowledge economy' [1]. Research outcomes provide the ground that human capital, especially education, plays a crucial role in fostering technological change and diffusion, innovating new technologies, and a necessary factor for their adoption and efficient use. As technological change and new production methods are shaping the world economy nowadays, the role of education is even more critical. As a result, education is considered as the cornerstone of economic and social development because social development is interlinked with economic development.

A key factor in promoting economic development is to increase the productivity of economic inputs. Human capital embedded in labour input constitutes one and a very crucial element in the productivity equation, who mix labour with other inputs using their knowledge, skill, and capabilities. After independence, the economy of Bangladesh has gone through a structural transformation, as its share of the agriculture sector to Gross Domestic Product (GDP) is declining, and the share of industry and service sectors are increasing day by day. The share of agriculture in GDP has declined from over 60 percent to less than 20 percent, whiles the relative significance of industry (including manufacturing) is increasing, currently estimated to be 28 percent of GDP [2]. In its economic growth endeavor, manufacturing sector-led development process gets the priority enshrined in its perspective plan 2010-2020. Its manufacturing sector is narrowly concentrated in low technology-based sub-sectors and faces the challenges in diversification and productivity enhancement [2]. The manufacturing sector in Bangladesh is facing challenges in terms of low-quality human resources represented by the shortage of skilled workers and a lack of entrepreneurial and managerial skills. Entrepreneurs are bound to recruit foreign workers with high salary despite the fact that Bangladesh is a labour abundant country. The number of educated unemployed workforce is also large, but due to the lack of adequate skills, they are denied having a job. This unutilized human resource implies the loss of economic growth and drainage out of valuable foreign currencies.

To aware of the governments about the cost of inaction or disproportionate action and reinforce the demand for investment in human capital through country engagement and analytical work, the World Bank launches the Human Capital Project. The project considers the complex issues in developing Human Capital

Index: insufficient and wasteful spending, governance and service delivery challenges, population dynamics, fragility and conflict, and gaps in infrastructure to emphasize the coordination across all levels of government and continued leadership. It has prepared a Human Capital Index (HCI), which is presented at the Annual Meetings of the International Monetary Fund and The World Bank Group in Bali, Indonesia, on 18 October 2018. The HCI applies new analytical ground for different components of human capital and draws attention to the relationship between human development and the broader impact on economies, which is a crucial consideration and vital for many policymakers.

1.1. Statement of the Problem

Despite the immense potential of human capital to economic growth, economies are not well prepared for their human resources. The world is evolving with the changing technology. The nature of work is changing with the change in the technology-led production processes. In these circumstances, the priority to make the most of this evolving economic opportunity is to invest more in human capital. Now a day, labour markets opt for three types of important skills: advanced cognitive skills to solve the complex problem (problem-solving skill), socio-behavioral skills to work as a team (teambuilding skill), and adaptability, skill combinations that are predictive of reasoning and self-efficacy. Building these skills requires strong human capital foundations and lifelong learning [3]. Bangladesh, a developing country, allocates 7.88 % of its national budget to the education sector in 2016-17 [4], where it should be 20% according to the United Nations Educational Scientific and Cultural Organization (UNESCO). This poor allocation is reflected in its position on the Human Development Index of World Bank, where it occupies 106 positions out of 157 countries [5]. To achieve the education target of Millennium Development Goals (MDG), Bangladesh is promoting equity in access to the school that leads to the quantitative expansion of education, but the quality is not up to the mark yet. Due to resource constraints, quality-enhancing training facilities for teachers is inadequate; teacher-student ratio and dropout rate are still high. In addition to that, education is less responsive to market demand [6]. Researchers have frequently stated that education improves productivity, which leads to economic growth; therefore, inadequate education in terms of delivery, management, and the like may cause the loss of productivity and economic growth. The motive of this paper is to find out the education led productivity gap in Bangladesh. The motive of this paper is to find out education led productivity gap in Bangladesh.

1.2. Rationale

The outcomes of investment in human capital take a long time to materialize. That is why policymakers sometimes remain skeptical about investing in human capital, though human capital is a central driver of sustainable growth and poverty reduction [7]. Many developing and underdeveloped countries' investments in human capital are much below the required level, resulting in prolonged sustenance in poverty. Measurement of human capital and its productivity aware the governments to invest in human capital and intended them to learn and implement appropriate policy to boost up human capital and compare its status internationally. Economic growth and competitiveness is the outcome of improved productivity. Productivity measurement is the pre-requisite to improve productivity. It defines how efficiently production inputs are used in the process of production. Growth of productivity depends on different sources where human capital is the most crucial among sources. 'Measurement spurs the demand for policy interventions to build human capital in countries where governments are not doing enough. Most governments commit a significant share of their budgets to education and health, but public services are often too low quality to generate human capital [3]. As a health and education provider, the government can play a vital role in improving human capital and as a regulatory authority control accreditation and quality of the private providers. This study is an attempt to find out the productivity gap due to human capital, especially for education, that helps policy planners revisit the challenges that lead to the poor-quality delivery of educational services and that they are resonated for adopting pro-human capital policies to boost up economic growth. The remaining part of this paper is arranged as section 2 details the conceptual framework, section 3 presents data and method in brief, and section 4 includes the results, and discussion with policy implications and section 5 concludes the paper.

II. Conceptual Framework

The human capital theory and the conceptual footing of the World Bank in Human Capital Project serve as the theoretical and conceptual framework of this study. The proponents of human capital theory [8][9][10][11][12] have believed that human capital, such as education, and training, contributed to raising human productivity. Realizing the potential of human capital, the World Bank has prepared a Human Capital Index (HCI), which is used to compare stock of human capital internationally and bolster investment in human capital across the globe. The HCI of World Bank assumes the amount of human capital as a newborn child expects to achieve up to his/her eighteen years of age. The achievement of human capital differs from country to country due to poor health and education. It has three components: 1. Survival- this component measures

survival by using the under-5 mortality rate. 2. Expected years of the learning-adjusted school-this component includes a quantitative and qualitative measure of education. The quantitative measure is the expected years of education up to eighteen years of age. Children learning based on countries' relative to international student achievement tests measure the quality of education. This combination produces the expected years of learning-adjusted school, which reflects the reality that by staying the same time in school, children in some countries learn less compared to children in other countries. 3. Health- the rate of stunting of children under age five, and the adult survival rate (the proportion of 15-years-old who will survive until age 60) combines to present a country's overall health environment. The contribution of a worker to productivity is measured by the health and education components of the index. The index is prepared by the project from the evidence of rigorous micro-econometric empirical studies.

The project assumes fourteen years of high-quality schooling of a child as a benchmark schooling within eighteen years of age as full education to prepare the education index of HCI. The health index assumes a child with no stunting and sixty-year survival as full health. If the human resource of a country enjoys full education and full health, it will score 1, and the lowest score is 0; that is, the education and health indices range between 0 and 1.

The measurement of human capital is complex. It depends on the objective of research, definition, and availability of data. Researchers in the absence of credible data or internationally comparable data often use the simplistic, partial, or proxy measurement of human capital, which captures the quantitative measure of human capital. 'The first step in the project is an international metric to benchmark certain components of human capital across countries' [13]. The first and foremost important thing is to measure human capital by using the same yardstick unless it is not an internationally comparable human capital index for global use. School or education component in HCI is derived by benchmarking expected years of schooling, Harmonized Test Score, and Learning Adjusted Year of Schooling. This project uses data from 192 countries to develop a benchmark of the expected year of schooling. The year of schooling that a child can expect to complete by his /her 18 years of age is defined as the expected year of schooling. The sum of enrollment rates at age 4 to 17 is defined as expected years of schooling, and the range is zero to fourteen. Age-specific cross-country enrollment data is not available, level-specific enrollment data is used to approximate age-specific data, such as, age 4 to 5 is preschool age, the age bracket of primary school is 6 to 11, lower secondary is 12 to 14 and upper secondary is 15 to 17. Therefore, within 18 years of age, a child is expected to complete 14 years of school. Fourteen years of school is taken as the benchmark of expected years of school and it captures the quantitative measurement of education.

The benchmark of expected years of schooling of children from preprimary at years four up to eighteen years of age is fourteen, but learning varies across countries due to the differences in the education delivery mechanisms and education management systems. Cross-country measurement of quality of education by a common yardstick is very much complicated. What children learn within the expected years of schooling, that is to capture the qualitative measure of education, expected years of schooling is converted into learning adjusted years of school. The World Bank Group and its partners have prepared a comprehensive new database of international 'student achievement test scores' to get a benchmark of learning adjusted years of school. The database includes major international student's achievement testing programs cover nearly 160 economies. The project then harmonizes test scores from international and regional testing programs so that they are comparable. The common yardstick is prepared by harmonizing learning outcomes of major international tests such as Trends in International Mathematics and Science Study (TIMSS) testing program, the Progress in International Reading Literacy Study (PIRLS) and the Programme for International Student Assessment (PISA). In addition to that, in this process, three major regional testing programs, the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), the Program for the Analysis of Education Systems (PASEC),and the Latin American Laboratory for Assessment of the Quality of Education (LLECE) are explored.

In most cases, the tests are designed in such a way that they can represent nationally. The project gets the country-level variation of test scores that ranged around 300 to around 600 on average. Considering the test scores, a score of roughly 400 is taken as a benchmark of minimum proficiency set by the Programme for International Student Assessment (PISA), the largest international testing program and then converted the scores to TIMSS unit, which corresponds to the benchmark of advanced achievement score 625 of TIMSS. Learning-adjusted years of school are obtained by multiplying the country level expected years of school by the ratio of country-level harmonized test scores to 625 of TIMSS.

Overall, the human capital of a country is measured by the HCI. This index is constructed by multiplying the contributions of three components of human capital- survival, school, and health in the index to relative productivity, as follows:

$$HCI = Survival \times School \times Health \quad (1)$$

The education component is measured by the gap in adjusted year schooling in Human Capital Index by the following equation:

$$School = e^{\varphi\,(Expected\ \ years\ of\ school \times \frac{Harmonized\ \ Test\ Score}{625} - 14)} \qquad (2)$$

Where φ = Return to Education = 8% = .08

The education's contribution to productivity interpretation is anchored with the 'returns to education' at the individual level. The evidence of large empirical literature measuring the 'return to education' provides a rough consensus that an additional year of school increases earnings by about 8 percent. Equation 2 provides the gap in learning-adjusted years of school to the benchmark learning adjusted year of school 14 years. The gap provides the productivity gap relative to the benchmark of the full education component of human capital index. The return to earning is usedto convert differences in learning-adjusted years of school across countries into differences in worker productivity.

III. Data and Method

The comprehensive method of measuring the education component of human capital is introduced in 2018. The data of expected years of schooling and harmonized test scores are available only for the year 2017 on the World Bank database as well as UNDP's Human Development Report [14]. This study applies World Bank's method of measuring schooling component in human capital index to estimate the productivity gap related to education.

IV. Result and Discussion

In Bangladesh, expected years of schooling is 11.2 years in 2019 (hdr.undp.org), which is a child by 18 years of age who expects 11.2 years of schooling instead of 14 years. Therefore, learning adjusted years of schooling, which captures the quality component of education, is 6.6.

$$L\,earning\ Adjusted\ Years\ of\ Schooling = Expected\ Years\ of\ Schooling \times \frac{Harmonized\ Test\ score}{625}$$

$$= 11.2 \times \frac{368}{625} = 6.6$$

A child, though completed 11.2 years of schooling, his or her learning is equal to only 6.6 years of schooling. That is, the loss of learning is equivalent to (11.2 - 6.6 = 4.6 years) 4.6 years of schooling on average. In the Human Capital Index, the education component is measured by the following equation:

$$School = e^{\varphi\,(Expected\ \ years\ of\ school \times \frac{Harmonized\ \ Test\ Score}{625} - 14)}$$

$$= e^{.08\,(11.2 \times \frac{368}{625} - 14)}$$

$$= 0.5529$$

The gap in learning-adjusted years of school multiplied by returns to education provides a gap in workers (human resources) productivity relative to the benchmark of a complete education.Therefore, the productivity related to learning adjusted year of schooling in Bangladesh is only 55% of what it would be under the benchmark of a complete education, a partial measure of human capital in the Human Capital Index.

Gender Based Productivity Gap

Male

$$Education = e^{\varphi\,(Expected\ \ years\ of\ school \times \frac{Harmonized\ \ Test\ Score}{625} - 14)}$$

$$= e^{.08\,(10.8 \times 5.88 - 14)}$$

= 0.5426 (taken common Harmonized Test Score for male and female)

Female

$$Education = e^{\varphi\,(11.6 \times \frac{Harmonized\ \ Test\ Score}{625} - 14)}$$

$$= e^{\varphi\,(11.6 \times 5.88 - 14)}$$

= 0.5634 (taken common Harmonized Test Score for male and female)

Therefore, the gap in productivity is higher for male than female because females have 56% productivity, and males have 54% productivity than it would be under the benchmark of complete education 14 years.

Education Led Productivity Gap in Selected Countries

Table 1 shows that among South East Asian Countries, Sri Lanka enjoys the highest education-led productivity but still below Singapore, China, and Thailand. These countries achieved relatively better economic growth than South East Asian Countries having better education led productivity than South East Asian Countries. Southeast Asian countries should prioritize human capital development to achieve a sustained higher level of economic growth, allocate more budget on education, and learn from experiences of advanced countries for proper implementation of the education budget.

Tab-1: Comparison of Education Led Productivity Gap among Selected Countries in Asia in 2018

Name of the Country	Expected Year of Schooling	Harmonized Test Score	Education Led Productivity Gap
Bangladesh	11	368	55%
China	13.2	456	71%
India	10.2	355	52%
Japan	13.6	563	88%
Myanmar	9.9	425	56%
Malaysia	12.2	468	68%
Nepal	11.7	369	57%
Pakistan	8.8	339	48%
Singapore	13.9	581	92%
Sri Lanka	13	400	64%
Thailand	12.4	436	65

V. Conclusion

The government allocates a significant budget to the education sector; little is known about the cost-effectiveness of this expenditure in Bangladesh. Empirical evidence supports education's productivity enhancing role, which in turn promote economic growth, in Bangladesh, does education play its due role need to explore. Therefore, the research on the relationship between education and productivity by using different methodologies and analytical frameworks can unveil the truth. The present study by using the World Bank's new measures of HCI provides a dismal feature of education led productivity gap in Bangladesh, steps to be taken to improve the productivity of human capital through improving quality and quantity of education. Closing of education's quality gap can be done by improving the learning of students through integrated efforts. It covers infrastructures, curriculum, teachers' recruitment process, teachers' training, and education delivery process. The government has done well and is doing to improve student enrollment rate and retention rate; however, this is a cross-cutting issue that needs to be addressed simultaneously. Poverty bares, for example, especially male students from staying school. They opt for earning to support family expenses. Otherwise, this country cannot enjoy full benefit or at least the similar benefit enjoying by countries like Malaysia, Vietnam, and others from education led productivity. The loss of productivity is the foregone economic growth, a national wastage that cannot be continuing. In the advent of the fourth industrial revolution, the country needs to prepare its human resource base for embracing it; the education sector needs urgent restructuring. Special attention is due to improve the quality of learning. A rigorous education sector review from pre-primary to tertiary level focusing on quality enhancement is to be done.

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