Cost of Educational Deprivation: A Case of Pakistan

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ABSTRACT

Being a developing country, with a hugely deprived educational profile, Pakistan is facing huge cost of its millions of uneducated and out of school population. Though we know that lack of education imposes costs on individuals and society, however no precise estimates of such costs are available. This research attempted to explain the cost associated with massive educationally deprived population in Pakistan by using HIES-PSLM 2018-2019 dataset in the light of human capital theory and capability approach. The results showed gigantic loss of income for Pakistan due to the current educational profile of labor force which includes enormous population with no education or lower level of education. Given the results, we can say that if every individual in Pakistan receives at least 10 year of schooling according to SDG Goal 4, then Pakistan could have thousands of billion more income which not only stimulate further economic growth but a wider development in every sphere of life at individual as well as collective level.

Keywords: Pakistan, Development, Human Capital, Returns to Education, Cost, SDGs
JEL Classifications: O1, O2, I2, I3

1. INTRODUCTION

A quick review of pre-WW-II development discourses reveals the dominance of economic perspective emphasizing the availability and growth of economic resources as the key to societal development. This perspective with various interpretation remained dominant in the post-world-war two period till 1980s, when development experts across the globe felt stagnation, a so-called development impasse in the development thinking after recognizing failures of traditional development philosophy in generating efficient responses against various socio-economic problems such as poverty, inequality, unemployment, conflicts, market inefficiencies, lack of growth, and distribution of resources (Booth, 1985). This very situation urged academia to re-assess the development thinking to move forward for a breakthrough for a sustainable, inclusive and holistic development of societies (Schuurman, 1993). Some important breakthroughs in the post 1980s development thinking then emerged which changed the dynamics of growth and development of societies. First, Social

as well as Political parameters were recognized equally important for the sustainable development of a society in addition to its economic attributes. Second, the missing link in development planning were identified, resulting the inclusion of development beneficiaries in development planning in an inclusive bottom-up participatory development model contrary to the top-down development approach. Third, a major shift in the thinking emerged as a realization of the importance of rule of games i.e. the role of social, economic, and political institutions to govern the development process in a nation state framework. Fourth, a wider recognition of individuals, the fundamental unit of a society, as the "mean" as well as the "end" in the development process. This recognition highlighted the importance of individuals and their quality explained by a wider set of capabilities in defining the nature of institutions and hence shaping the path of development for a society. Fifth and the most important breakthrough in post 1980s development thinking emerged as a greater recognition of education as an important factor determining the quality of individuals and hence quality of institutions as well as society

(North, 1991; Chambers, 1997; Robinson and Acemoglu, 2012; Ostrom, 2015). Education, thus, has been recognized to be the most important social commodity that provides the foundations for enlightened, developed, and civilized societies. Supplied through public as well as private channels, education transforms the raw individuals into worthy human capital and hence influences the wellbeing of individual as well as societies through various channels. It enhances the capabilities of individuals and hence offer freedom to the individuals as well as societies to grow. The flipside is that deprivation of education defined by lack of education of masses, deprives the individual and society of freedom explained by limited set of capabilities and hence creates barriers for the wellbeing of individual as well as society. Individuals with less education or no education are thus considered, poor-quality individuals with less freedom to enjoy wider set of functionings in social, economic, and political spheres.

The path of development a society follows mainly depends upon the quality of individuals an economy has and quality of individuals mainly depends upon their capabilities, defining their freedom as well as operational domain to contribute effectively to their own as well as societal growth and development (Sen, 1980). Thus, by recognizing individuals as the means as well as end in the development process, the post 1980 development thinking emphasized the importance of individuals towards the wellbeing of societies.

The capabilities and operational domain of an individual besides dependence on various societal conditions, equally relies heavily upon individuals' personal worth, explained by level of education and hence access to resources. This development thinking seems miles away from its actual sense and application, when analysed in the context of Pakistan. Pakistan with an abysmal educational progress is immensely deprived of educated individuals. Presence of a massive uneducated population on one hand is incapable of generating substantial national resources and hence hinder the speed of economic growth in Pakistan but on other hand is creating huge anxiety in the society through various social, economic, political and security issues requiring huge efforts accompanying massive economic resources. Presence of massive uneducated population in this way is costing Pakistan in terms of lower contribution to the national income as well inefficient utilization of resources leading to fragile and inconsistent economic, social, and political development.

Though we know that lack of education imposes costs on individuals and society, however no precise estimates of such costs are available. This huge void in research makes societies like Pakistan incapable of realizing the importance of education for a sustained, stable, and efficient growth and development. This study seeks to fill this gap by computing the cost of educational deprivation for Pakistan by considering the district level data of Pakistan Social and Living Standard Measurement Survey HIES-PSLM 2018-2019.

The study attempted to successfully achieve two main objectives: First, it estimated the returns to education for the case of Pakistan based on latest dataset; Second, by considering the labor force proportion in the age bracket 25-59 according to educational level, and returns to education estimates, the study has explained the cost associated with massive uneducated or less educated labor force, what we called, the cost of educational deprivation.

This research in the light of earlier explained objectives has been extremely important for identifying and highlighting the value of education and the cost of educational deprivation in terms of lost incomes based on less productive and less efficient massive uneducated population. Computing this income loss is extremely important because if saved or reduced by educating population, this income can put Pakistan on the path of sustainable growth and development. Thus, current situations and future growth perspective of Pakistan become the core motivation for this analysis. This analysis can provide important policy insights by highlighting the losses and their sources associated with educational deprivation.

On applied fronts, the research, by showing the significance of quantity as well as quality of education has provided valuable insights to supplement Pakistan's journey towards achieving various Sustainable Development Goals. Individuals, political leadership, policy makers and society can be induced to pay greater attention to imparting and seeking education if it can be shown that education is the key to growth and development in every domain of life and lack of education is imposing substantial costs for individuals as well as societal wellbeing. By discussing the case of Rahim Yar Khan, this research has highlighted the importance of education for eradication of poverty and hunger; for improvements in health and wellbeing; for quality education; for innovation, infrastructure development, decent work, economic growth, peace, justice, equity and strong institutions. In this context, all the earlier mentioned data sets and estimations generated through this research will support the state towards achieving SDGS by providing the basis for productive, sustainable policies for a long-term sustainable growth and development of Pakistan.

Attempting to achieve the explained objectives, this research is organized as follows. Section 2 provided an overview of Pakistan's development, section 3 describes the framework, data and methodology of this research, section 4 provided the results and section 5 provides result discussion and conclusion of the whole research and suggested policy recommendations.

2. AN OVERVIEW OF PAKISTAN'S DEVELOPMENT

As per sixth population census conducted in 2017, total population of Pakistan stands at 207.78 million. When compared with the results of Population Census 1998, the total population grew at a rate of 2.40% from 1998 to 2017. The urban population rise by 4 percentage points from 32.5% in 1998 to 36.4% in 2017. The female population also depicts a growth of one percentage point from 48% to 49% causing a decline in the sex ration from 108.5 to 105.07. The age structure of population has also changed from 1998 to 2017 as percentage of population in under 15 years of age fell to 30.76% from 43.4%, the working age population on the other hand has risen to 64.5% in 2017 from 53.09% in 1998, and population in the age bracket of 65 and above has also risen to 4.56% from 3.5%. This change in age structure, with shift of population into working age

bracket from youth dependent age bracket has changed the overall age dependency ratio from 88.34 to 65.3, with youth dependency ratio of 57.9% and elderly dependency ratio of 7.4.

The literacy rate of Pakistan also changed from 43.92% in 1998 to 59.13% in 2017 but still Pakistan is ranked 147th out of 165 countries according to global literacy rate ranking, showing a poor state of education. Pakistan, with a 51.5 million uneducated adults and 10 million uneducated youth, is the third amongst top ten states with more than 10 million uneducated adults, second amongst top ten states with 2 million uneducated youth (AEPAM, 2015). In addition, Pakistan is second highest in the world with 22.84 million[1] out of school children in the age bracket of 5-16, representing 44% of the total population (51.53 million) in this age bracket (NEMIS-AEPAM, 2018).

According to the recently conducted Household Integrated Economic Survey (HIES) 2018-2019, from 25,490 households across the four provinces in Pakistan, 61% of the total population has ever attended schools. 30% of the children in the age bracket 5-16 are out of school with 23.56% never been to school and 6.57% attended but dropped out. Overall literacy rate stands at 60% with males 71% and Females 49%. Youth literacy for the age bracket 15-24 is 72%. According to the survey, 14% of the households has computer, 95% has mobile phones and 34% has internet. 45% of the individuals own mobile phone with at least one connection, 8.25% has desktop, laptop, and tablet pc, 5 % has smart phones with 59% are able to use any of the ICT technology for entertainment, 43% able to use social media, 47% are able to email, 17% use computers for presentations, 26% for spread sheet, 32% for file transfer among devices, whereas only 17% possess the advance skills to use ICT for programming.

This miserable state of education, on one hand depicts an inherited disability of the nation towards achieving higher growth and hence a sustainable development and on other hand is a major source of various social, economic, and political problems of Pakistan. The situation is well evident from the performance of Pakistan on various development indicators.

A poor state of education depicts a great failure of Pakistan towards prioritizing education in due course of history. Many social, economic, political, and religious factors played a role behind this state of affairs and kept literacy rate below 60% which also includes a massive population which can only read or write. Lack of resources and lack of will both played well towards poor growth of education in Pakistan. Deficiency of resources due to fragile and inconsistent economic growth, corruption, political instability, weak policies, strong feudal impacts, religious disharmony, regional disputes and a continuous state of war after independence in different forms are the major factors towards extremely slow progress in educating the nation (Zaidi, 2015). Due to slow pace of educational growth in Pakistan, the country is facing challenges on all fronts at micro and macro level. The country has a huge mass of illiterate and unskilled population unable to contribute well in a productive manner for the development of state. Its illiterate population is unable to pick the right political leadership, played in the hands of so-called

religious extremist forces, is ignorant or less enthusiastic towards environmental, health and gender issues. All these areas on one hand hinder the speed of economic growth in Pakistan but on other hand create social, economic, political and security problems requiring huge efforts accompanying massive economic resources to cope with them. In this way presence of gigantic uneducated population is costing development of Pakistan in every sphere (Zaidi, 2005). This situation is evident from Pakistan's ranking on various global measures/indices covering political, economic, and social domains.

Politically Pakistan's ranking of 189 out of 195 states on global political stability index[2], depicts it as the 7th most instable political landscape in the world. In addition to political instability, Pakistan is ranked 120th out of 180 countries on the Corruption Perception Index 2019, depicting the state of fair dealings. According to Global Prosperity Index 2019[3] Pakistan is ranked 140th out of 167 states with 156th place with reference to Peace and security, 122nd for personal freedom, 120th for governance, 127th for enterprise conditions, 128th for market access and conditions, 138th for economics quality, 121st for living conditions, 127th for health, 133rd for education and worst for natural environment with 167th place. This situation is also verified by the poor performance of Pakistan according to the recently published report of globally recognized Human Development Index[4]. Pakistan, with 67.1 years of life expectancy at birth, 8.5 expected years of schooling, 5.2 means year of schooling and $ 5109 GNP per capita (2011 PPP) is currently occupying 152nd place out of total 189 countries for overall Human Development and Gender Development. Also ranked 136th according to Gender Inequality with maternal mortality rate of 178 deaths per 100 live births, adolescent birth rate of 38.8 births per 100 women aged 15-19, twenty percent share of seats in parliament 26.7 % female population with at least secondary education in comparison to 47.3 5 of males and 23.9% of labor force participation for females aged 15 and more in comparison to 81.5% of males. Furthermore, it is a house of 38.3% poor population according to Multidimensional Poverty Index 2019.

Pakistan due to unskilled labor force, inefficient and outdated technology, corruption, and poor governance ranked 110th out of 141 economies regarding global competitiveness according to recent report[5]. The report ranked Pakistan 29th largest economy according to market size, 52nd dynamic business environment and 79th state with reference to innovative potential. Despite this, the state is considered to be lacking a long-term view of competitiveness with mediocre ranking of Pakistan for the rest of 9 out of 12 pillars of Global Competitiveness i.e. Institutions (107), infrastructure (105), macroeconomic stability (116), ICT adoption (131), Health (115), skills (125), product market(126), labor market (120), financial system (99).

In addition to Pakistan's poor global rankings, the average productive capacity of the work force is way behind the economies with higher proportion of educated population. It has been

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1   https://www.unicef.org/pakistan/education

2   https://www.theglobaleconomy.com/rankings/wb_political_stability/
3   Legatum Prosperity Index 2019
4   Human Development Report 2019
5   Global Competitiveness Report 2019

comprehensively explained through schooling-wage relationship that productivity of an educated person on average is 40 to 50% more than an uneducated person. With this observation, an economy relying on uneducated or illiterate labor force bearing an economic loss of almost half of the total output as with educated labor force it can produce twice than with illiterate labor force. Regarding the importance of education towards economic performance, it is explained that better education does not only lead to higher individual income but also is a necessary precondition for long-term economic growth (Lutz et al., 2008). Education is a long-term investment associated with near-term costs, but, in the long run, it is one of the best investments' societies can make in their futures. A report titled 'Economic and Social Cost of Illiteracy' by World Literacy Foundation, summarized different types of social and economic costs related to illiteracy with reference to output, employability, business performance, technological skills, health, crime and welfare (Cree et al., 2012). The report, which looks at the cost of illiteracy in emerging and developing countries, as well as the cost of functional illiteracy in the developed world, points out that illiteracy costs the global economy over USD 1.19 trillion a year. As per the parameters described by Literacy Foundation report, illiteracy costs Pakistan an estimated USD 6 billion and India an estimated USD 53.56 billion. The losses to China are pegged higher at USD 135.60 billion. Russia at USD 28.48 billion and Brazil at USD 27.41 are placed at the third and fourth places, respectively.

In conclusion, if we look at the Socio-political and economic dynamics, Pakistan is a state with massive illiterate population, 2nd highest in the south Asia after Afghanistan. With this huge mass of illiterate population Pakistan is facing crisis in all domains. Economically, Pakistan's productive efficiency, competitiveness, innovativeness, in all major industries including agriculture is lowest as compared to its productive potential. A key factor, among many, of this situation seems to be uneducated and poorly skilled labor force. We can calculate the economic loss due to uneducated population by comparing the current and potential production. Socially, level of human rights violations, crimes, gender issues, terrorism, problems of extremism, and feudalism all are typically at a higher proportion in uneducated population and it directly or indirectly impacts economic development in the state. As per Cree et al. (2012) 85% of the prisoners involved in different types of major or minor crimes in developing world have no education. One of the major causes of under development in rural Pakistan is the hold of feudal system that only stands upon the exploitation of massive uneducated poor population, that restrict them to participate actively in the economic and development process for their own and overall social welfare (Reference).

Politically, Pakistan is ranked among top fragile states where democracy is only symbolic without any real fruits for the common man. One of the major reasons for this fruitless political system seems to be massive uneducated population, less able to take rational and effective political decision on merit. This state of affairs has the potential to lead to the election of inefficient, or incapable political leadership. This in turn hurts overall development through nepotism, corruption, bad governance, wrong policies, inefficient use of resources and authority. These practices at one end weaken the confidence of foreign investors due to inconsistencies in policies committing a heavy economic loss and push nation into depths of desperation and on the other hand invite non-political forces to occupy the state machinery which is evident from more than three decades of military rules in the overall history of Pakistan. This indirectly cost nation in term of fragile political systems and also severely impacts state sovereignty (PILDAT, 2004).

3. FRAMEWORK, DATA AND METHODOLOGY

Recent advancements in the development thinking positioned individuals, the basic unit of every society, at the core of development. Being end as well as mean in the development process, individuals are recognized to be the most important factor in the development of every society since heterogeneities in the development of states in the contemporary development map is explained by the differences of the quality of individuals they have. An overview of global development landscapes provides worthy insights that states who developed rapidly, invested heavily on their individuals to turn them into worthy human capital. These investments when makes individual to have more capabilities and hence access to a wider operational domain, at the same times provided state with the high-quality human capital to generate extra resources as well as strong institutions, and providing foundations for the sustainable development. A further review outlined some common policy traits of highly developed societies that they paid equal attention to the growth of individual parallel to the growth of infrastructure. When they build physical infrastructure, at the same time they focused equally on the quality of individuals to utilize their infrastructure and resources. Quality of individuals in state when required good infrastructure, it also requires massive investments in education and health. These investments lead to an improved life expectancy, improvement in productivity and hence improved level of individuals as well as national earnings. Thus, education stands out to be the most important and influential factors in societies transition from less developed to more developed, and that is only through turning poor quality individuals into high quality productive human resource.

Base on the study objectives, two main areas which this research has focused involves the estimation of Returns to education and Cost of Educational Deprivation. To estimate returns to education we have consulted Mincerian Earning Function in the broader framework of human capital approach. To compute cost of educational deprivation, we have adopted a straightforward computational mechanism that involves the comparison of incomes to explain difference of income generation as the opportunity cost of lower educational profile.

3.1. The Concept of Capital and Human Capital
In difference fields the term capital refers to different meaning: in accounting capital means financial assets to start and run a business enterprise, in economics it generally refers to tangible assets, technology or infrastructure to facilitate the production of want satisfying goods and services, in social sciences capital

means the social infrastructure that provides the foundations of a stable society. Whatever is the field of study or domain, the term capital refers to certain resources which may facilitate the creation of some goods or services. With this interpretation, capital may also include individuals without which it is hard to produce goods and services and which are the ultimate consumers of these goods and services. This perspective of seeing individual as capital can be found in the ever-progressing production theories which first assume individual as a factor of production to produce goods and services by utilizing capital and other resources. In the earlier parts of twentieth century, individual was described to be a special type of capital. Walsh (1935) being pioneer in this respect, in his influential work "Capital concept applied to man" argued that individuals has all the attributes which capital goods assume and hence can be treated as a special capital. This capital also requires investments with similar importance as are required for the physical capital to produce more goods and services. With investments made to human are equally important as investments made in physical capital for growth and development of a society. One of the important investments as explained by Walsh (1935) is investments for educating individuals, this in addition to enhancing the technical skills, will improve the thinking abilities and visions to optimally respond in different social, economic, and political spheres. Education at one end will directly impact the earning potential/lifetime earnings and on other hand it will provide handy tools and information for lowering costs and increasing benefits in different other areas such as physical, mental, and social health, urge for innovation, urge for better environment, and stable socio-political system. Building on this principle (Kendrick, 1961) explained four major types of capital as: tangible human capital which principally refers to quantity of labor force; intangible human capital which encompass the knowledge, expertise, experience, skills and other human attributes qualities which makes them able to produce more, intangible non-human capital that refers to process and procedures, techniques and technologies to facilitate production process; and tangible non-human capital which covers every physical assets, machinery, plants, structures, resources which can facilitate production process. Human capital as explained by (Becker, 1964), refers to the aggregate investment on humans which not only enhances their market capabilities earning potentials but also impact their general life through its wider spillover effects. The phenomenon refers to a combination of innate and acquired skills and abilities throughout the life span of an individual. Innate abilities when depends upon the circumstances of individuals in which they born and grown, the acquired skills on the other hand requires some treatment to facilitate accumulation of knowledge, skills, and health against substantial costs, called investments in human capital.

Individuals at various stages of their life, utilizing both sets of skills and abilities to be more productive and hence enjoy better standards of living and wellbeing. Despite simplicity in the meaning, the concept of human capital is a complex phenomenon and requires a greater grasp of some aspects which may influence its accumulation. Generally, the concept is defined through some specific aspects with some basic's differences from non-human capital. First, human capital consists of both the innate and acquired abilities and skills. Innate human

capital represents the trio of inborn physical, psychological, and intellectual strengths which an individual carry at the time of birth. Acquired human capital on the other hand, represents the intellectual assets and knowledge, technical skills, good health and physical strengths, and capabilities which individuals attain throughout their lifetime through personal contacts and with some investments. Second, non-human capital generally refers to a stock variable and a tradeable good. Human capital on the other hand can be considered as a stock as well as a flow variable based on the components it encompasses which regularly changes with the scale of knowledge, experience, age etc. Furthermore, human capital is a different kind of capital in comparison to physical capital with reference to its marketability and trade, accumulation, financing and returns. Third, decision control regarding the quantity and quality of human capital stock an individual may have varies with the age. Starting from the strict decisional control of parents and various socio-economic institutions, individuals internalize these decisions in the later stages of their lives. Individual, then take decisions based on the micro and macro environment and associated incentives with the level and kind of human capital. Fourth, sources of human capital are both formal as well as informal. Formal sources include the institutional mechanism to transfer essential skills and knowledge to the human in a regulated formal environment. Informal sources of human capital on the other hand encompass the broader ecosystem where individuals live and work. This ecosystem helps individuals accumulate human capital through personal engagements and self-learning. Fifth, human capital can further be categorized based on its domain of operations. The kind of human capital associated with some specific activities or involves some specific skills, knowledge, and training, is called specific human capital. Whereas the kind of human capital that pertains a broader application in the social and economic environment is called as general human capital. Sixth, the stock of specific and general human capital for individuals vary according the level of investments as well as the quality of investments individuals incur while accumulating human capital.

Furthermore, human capital involves both qualitative as well as quantitative aspects. Knowledge is a qualitative face of human capital, but years of schooling an individual has quantitatively represents this human capital. Similarly, same year of schooling from a good quality institution and a bad quality institution also reflects on the human capital of individuals. With this comes the influence of some external factors and quality of broader ecosystem where an individual acquires and apply human capital. For instance, the quality of educational system, the kind of working environment and the social conditions all influence the quantity as well as quality of human capital. In the light of these aspects, the stock of human capital may vary among individuals based on their circumstances and their investments. With reference to its uses, human capital corresponds to a set of marketable and non-market individual characteristics and skills. By marketable it means, those skills and individual attributes which increases the productivity of individual in labor market (Becker, 1993). Most of the literature on human capital address this use by considering knowledge and skills as an essential part of production function.

By non-market uses, it explains the spillover effects of knowledge, skills, training, and good health beyond market for the broader wellbeing of individuals.

3.2. Education and Human Capital Stock

An important attribute that differentiates human from other livings species is the ability to learn and then utilize this learning to generate multiple benefits in the life. A key attribute in this context involves the retention and transmission of the learning/knowledge and skills among people which stands out to be the key to contemporary growth and development on both academic as well as nonacademic fronts. A structure that facilitate this transmission of knowledge is generally referred to as schools and the process through which transmission took place is called schooling, generally called education. Since human capital is the stock of knowledge, the education then corresponds to process of accumulating the stock of knowledge that requires certain investments. Education thus is considered as a major form of investment in human capital. Human capital approach consider education as a triggering force for many positive externalities for an individual as well as society's growth and development in addition to its services for production. It emphasizes the investments in human resources today to generate some private as well as social returns at some future time. Private returns are purely related to the individual's cost and benefits of investment in education. It explains that: what direct cost as well opportunity cost individuals incur for their education; how this education add value into the life and productivity of individuals; and how this improves the earning prospect at some future times (Walsh,1935; Mincer, 1974; Schultz, 1961; Becker, 1964).

Individuals investment in formal education create positive signals regarding their abilities, skills, and set of information which makes them attractive to employers and raise their chances of employment (Schultz, 1961). Their skills gained through education when coupled with their work experience makes them more competitive in labor market to have more private return in terms of higher current earnings and to accumulate more life time wealth than those with less education (Mincer, 1974). As far as social returns are concerned, these are explained by the investments plus opportunity costs incurred by the society towards educating an individual and the benefits associated with these investments. So, educating an individual by the society does not only create value for that individual, it is equally valuable for the whole society as it will enhance the productivity and earning potential of the whole society (Riddell, 2006). Contemporary research has recognized education as the key lever of individual, societal, and global growth, and development. Linking human capital approach with the capability approach, education enable individuals to acquire essential skills and abilities to liberate himself from the economic limitations to enjoy greater economic freedom for his own as well as societal wellbeing. In line with observation we can build on the nexus of education, human capital, and individual quality. To analyse the association of education, the stock of human capital, and quality of individuals, we need to investigate the dynamics of individuals quality and its associated concepts. In the earlier mentioned aspects of human capital, an individual having substantial stock of human capital may well be called a good quality individual in comparison

to the one with a poor stock of human capital. It is hard to exactly quantify or assess the quality of human capital stock and difficult to ensure the full utilization of all the skills, knowledge, and abilities representing the human capital stock. Measuring the quality of individual in this context is a complex phenomenon.

The quality of individuals is explained contextually as there is no universal definition or measure of individual quality based on the subjectivity and complexity the phenomenon entails. Economic theory addressed this complexity through the marketability of human capital representing individual quality by viewing individuals with the lens of how they may impact their own as well as society's economic wellbeing. General production theory explains this impact by considering individuals as one of the major factors of production i.e. labor, responsible for transforming the inputs into valuable outputs by utilizing the physical, technical, technological capital available for production. The extent to which labor contributes to the production process is explained by means of labor productivity, the incremental output associated with each labor unit. The market value of this incremental output provides the basis for the compensation (wages) of labor against their efforts. Labor which contributes more to the production tends to achieve higher wages and enjoy more economic freedom and a wider operational domain. In the light of above, the wage of labor is an effective measure of labor productivity as more productive labor tends to earn more value against their incremental contribution. Wages in this scenario may serve the purpose of a measure to assess the productivity of individuals which may vary greatly among individuals. An individual is called more productive if he or she is earning more in comparison to his peer under the similar circumstances. Concluding on the discussion of human capital, we end up with the year of schooling as a representative measure of acquired human capital and the wages, an individual earn, represents the outcome of his/her stock of human capital and may well be a representative measure of quality of individuals.

3.3. Returns to Education

According to the objective 1, this research has estimated the impact of education (human capital proxy) on the wages of individuals, the two key variables inferred from the previous discussion. The analysis followed returns to education approach as explained by Jacob Mincer, a leading economist representing the Chicago School approach of seeing human capital. The lead scientists in this school such as Becker, Mincer, and Schultz analysed the concept of human capital by considering year of schooling and job experience as the main variables having strong influence on the market wages of individuals. They introduced the idea of returns to education by addressing the linkages of education with wages. The analysis of returns to education occupies a substantial volume of socio-economic literature and significantly contributes towards highlighting the importance of education for individual as well as societal wellbeing. These studies investigated the returns to education by considering varying contexts and data sets and unanimously concluded a positive impact of schooling on wages and hence individual wellbeing. These findings have been at the fore front of policy decisions regarding public interventions in education sector for the holistic wellbeing of societies. The most prominent measure in this regard comes from the Jacob Mincer

in the form of Mincerian Earning Function on the principles of neoclassical theory of capital. He developed a very simple and parsimonious model to assess the returns to education in the broader framework of human capital approach (Mincer, 1974). This model, renowned as Mincerian Earning Function (MEF) in literature, has enjoyed the most popular measure in the subject matter of returns to education. Despite its simplistic structure and various methodological issues, hundreds of the studies on returns to education in varying contexts has used and are using MEF as the foundation of their analysis. MEF is thus globally enjoying the status of a reference framework to analyse the economic impact of education in term of its contribution towards earning potentials of individuals and how this earning potential changes with a change in the educational level? Mincer (1974) explained this relationship by examining the impacts of schooling years on per hour wages, indicated by returns to education or returns to schooling. Another approach which attempted to estimate the returns to education is called elaborate approach. This method by considering the age earnings profiles with reference to education level, attempts to finds the discount rate which equates the stream of educational benefits with the flow of educational investment at a given point in time. The annual stream of benefits according to elaborate method is the earning of particular educational level whereas stream of cost involves the foregone earning as well as investment on schooling. Private rate of return in this approach reflects the behavior of people in seeking different levels and types of education, and as the distributive measures of the use of public resources.

The greatest limitation for the elaborate method is the unavailability of detailed data which is required for the estimation of returns to education according to this method. Since other methods involves detailed data sets or methodological complications, Mincerian framework, the earning function method, on the other hand involves year of schooling, experience and wage earning and this is the most widely used approach in the world despite various limitations of the Mincerian equation, if simplicity is considered for the estimating of the impact of work experience and schooling on wages, the Mincerian equation is hard to beat (Bjorklund and Kjellstrom, 2002).

The earning function method estimates the private returns of education by means of a log linear relationship of wages with the work experience with and without a square term for year of experience and year of schooling. The coefficient on schooling in this relationship corresponds to the returns to education contrary to the short-cut method which computed private returns to schooling as the proportion of years of schooling and earning. The equation presented by Mincer has been widely accepted and referenced since the time of its inception in 1970 and has been used as a standardized method of calculation of returns to investment in education (Psacharopoulos, 1981; Card, 1999; Heckman, et al, 2003; Patrinos and Psacharopoulos, 2010). Based on the fundamental explained by Becker (1964) towards estimation of returns to education in the framework of Human Capital Theory, Mincer (1974) proposed the following standard model based on cross sectional individual differentials to quantify the impact of schooling on individual earning.

$$\text{Log}(W)_i = \alpha + \beta_1 S_i + \beta_2 E_i + \beta_3 E_i^2 + \varepsilon_i \qquad (1)$$

The standard semi-logarithmic model written above, linearly explained variations in the hourly wages (W) through year of schooling (S) an individual has completed and his work experience (E). The model includes a quadratic experience term based on the curvi-linear behavior of wages against labor market experience. Various other studies also consider a variety of other controlling factors such as gender, race, profession, age, location, ethnicity etc. in addition to schooling years and experience in the Standard Mincerian Function to estimate returns to education (Card and Kruegerl, 1992). In contemporary literature, the application of MEF comes with and without consideration of individual abilities or capabilities (Behrman and Birdsall, 1983; Lang, 1993; Behrman and Rosenzweig, 1999; Regan et al., 2006). Most of the studies on returns to education does not account for the individual abilities as it appears in the above model, due to complexities involved in measuring abilities. These studies then evaluated the returns to education by considering abilities as unobserved. This approach of returns to education by assuming abilities as unobserved variable is followed in this research to estimate the returns to education for the case of Pakistan due to unavailability of any observed measure of abilities in the dataset followed for analysis, as explained in the next section.

3.4. Cost of Educational Deprivation

Finally, the framework to compute cost of educational deprivation follows a straightforward computational mechanism, developed solely for this research. The cost is explained in term of opportunity cost of staying with the current educational profile when it is compared with the incomes associated with some improved educational profiles. The difference of incomes is then explained as the income lost or cost of massive uneducated population. Cost is computed by using the outcomes of Wage Function for the case of Pakistan. The cost of educational deprivation, fundamentally, follows the concept of opportunity cost. The concept basically involves the potential and actual incomes associated with each level of education for the labor force in the reference age bracket of 25-59 years. The cost estimation further required the proportion of labor force according to education level. Cost estimation for the case of Pakistan follows a simple approach that involves five steps: First, wages rates for each year of schooling are determined by using the estimates of returns to education. The wage rates determined are multiplied with the total working hours available in a year to yield average annual income for each year of schooling. Second, total, employed, and unemployed working population in the age bracket 25-59 is determined based on the labor force survey 2018-2019. Furthermore, based on the education profile of the population in reference class, the proportion of population according to education level was determined. Based on the education proportions number of persons with each level of education are determined for total, employed and unemployed labor force. Third, multiplying the number of persons in each level of education for three classes of labor force (total, employed and unemployed) with average annual income to compute aggregate income of total and employed labor force as well as income loss of the unemployed labor force. This yielded the total and employed income for each level of education. Summing income of all the educational level generated the total income of all the labor force if assumed employed (at full employment level), total income of all the actually employed persons and value of income loss due to unemployed labor force, all in the age bracket 25-59. Fourth, six improved educational profiles are assumed for the

same working population but with a little improved educational profile from the original educational profile. For instance, profile of case 1 assumes a fifty percent decline in the uneducated population and an equivalent rise in the population with primary education. Based on the six profiles as explained in the section 4, step two and three are repeated to compute the income of total and employed labor force for each of the six profiles. These incomes are then compared with the original profile to explain the difference of income as the cost associated with the current poor educational profile of labor force in Pakistan. Fifth, Step one to four are repeated for the 9 years from 2009-2017 by discounting the labor force and average annual income with the average population growth rate and average income rise in the reference time 2009-2017. Based on these estimates an aggregate loss of income is explained by not having an improved educational profile as of six cases. The whole procedure and estimation results are explained in the next section.

3.5. Data

The need for reliable and quality data is widely emphasized in social research to produce the good and reliable results for reliable and effective empirical analysis. Thus, the pre-requisite for any empirical investigation is the availability of quality data as the method to be used for analysis ought to agree with the nature and quality of data at hand. The design of a study, in this way is defined by the nature of data which then study intends to investigate (Olsen and George, 2004; Wooldridge, 2010). Based on the research objectives defined earlier, this research followed a cross-sectional study design with primary as well as secondary data. Thus, whole analysis of returns to education for the case of Pakistan is done based on well tested credible dataset of Pakistan Social and Living Standards Measurement Survey HIES-PSLM 2018-19 with data of 24809 households from all the districts in four provinces of Pakistan covering urban as well as rural areas. The dataset provides comprehensive account of various indicators on education, health, population welfare, housing, water sanitation and hygiene, information communication and technology (ICT), food insecurity experience scale (FIES) and income and expenditure. In addition to household level indicators, the dataset provides a substantial individual level data of 175,691 individuals with variations according to gender, employment status, schooling, various earned as well as unearned incomes, working days, age, and various other attributes. We have used this individual level data of HIES-PSLM 2018-2019 to estimate the returns to education and then cost of educational deprivation for the whole Pakistan. All the individuals who are working and falls in the age bracket 25-59 were selected for this analysis. With this criterion, the data of 22,006 working individuals from all the districts of Pakistan is used for the estimation of returns to education. Further to this, the data regarding labor force statistics is extracted from the labor force survey 2018-2019.

Despite various issues and limitations, OLS is one of the most widely used estimation technique for the returns to education analysis. This research also used OLS for the estimation of earning function for Pakistan. As discussed earlier, we rely on the data of HIES-PSLM 2018-19 which provides no appropriate instrument which can be used in the return to education analysis and hence makes it difficult for us to use other techniques such as 2SLS or GMM. Based on our data constraints we followed the traditional OLS technique coherent with the analysis a lot of studies in domestic as well as global scale.

4. RESULTS

To analyse the returns to education for the case of Pakistan based on data of 22,006 individuals in the age bracket 25-59, we have used the traditional MEF in the light of various studies (Schultz, 1961; Becker, 1964; Mincer, 1974; Griliche, 1977; Blackburn and Neumark, 1992; Belzil, 2006). Under the available data and research objectives the estimation of returns to education follows the following Wage Function:

$$\text{Log (PHW)} = f (\text{Edu, Exp})$$

Where PHW represents per hour wages, Edu represents the completed schooling years and Exp is the work experience. Per hour wages was calculated by using the available data regarding total annual income, working days in a month, and working hours in a day. Thus, PHW is determined by dividing the reported total annual income of individuals with the total annual working hours[6] based on reported working days per month[7], and average work hours per day. The data regarding work experience was also not available in the PSLM dataset. Work experience[8] is then computed by means of Age and Schooling years. Log of Per Hour Wages is used in accordance with the conventional wisdom to look in the growth of Wages against Schooling (Becker, 1993; Belzil, 2006; Griliche, 1977; Mincer, 1974). The wage function was estimated under two assumptions related to the impact of education and experience in the light of literature. The effect of education on wage growth is widely explained to be positive. Coherent with the academic evidence, we have assumed a positive impact of schooling and work experience on the wage growth (Schultz, 1961; Becker, 1964; Griliche, 1977; Blackburn and Neumark, 1992; Belzil, 2006). Thus, based on our discussion in the previous section we started the estimation of returns to education by assuming:

$$\frac{\partial \text{Log(PHW)}_i}{\partial \text{Edu}_i} > 0 \quad \text{and} \quad \frac{\partial \text{Log(PHW)}_i}{\partial \text{Exp}_i} > 0 \qquad (3)$$

Under these assumptions, we have estimated the three wage equations for whole Pakistan i.e. for all areas, for urban areas, and for rural areas as shown in the Appendices Table 1. The estimates for all areas explained a 10.9% growth in hourly wages with each year increase of schooling or education. Similarly, a 1.8% growth in hourly wages is explained by the work experience. When a dummy variable Urban is introduced in the model to capture the variation based on regional differences, the growth in hourly wages is estimated to be 9.9% for Urban area and 10.6% for Rural areas. Similarly, the effect of experience also varies with region. Urban areas show on average 2.1% growth in hourly wages associated with each additional year of work experience in comparison to 1.5% growth for rural areas. The sign for both the education and work experience for all three models were according the assumptions. With these values the estimated wage rates for the

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6   Total Annual Working Hours = 26*12*8 = 2496
7   Reported average working days per month in PSLM 2018-19 are 26 and average working hours per day are 8
8   Work Experience (EXP) = Age – Education – 5. Here, five represents the average schooling start age

referenced education years are summarized in the Appendices Table 2. Annual earning for each level of education is determined by multiplying annual working hours available with the estimated hourly wage rates. Thus, annual income for each level of education was determined by using 2518 annual working hours per year. The estimates of income against each level are summarized in the Appendices Table 3.

4.1. Income Estimation

With estimation of annual income for each level of education, the next step involves the computation of income of total and employed labor force as well as value of unemployed labor force in the age bracket 25-59. According to the 2017 population census, total population of Pakistan is 207.9 million and 34% of this population (71.65 million) falls in the age bracket 25-59. 61% of the total population aged 25-59 is economically active with 96.3% employed and 3.7% unemployed. 38.21% of the total economically active population belongs to rural areas with 96.9% employed whereas 3.23% unemployed. 22.30% of the total economically active population in age bracket 25-59 belongs to urban areas with 95.3% employed and 4.7% unemployed. Proportion of population with reference to education level was determined for the age group 25-59, these proportion are used to determine the total population for each education level as shown in the Appendix's Tables 4-6. We have estimated the income of total and employed labor force as well as monetary worth of unemployed population by multiplying the education wise population proportions with respective average annual income of rural, urban and all areas. These incomes estimates are explained the following Tables 1-3:

According to our estimates in Tables 1-3, the working population for all areas with the current education profiles has the potential to generate Rs 8686 billion at full employment level but is generating Rs 8365 billion with a loss of 321 billion due unemployment. Similarly, rural areas with the current education profiles has the potential to generate Rs 4041 billion at full employment level but is generating Rs 3853 billion with a loss of 189 billion due unemployment. The urban areas on the other hand has the potential to generate Rs 4458 billion but are generating 4318 billion with a loss of 140 billion due to unemployment.

4.2. Cost Estimation

We have discussed six cases by assuming different and improved educational profiles for the reference labor force population of this research.to elaborate the cost of lack of education or lower level of education. We estimated potential and actual income as well as loss of Unemployment with these six profiles under following assumptions:

- Proportion of total employed, and unemployed labor force remained unchanged for the reference age bracket 25-59
- Average wage rate for each level of education also remained unchanged. Thus, we assume wage rigidity for each education level. This assumption seems valid for the case of Pakistan as wage rates depicts a rigid behavior and only changes with the announcement from the state.

Table 1: Income estimates (all areas)

Education	Education wise estimated average income (PKR billion)		
	Potential income	Actual income	Unemployment loss
0	691	665	26
5	1962	1889	73
8	1886	1817	70
10	1941	1869	72
12	973	937	36
14	760	732	28
16	341	328	13
18	133	128	5
	8686	8365	321

Table 2: Income estimates (urban)

Education	Education wise estimated average income (RS billion)		
	Potential income	Actual income	Unemployment loss
0	495	479	16
5	1300	1259	41
8	1037	1005	33
10	931	902	29
12	350	339	11
14	190	184	6
16	90	87	3
18	66	64	2
	4458	4318	140

Table 3: Income estimates (rural)

Education	Education wise estimated average income (RS billion)		
	Potential income	Actual income	Unemployment loss
0	247	236	12
5	734	700	34
8	837	798	39
10	940	896	44
12	545	519	25
14	477	455	22
16	206	196	10
18	56	53	3
	4041	3853	189

With these assumptions we consider the following six cases for our further analysis:

Cases	Description
Case 1	Half of the population with 0 year of schooling is added to population with 5 years of education
Case 2	All the population with 0 year of schooling is added to population with 5 years of education
Case 3	All the population with 0 and 5 year of schooling is added to population with 8 years of education
Case 4	All the population with 0, 5 and 8 year of schooling is added to population with 10 years of education
Case 5	All the population with 0, 5 and 8 year of schooling is added to population with 10 years of education and 25% of the population with 10-year schooling is added to population with 12 years of schooling
Case 6	No one is below 10 years of schooling, 50% (10 years of schooling), 30% (12 years of schooling), 10% (14 years of schooling), 6% (16 years whereas 4% with 18 or more)

With this description the proportion of population according to six cases for the all, urban and rural areas is shown in the Appendices Tables 7-9. The income of total and employed labor force aged 25-59 for All, Rural and Urban Areas with respect to six proposed educational profiles is computed according to new proportions as shown in the following Tables 4 and 5:

It shows a substantial difference of income when each proposed case is compared with the original case. This highlights the loss of income Pakistan is facing by not having an improved education profile of its labor force in the age bracket 25-59. Tables 6 and 7 shows the difference of income for each of the six cases with reference to original educational profile:

As shown in the Table 6, if Pakistan currently had the education profile of case 1 as in the years 2017, then it could have an extra potential to generate Rs 251 billion of more income with the same population in the age bracket 25-59. Similarly, it could have more potential income of Rs 501 billion, Rs 1721 billion, Rs 3245 billion, Rs 3929 billion, and Rs 5349 billion in 2017 it had the educational profile of case 2, case 3, case4,case 5, and case 6 respectively for same population in age bracket 25-59. Similarly, as shown in the Table 7, Pakistan could have extra Rs 242 billion, Rs 483 billion, Rs 1657 billion, Rs 3125 billion, Rs 3784 billion, and Rs 5151 billion in 2017 with the same employed labor force

Table 4: Income of total labor force as per six profiles

Income of total labor force aged 25-59 (RS billion)			
Cases	All areas	Rural areas	Urban areas
Original	8686	4458	4041
Case 1	8937	4632	4120
Case 2	9187	4795	4199
Case 3	10,407	5593	4594
Case 4	11,931	6529	5113
Case 5	12,615	6903	5372
Case 6	14,035	7858	5780

Table 5: Income of employed labor force as per six profile

Income of employed labor force aged 25-59 (RS billion)			
Cases	All areas	Rural areas	Urban areas
Original	8365	4318	3853
Case 1	8606	4486	3928
Case 2	8847	4644	4004
Case 3	10,022	5417	4379
Case 4	11,490	6325	4874
Case 5	12,148	6687	5121
Case 6	13,516	7612	5510

Table 6: Additional income of total labor force in comparison to original case

Additional income of total labor force aged 25-59 with proposed cases (RS billion)			
Cases	All areas	Rural areas	Urban areas
Case 1	251	173	79
Case 2	501	337	158
Case 3	1721	1135	553
Case 4	3245	2071	1072
Case 5	3929	2445	1331
Case 6	5349	3400	1739

in the age bracket 25-59, if it had the educational profile of case 1, case 2, case 3, case4,case 5, and case 6 respectively. This pattern prevails for both the Urban as well as Rural areas.

Amount of income lost by not having any of these educational profile for Pakistan's labor force is alarming in the wake of extreme resource scarcity Pakistan is facing. If we consider the whole working population in the age bracket 15-65, then this difference of income may be more substantial showing the cost of lacking behind in educating the individuals, a worthy resource for production.

4.3. The Cost Estimate for the Time 2009-2017

With an aim to further explain the income loss dues to uneducated as well as less educated individuals, the study has repeated the whole exercise of cost computation for the all areas from year 2009 to 2017. This was done to highlight the gigantic cost associated with the weak educational profile from 2009-2017. This computation was performed in the light of following assumptions:

- First, we assume that the proportion of population in the age bracket 25-59 does not changed over the time 2009-2017
- Second, the proportion of total, employed and unemployed labor force also remained same over the time 2009-2017
- Third, the educational profile of population in age bracket 25-59 also remained same over the time 2009-2017.

Under above mentioned three assumptions, we have computed the income of total and employed labor force in the age bracket 25-59 from 2009-2017 by considering seven educational profiles[9]. To make this exercise accurate we have computed the average annual income for each year by considering the income of 2017 as base and then year by year discounting of this income. The discounting of income was done by considering the average wage increase rate of 10% announced by state for the budgetary statements in between 2009-2017. To adjust for the population numbers for each year we have again applied the year by year discounting of 2017 total population by assuming the average population growth rate of 2.1% as the population discount rate. With this treatment, the Average Annual Income for each year of education and total population, and labor force proportions (total, employed) in the age bracket 25-59 for the period 2009-2017 were computed. These values are used to compute the income associated with total and employed labor force in the age bracket 25-59(All areas) for each year from 2009-2017 as shown in the following Tables 8-9:

To explain the cost associated with uneducated and lower educated individuals we have compared the present scenario (2017) of

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9   Original and six proposed profiles

Table 7: Additional income of employed labor force in comparison to original case

Additional income of employed labor force aged 25-59 with proposed cases (RS billion)			
Cases	All areas	Rural areas	Urban areas
Case 1	242	168	76
Case 2	483	326	151
Case 3	1657	1099	527
Case 4	3125	2006	1022
Case 5	3784	2368	1269
Case 6	5151	3293	1658

Table 8: Income of total labor force (25-59) for 2009-2017

Cases	Income of total labor force aged 25-59 (all areas) with different 7 educational profiles (RS billion)								
	2017	2016	2015	2014	2013	2012	2011	2010	2009
Original	8686.6	7734.5	6886.7	6131.9	5459.8	4861.4	4328.5	3854.1	3431.6
Case 1	8937.5	7957.9	7085.6	6309.0	5617.5	5001.8	4453.5	3965.4	3530.8
Case 2	9187.7	8180.7	7284.0	6485.6	5774.7	5141.8	4578.2	4076.4	3629.6
Case 3	10407.5	9266.7	8251.0	7346.7	6541.4	5824.4	5186.0	4617.6	4111.5
Case 4	11932.3	10624.4	9459.9	8423.0	7499.8	6677.8	5945.8	5294.1	4713.8
Case 5	12615.8	11233.0	10001.8	8905.5	7929.4	7060.3	6286.4	5597.4	4983.9
Case 6	14036.2	12497.7	11127.9	9908.2	8822.2	7855.2	6994.2	6227.6	5545.0

Table 9: Income of employed labor force (25-59) for 2009-2017

Cases	Income of employed labor force aged 25-59 (All areas) with different 7 educational profiles (RS billion)								
	2017	2016	2015	2014	2013	2012	2011	2010	2009
Original	8364.5	7447.7	6631.3	5904.5	5257.3	4681.1	4168.0	3711.2	3304.4
Case 1	8606.0	7662.7	6822.9	6075.0	5409.2	4816.3	4288.4	3818.3	3399.8
Case 2	8847.0	7877.3	7013.9	6245.1	5560.6	4951.1	4408.4	3925.2	3495.0
Case 3	10021.5	8923.1	7945.0	7074.2	6298.8	5608.4	4993.7	4446.4	3959.0
Case 4	11489.8	10230.4	9109.1	8110.6	7221.7	6430.1	5725.3	5097.8	4539.0
Case 5	12148.0	10816.5	9630.9	8575.3	7635.4	6798.5	6053.3	5389.8	4799.1
Case 6	13515.7	12034.2	10715.2	9540.7	8495.0	7563.9	6734.8	5996.6	5339.4

Table 10: Additional income of total labor force 2009-2017

Cases	Additional income of total labor force aged 25-59 with proposed cases 2009-2017 (RS billion)									
	2017	2016	2015	2014	2013	2012	2011	2010	2009	Total
Case 1	251	223	199	177	158	140	125	111	99	1484
Case 2	501	446	397	354	315	280	250	222	198	2964
Case 3	1721	1532	1364	1215	1082	963	858	764	680	10178
Case 4	3246	2890	2573	2291	2040	1816	1617	1440	1282	19196
Case 5	3929	3499	3115	2774	2470	2199	1958	1743	1552	23239
Case 6	5350	4763	4241	3776	3362	2994	2666	2374	2113	31639

Table 11: Additional income of employed labor force 2009-2017

Cases	Addition income of employed labor force aged 25-59 with proposed cases 2009-2017 (RS billion)									
	2017	2016	2015	2014	2013	2012	2011	2010	2009	Total
Case 1	242	215	192	171	152	135	120	107	95	1429
Case 2	483	430	383	341	303	270	240	214	191	2854
Case 3	1657	1475	1314	1170	1042	927	826	735	655	9800
Case 4	3125	2783	2478	2206	1964	1749	1557	1387	1235	18484
Case 5	3784	3369	3000	2671	2378	2117	1885	1679	1495	22377
Case 6	5151	4587	4084	3636	3238	2883	2567	2285	2035	30466

income with the proposed/discussed six cases for income for total and employed labor force in the reference age bracket. The difference of incomes for each year were calculated to explain the total cost of educational deprivation for the time 2009-2017 as shown in the following Tables 10 and 11:

Table 10 explains that total labor force aged 25-59 if all employed could have earned PKR 1484 billion more income from 2009-17 if it had educational profile of Case 1 in year 2009. Similarly, Pakistan could have more income of PKR 2964 billion, PKR 10178 billion, PKR 19196 billion, PKR 23239 billion, PKR 31639 billion if it had educational profile of Case 2, Case 3, Case 4, Case 5, Case 6 in 2009. Table 11 explains that employed labor force aged 25-59 could have earned PKR 1429 billion more income from 2009-17 if it had educational profile of Case 1 in year 2009. Similarly, the employed labor force Pakistan could have more income of PKR 2854 billion, PKR 9800 billion, PKR 18484 billion, PKR 22377

billion, PKR 30466 billion if it had educational profile of Case 2, Case 3, Case 4, Case5, Case 6 in 2009.

5. DISCUSSION

The return to education for the case of Pakistan according to this study was estimated to be 8.6% when experience was not considered and 10.9% for all areas when experience is accounted for. When adjusted for the location, the returns to education estimated to be 9.9% for Urban areas whereas 10.6% for Rural areas. The estimates of returns to education are found closer to the 7.2% return to education for the case of Pakistan (Nasir and Nazli, 2000) and on global level the estimates of the 9% return to education (Borjas, 2004), South Asian Average Return to Schooling of 8.1% and World Average return to schooling of 8.8% (Psacharopoulos and Patrinos, 2018). The average wage rate and average annual income for each level of education as shown in the

Table 1, depicted a rising wage rate with schooling years. The lowest wage rate per hour was estimated for the population with no education which stand out to be PKR 35 for all areas, PKR 44 for urban areas and PKR 32 for rural areas. The highest estimated wage rate was estimated for the labor force with 18 years of education and that was PKR 276 for all areas, PKR 288 for urban areas and PKR 240 for rural Areas. Based on the PSLM data, an average 2488 hours were available for work in a year. Multiplying these available work hours with relevant wage rate per hour we have computed the average annual income for every level of education. The estimates again followed the same pattern as it appears for wage rates that total annual income appears to be lowest for individuals with no education whereas highest income is associated with highest level of education. The average income for urban areas is higher than rural areas as shown in the Appendices Table 3. To further proceed for the cost estimates, the proportion of labor force in age bracket 25-59 was determined with total labor force amounted to be 43.35 million. 41.75 million of this total labor force was employed whereas 1.6 million was unemployed according to the labor force survey 2018-19. The educational profile of this labor force was extracted from labor force survey which depicted more than 70% labor force with 8 or less years of education. According to the proportions, 18.30% labor force has no education, 30.14% has primary or less education, 20.90 % has education of 8 years or less but more than five, 17.29 % with 10 year of education, 9.97 % has intermediate or equivalent, 4.38% has 14 years, 1.58, and 0.44% has 18 years of education. The education wise situation is worse for the rural areas where 78% labor force has education 8 or less years of schooling in comparison to urban areas with 60% labor force in the same education profile. By using these proportions, the number of total labor force, employed labor force and unemployed labor force was determined as shown in the Appendices Tables 4-6. These number in conjunction to the average annual income estimates, provided the income of total labor force (full employment level), employed labor force(actual income) and income loss associated with the unemployed labor force as shown in the Tables 1-3.

The aggregate potential income[10] for all areas estimated to be PKR 8686 billion for all areas, PKR 4458 billion for urban areas and PKR 4041 billion for rural areas. The income of employed labor force was estimated to be PKR 8365 billion for all areas, PKR 4318 billion for rural areas and PKR 3853 billion for urban areas. The income loss of unemployed labor force was estimated to be PKR 321 billion for all areas, PKR 140 billion for rural areas and PKR 189 billion for urban areas.

Income of total and employed labor force was again computed by considering six improved educational profiles as shown in the Appendices Tables 7-9. The income estimates based on six cases depicted a substantial change from the income estimates of original educational profile as shown in the Tables 4 and 5. According to the estimates, if fifty percent of the labor force with no education had at least 5 years of education (case 1) then Pakistan could have an extra potential of 251 billion income generation for all areas with 173 billion potential of income associated with rural areas and PKR 79 billion associated with urban areas. This extra potential rises to PKR 501 billion with case 2 that requires no one with less than

primary education, PKR 1721 billion with case 3 that requires no one in labor force with less than 8 year of schooling and PKR 3245 billion with case 4 which is exactly a matching case of SDG 4 that requires no one with <10 year of education. Similarly, our analysis depicts a much higher increase in potential as well as actual employed income with more improved cases 5-6 as shown in the Tables 6 and 7. Thus, the estimates of Tables 6 and 7 indicates huge loss of income associated with the less attractive educational profile of labor force in the age bracket 25-59. This highlights the importance of having much improved educational profile of labor force to have greater income generational capability of individuals and hence overall Pakistan. To further elaborate the loss of income in multiple years, the analysis of 9 year from 2009 to 2017 also depicted a horrendous loss of income due to not having an improved educational profile as of the six cases presented in this research. According the estimates of 2009-2017 presented in Table 10, Pakistan lost the potential of PKR 1484 billion by not having an educational profile of case 1 in year 2009. If Pakistan had case 1 profile in 2009 then with the current proportion of employed labor force Pakistan could have earned 1429 billion extra income and with case 4 Pakistan could have earned PKR 19191 billion extra income from 2009 to 2017. If Pakistan had the educational profile of case 6 then in 9 years Pakistan could have an extra income of PKR 31639 billion from 2009 to 2017. This shows that being with the current educational profile if assumed same in the year 2009, costed Pakistan loss of gigantic amount by not having improved educational profile as shown in the Tables 10 and 11.

6. CONCLUSIONS

Present study is conducted under some constraints or limitations which makes it hard to evaluate the concept in all respects as dataset of HIES-PSL 2018-2019 lacked various background and abilities related variable which can make this analysis more rigorous. So, given unavailability of data regarding background variables, proxy for individual abilities and some instruments for schooling or education, the present study by relying on available data and OLS as estimation technique has comprehensively analysed the cost of education deprivation for the case of Pakistan. Furthermore, the complete educational profile of whole country covering different attribute such as gender, work status etc. was not available in the population census and labor force surveys which makes it difficult to analyse these dimensions in the light of this research with available dataset. Under data, time, resources, and technique related constraints the present study has successfully highlighted the significance of education towards individual as well as aggregate level development by working out the massive cost of educational deprivation.

The research shows that Pakistan lost an income potential of PKR 251 billion by not having an educational profile of case 1 that requires promotion of 50% of the uneducated to at least primary level education. This loss is 10 times of the budgetary allocation for the health and higher education sector of Pakistan according to the recent budget 2020-21. According to a prefeasibility study conducted by SMEDA[11], a high school franchise with the student capacity of 500 needed PKR 10 Million of infrastructure cost

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10   Based on total labor force in the age bracket 25-59

11   Pre-feasibility study for High School, 2015. http://www.commerce.gov.pk/wp-content/uploads/pdf/High-School-Franchise.pdf

with additional PKR 5 million as annual running cost in 2015. By considering the future value of this amount in current year it amounts to be PKR 14 million for infrastructure and PKR 7 million for annual running cost. Thus, we can build a middle or a high school with a capacity of 500 student and run it for 5 years in PKR 50 million. Half of this amount may well be enough to construct and run a primary school. According to Economic Survey of Pakistan 2019, Pakistan has 172000 primary schools, 46700 middle school, 31400 secondary school, and 5800 higher secondary schools. The lost income potential of PKR 251 billion when considered in school infrastructure context, this is the amount through which state can double the existing stock of schools for primary, middle, secondary, and higher secondary education. Similarly, this amount is enough to having ten more universities in the current stock of 211 with 5 years of operational expenditures. This amount is enough to feed 14 million poor people for 5 years according to the per capita monthly cost of food basket of PKR 2800 per month. As per our estimates Pakistan lost PKR 501 billion by not having the labor force profile of case 2, that requires promotion of everyone in the labor force from no education to 5 years of education. With this amount in addition to the extra educational infrastructure, health and food spending, Pakistan could have doubled the spending on Ehsas Program dealing with millions of poor and less privileged families. The loss of PKR 1721 billion is associated with the case 3 educational profile that requires promotion of labor force with no or primary education into middle education i.e. no one without 8 years of schooling. With this amount, in addition to the development spending as explained for the case 2, Pakistan could have more than 1000 Km of motorways or may well managed to construct Main Line 1 (ML1) railway project on its own basis which requires PKR 1340 billion. The loss of PKR 3245 billion associated with case 4 profile which is also goal 4 of SDGs, Pakistan in addition to previously explained development spending could have resources to build Diamir Bhasha Dam on its own. The potential loss associated with case 5 and case 6 may have more substantial development impacts. The loss of income potential in 9 years from 2009-17 reflects gigantic impact on development based on the opportunity cost of thousands of billion rupees associated with case 1 to case 6. As per our estimates, if we look at the case 4 only, Pakistan has lost an income potential of PKR 19196 billion from 2009-2017 by not having the educational profile of at least 10 year of education for everyone in the labor force. This amount is more than the total foreign debt of Pakistan $110 billion[12] as per economic survey of Pakistan.

Our estimates are based on the labor force in the age bracket 25-59, the amount and impacts may inflate to higher degree if we consider the whole working age population of 15-65. Furthermore, apart from the impact of lost income potential, this income if earned by the labor force may have multiplier effects on the economy as well as society. Individuals earning extra income means their ability to consume, save and invest also rises. A rise in consumption of goods and services lead to a rise in the demand for goods and services and hence production. This stimulates investments having positive impacts on employment, government revenue collection, exports, exchange rates and all other macroeconomic indicators. These developments motivate government spending on infrastructure and hence further stimulates the impacts.

12   PKR 18040 billion @ the current exchange rate of PKR 164

In addition to these, a rise in income at personal level lead to more affordability of goods and services. Individuals with higher income can afford better quality health, education, and other necessities by their own rather than relying on state resources. This further provides quotient to the state to invest more rigorously on the development at broader level and hence further improve the general standard of living.

As we have explained comprehensively the cost associated with the uneducated population. In the light of our analysis it is imperative to focus on education, this will not only speed up the journey of Pakistan towards achieving Goal#4 but it will also provide essential resources both human and economic to facilitate progress towards other Sustainable development goals. As resource are the pre-requisite to end poverty and hunger(Goal#1 and 2), to achieve sustainable health(Goal#3), to have quality education (Goal#4), to have better development infrastructure(Goal#6,7,9,11), to promote innovation and economic growth (Goal#8) and for a sustainable, healthier and responsible, peaceful and equitable living (Goal #5, 12 and 16). These precious resources can only be generated by equally investing in human capital by providing them with essential quantity as well as quality of education. We have comprehensively highlighted the need for this investment by showing the opportunity costs of not investing for the education of uneducated.

In addition to investments in education, state needs to provide necessary infrastructure and physical capital to consume the human capital as human capital without necessary avenues and opportunities may create burden rather than incentives for the state. We have shown this burden in term of monetary costs related to unemployment as a loss of massive income. This research highlighted the severity of issues related to educational deprivation and provide guidance to the policy makers to focus on the issues discussed in a more targeted manner based on the alarming estimates associated with the lack of education.

To tackle with the deficiencies and to achieve all the sustainable development goals by the year 2030, in the light of our findings, the state needs to focus on certain areas with utmost importance such as:

First, it needs to revamp the whole political landscapes of whole Pakistan with a strong, influential, and independent inclusive local government system, which encourages participation from a wider part of society rather than a minor political elite. Furthermore, state needs to eliminate the barrier to entry for well-educated and rational political class at provincial as well as national level.

Second, state need to provide opportunities, resources and expertise to facilitate growth and development in an inclusive participatory framework for which we have explained the need of a fully functional local government system which includes every segment of the society in each phase of the development process, from its planning to its post implementation evaluations and ownership.

Finally, state need to aggressively invest on the educational infrastructure to remove the impeding factors of retaining student at various levels of education as explained in the previous section. Since we have shown the positive effect of rise in schooling years without any consideration of quality of education. This highlight the need for investments in schooling infrastructure as

if state increased the current infrastructure with current quality of education then it may still have substantial impact on the growth and development of Pakistan in the future. And if quality is also improved with the numbers then these impacts may further be substantial in volume as well as intensity.

Investing on the infrastructure with the huge stress on resources is a great challenge for the state. To cope with this challenge, the state in a strictly resource deficient situation need to devise mechanism to engage various stakeholders such as private investors, donor agencies, highly qualified unemployed human resource and the common public in an all-inclusive framework to generate resources in a sustainable manner through rational planning and execution for building and running educational infrastructure keeping in mind the long-term future needs of the Pakistan. One of the key resources in this regard may be the universities graduates at various levels which may be integrated in the current infrastructure to cope with the deficiencies of human resource. For example, there is a huge demand for university education, where every year thousands of students graduated at various levels. Some these graduates got job opportunities and other remained unemployed or join further studies. Those who failed to get a job or those who intends to join further studies can be utilized the system through a comprehensive internship programs and restructuring the admission criteria of universities. For example, if every university makes it mandatory for every undergraduate student to complete at least 1 year of service/internship at any primary, middle or secondary school before applying for the admissions of graduate programs and graduates to serve higher secondary schools or colleges before joining postgraduate studies. Then, it will solve the problems of supply with highly qualified and updated younger human resource to educational institutes without much cost. With this model state only needs to invest on infrastructure and makes partnerships with universities to indulge their graduates in educational system. This on the other hand will also enhance the quality of university intake as now the student joining universities will have a reasonable experience which will benefits universities in their quality of education.

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APPENDICES

Appendices Table 1: Returns to education estimated models

Variable	Model 1	Model 2	Model 3
(Constant)	3.678*** (0.009)	3.039*** (0.022)	3.04*** (0.029)
Edu	0.086*** (0.001)	0.109*** (0.001)	0.106*** (0.002)
Exp		0.018*** (0.001)	0.015*** (0.001)
Urban			0.150*** (0.044)
Urban*Edu			−0.007** (0.003)
Urban*Exp			0.006** (0.001)
R²	0.236	0.268	0.290
F-Stat	6788.592	4032.294	1794.417
F-Sig	0000	0000	0000
Observations	22,006	22,006	22,006

Significance: *P≤0.10; **P≤0.05; ***P≤0.01 brackets (standard error)

Appendices Table 2: Education wise estimated wage rates

Estimated wage rates (PKR per hour)			
Education	Overall	Urban	Rural
0	35	44	32
5	60	72	54
8	83	97	74
10	103	118	92
12	128	143	114
14	159	175	140
16	198	213	173
18	276	288	240

Appendices Table 3: Education wise estimated annual income

Estimated average annual income			
Education	Overall	Urban	Rural
0	87,048	110,108	80,115
5	150,124	180,633	136,110
8	208,193	243,098	187,067
10	258,906	296,327	231,242
12	321,972	361,212	285,849
14	400,400	440,304	353,352
16	497,933	536,714	436,795
18	694,640	725,860	603,697

Appendices Table 4: Education wise labor force (all areas)

Labor force by level of education 25-59 years (all areas)				
Education	% age of population	Total	Employed	Unemployed
0	18.30	7,933,454	7,639,872	293,583
5	30.14	13,066,356	12,582,827	483,529
8	20.90	9,060,612	8,725,318	335,294
10	17.29	7,495,597	7,218,218	277,379
12	6.97	3,021,649	2,909,831	111,818
14	4.38	1,898,827	1,828,560	70,267
16	1.58	684,965	659,617	25,348
18	0.44	190,750	183,691	7059
		43,352,210	41,747,934	1,604,276

Appendices Table 5: Education wise labor force (rural)

Labor force by level of education 25-59 years (rural)				
Education level	% age of population	Total	Employed	Unemployed
0	22.57	6,178,899	5,985,011	193,888
5	34.88	9,548,959	9,249,321	299,638
8	20.25	5,543,762	5,369,804	173,958
10	14.71	4,027,098	3,900,731	126,367
12	4.47	1,223,734	1,185,334	38,400
14	1.96	536,581	519,744	16,837
16	0.75	205,325	198,882	6443
18	0.40	109,506	106,070	3436
		27,373,864	26,514,897	858,967

Appendices Table 6: Education wise labor force (urban)

Labor force by level of education 25-59 years (urban)				
Education level	% age of population	Total	Employed	Unemployed
0	14.06	2,246,171	2,141,392	104,778
5	25.45	4,065,792	3,876,133	189,659
8	21.54	3,441,146	3,280,625	160,521
10	19.85	3,171,158	3,023,232	147,927
12	9.44	1,508,097	1,437,748	70,349
14	6.78	1,083,146	1,032,620	50,526
16	2.40	383,415	365,529	17,885
18	0.48	76,683	73,106	3577
		15,975,608	15,230,386	745,223

Appendices Table 7: Education wise proportion (%) of labor force (all areas)

Education wise proportion (%) of labor force (all areas)							
Education	Current profile	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
0	18.30	9.15	0.00	0.00	0.00	0.00	0.00
5	30.14	39.3	48.45	0	0	0	0
8	20.90	20.90	20.90	69.35	0.00	0.00	0.00
10	17.29	17.29	17.29	17.29	86.64	61.64	50
12	6.97	6.97	6.97	6.97	6.97	31.97	30
14	4.38	4.38	4.38	4.38	4.38	4.38	10
16	1.58	1.58	1.58	1.58	1.58	1.58	6
18	0.44	0.44	0.44	0.44	0.44	0.44	4

Appendices Table 8: Education wise proportion (%) of labor force (urban)

Education wise proportion (%) of labor force (urban)							
Education	Current profile	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
0	14.06	7.03	0	0	0	0	0.00
5	25.45	32.48	39.51	0	0	0	0
8	21.54	21.54	21.54	61.05	0	0	0.00
10	19.85	19.85	19.85	19.85	80.9	55.9	50
12	9.44	9.44	9.44	9.44	9.44	34.44	30
14	6.78	6.78	6.78	6.78	6.78	6.78	10
16	2.40	2.40	2.40	2.40	2.40	2.40	6
18	0.48	0.48	0.48	0.48	0.48	0.48	4

Appendices Table 9: Education wise proportion (%) of labor force (rural)

Education wise proportion (%) of labor force (rural)							
Education	Current profile	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
0	22.57	11.3	0	0	0	0	0.00
5	34.88	46.18	57.21	0	0	0	0
8	20.25	20.25	20.25	77.46	0	0	0.00
10	14.71	14.71	14.71	14.71	92.17	67.17	50
12	4.47	4.47	4.47	4.47	4.47	29.47	30
14	1.96	1.96	1.96	1.96	1.96	1.96	10
16	0.75	0.75	0.75	0.75	0.75	0.75	6
18	0.40	0.40	0.40	0.40	0.40	0.40	4