The Role of Education On Economic Growth in Pakistan

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Abstract

The role of improved schooling, a central part of most development strategies, has become controversial because expansion of school attainment has not guaranteed improved economic conditions. This paper reviews the role of education in promoting economic well-being focusing on the role of educational quality. Much evidence from developing countries suggests that education has strong influence on economic growth. The main purpose of this study was to examine the effects of some of the key macroeconomic variables on Pakistan's economic growth during 1980-2007 taking four different education levels including Primary school enrollment, Middle school enrollment, High school enrollment and other school enrollment as a ratio to total employed labour force. Other variables include exports, Basic health unit (BHUs), as main macroeconomic variables. It concludes that there is strong evidence that the cognitive skills of the population-rather than mere school attainment-are powerfully related to individual earnings, to the distribution of income, and to economic growth. Primary education is considered to be an important prerequisite for accelerating growth. The magnitude of change needed makes it clear that closing the economic gap with industrial countries will require major structural changes in schooling institutions. The integration of information technology in teaching is a central matter in ensuring quality in the educational system. There are two equally important reasons for integrating information technology in teaching. Pupils must become familiar with the use of information technology, since all jobs in the society of the future will be dependent on it, and information technology must be used in teaching in order to improve its quality and make it more effective.

INTRODUCTION

Education is key to the socio-economic development of a country. It plays a vital role in building human capabilities and accelerates economic growth through knowledge, skills and creative strength of a society. The positive outcomes of education include reduction in poverty and inequality, improvement in health status and good governance in implementation of socio-economic policies. The multifaceted impact of education makes it an essential element for policy framework. Developing countries, where majority of the world's population resides, need to redesign educational policies for promoting productivity in different sectors of the economy by developing highly skilled manpower and addressing their development needs for rapid industrialization. The government is making earnest efforts to improve the quantity and quality of education by enhancing educational facilities within the minimum possible time. The overall literacy rate for the years 10 and above was 55 percent during 2006-07 compared with 45 percent in 2001-02), indicating a 10 percentage points increase over a period of only six years. [Source: Pakistan Integrated Household Survey PIHS (various issues)].

To achieve sustainable growth and development in Pakistan, it is imperative to continue assistance in poverty reduction and develop social and economic infrastructure more importantly education. Since many years the unsustainable economic growth is worrisome in Pakistan. The factors responsible for this situation were unfavorable economic growth, political instability, negligence in education sector, worse law and order situation and poor attraction for the foreign investors. The unsustainable economic growth can be related with high inflation rate, a mounting fiscal deficit, increasing foreign debt and debt servicing, weak foreign demand for Pakistani products, low level of physical and human capital, unfavorable weather, and political instability and among other factors, a deteriorating law and order situation in the country. It is beyond doubt that education is a significant contributor to economic prosperity. To achieve a strong growth, education should be given top priority more particularly in developing countries. The most important impact of the education can be witnessed into two ways in developing countries. Firstly, education will provide people with power of decision-making which could instill gender equality. Secondly, educating the people of developing countries mean to make more sustainable choices which will create a better world to live in.

Primarily, the links between education and economic growth, income distribution and poverty reduction were well established. Education equipped people with the knowledge and skills they needed to increase their income and expanded opportunities for employment. This is true for households and for

national economies. Levels for productivity, economic growth and patterns of income distribution are intimately linked to the state of education and the distribution of educational opportunity. Increasing global economic interdependence and the growing importance of knowledge-based process in economic growth have raised both the premium on education and the cost associated with education deficits.

Economic growth and education are intertwined. Greater access to education has certainly contributed to higher rates of economic growth. The extent of the contribution of education to economic growth depends not only on building skills, but also on their application. There is evidence that state led development models and rigid labour markets do not favor rapid economic growth, even when the state offers broad access to schooling and high education quality (for example, in Eastern European countries under socialist rule). In the words of Hannum and Buchmann (2006) education is organized as a basic human right, and better education improves people's welfare. As an instrument of development, education fosters and enhances work skills and life skills such as confidence and sociability. These skills in individuals promote economic growth on a societal level via increased productivity and potentially better governance.

In conclusion, it is observed all over the world that not a single country has achieved sustained economic development without substantially investing in education sector. Education by itself does not guarantee successful development, as history has shown in the former Soviet Block, Sri Lanka, the Philippines, and the Indian states of Kerala and West Bengal. Unequal distribution of education tends to have a negative impact on per capita income in most countries. There is a strong causal link between education and economic growth. If more education leads to faster economic growth, then investments in education could pay for themselves in the long run, and could also play a role in reducing poverty. Education is the most important determinant for economic growth. Some prominent economists have analyzed the relationship between education and economic growth and viewed that education is strong predictor of economic growth. In the same context, we will analyze the relationship between education and economic growth for Pakistan during last twenty seven years (1980-2007).

Objectives of the study

The objectives of the study are to establish a relationship between education and economic growth in Pakistan during (1980-2007). The overview of the previous researches in most parts of the world proved that education has significant impact on economic growth. The programmes launched in developing countries for the uplift of education have shown that education is major source for the economic development in their countries. Furthermore, it is also aimed to provide a comprehensive and critical overview of the impact of education on

economic growth in Pakistan during which would be a source to provide a base for decision maker for future planning.

EDUCATION IN PAKISTAN

Education encompasses both the teaching and learning of knowledge, proper conduct, and technical competency. It thus focuses on the cultivation of skills, trades or professions, as well as mental, moral and aesthetic development.

Historical background

When Pakistan gained independence in 1947, West Pakistan had only one institution of higher education, the University of the Punjab; East Pakistan had the University of Dhaka. Over the next 20 years, many private and public schools and higher education institutions were established to help fuel the country's socio-economic development.

In the early 1970's all of Pakistan's educational institutions were nationalized government of Zulfikar Ali Bhutto, who was committed to the idea of Islamic Socialism. For the next decade, Pakistan's entire system of education was state-run. However, the growing demand for higher education fast outpaced the establishment of new public universities. During that period, the system could accommodate only 25 percent of the

High school graduates who applied to higher education institutions. The overcrowding Prompted many wealthy Pakistanis to seek university degrees abroad in the United States, Great Britain and Australia, while others sought out private tutors at home or entered the job market without a degree.

In 1979 a government commission reviewed the consequences of nationalization and concluded that in view of the poor participation rates at all levels of education, the public sector could no longer be the country's sole provider of education. By the mid-1980s, private educational institutions were allowed to operate on the condition that they comply with government- recognized standards.

Until 1991, there were only two recognized private universities in Pakistan: Aga Khan University established in 1983; and Lahore University of Management Sciences established in 1985. By 1997, however, there were 10 private universities and in 2001-2002, this number had doubled to 20. In 2003-2004 Pakistan had a total of 53 private degree granting institutions. The rapid expansion of private higher education is even more remarkable if we look at the number of institutions established on a year-by-year basis. In 1997, for instance,

three private institutions were established; in 2001 eleven new private institutions were opened; and in 2002 a total of 29 private sector institutions sprung up.

The government has decided to introduce ‘English Medium Education' on a phased basis and to substantially end the right to 'Mother Tongue Education'. This new policy which is termed 'Education Sector Reforms (Policy decisions)', states that "English language has been made compulsory from Class-1 onwards." and the "Introduction of English as medium of instruction for Science, Mathematics, Computer Science and other selected subjects like Economics and Geography in all schools in a graduated manner.

Role of Technology in Education for Enhancing Economic Growth in Pakistan

Technology has found its way into every aspect of our culture today. It's in medicine, it's in social work, and no even more than it use to be, it's in our education systems[1]. Teachers are continually being encouraged to take technology classes so that their students can benefit from their knowledge. In Education, technology plays are role in the classroom, in assistive technology products, and software that is brought into the school. So what exactly is the role of technology in education? Technology is making it possible for teachers to reach more students, allowing students the time they need to succeed, and providing our future workforce with competent, knowledgeable employees. It is so true that technology is embedded in our culture, and that we are immersed and dependent on it, as well. Technology changes so rapidly and has such a pervasive impact that it is actually determining our culture. Children and adolescents are prime users and beneficiaries. Admininistrators and educators need to keep pace with life outside the classroom in order to integrate and access the wonderful learning opportunities the Internet, iPods, cell phones, podcasting, and even social networking sites and video game play offer. Today's youth spend half their leisure time in front of screens - it is a huge part of their life. Teaching in a dydactic/lecture format no longer works, and it is not utlizing the power of technological advances. Teachers need to invite students to learn by using what they know best-technology gadgets.

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[1] Dr. Michael Osit, Psychologist/Author of Generation Text: Raising Well Adjusted Kids In An Age Of Instant Everything

Spending on science & technology in the Pakistan is far below the global average. According to reputable organizations such as UNESCO and the World Bank data on science spending in most OIC (Organization of the Islamic Conference) countries including Pakistan is average annual spending on R&D as 0.34% of GDP, much lower than the global average over the same period of 2.36%. Therefore countries in the Islamic world including Pakistan are finding it hard to improve the current status of science & technology education in the country. Pakistan continues to fall behind not only the developed countries in the West but also emerging nations in east Asia like Taiwan and South Korea. In the past decade, Taiwan and South Korea have shown a ground breaking performance in science and technology coupled with rapid economic growth. The importance of science & technology in contributing to the overall welfare of Pakistani society needs to be recognized with serious ambitions. Scientific progress in academia in Pakistan is often hampered by relatively immature university system. Promotions and appointments in most institutions are often more in peer-reviewed journals; thousands of PhDs and Postdocs are getting training at home and as well abroad; a free digital library for all educational institutions in the country is already established where thousands of research journal and books available around the clock; scheme to attract researchers from abroad to work in Pakistan under the foreign faculty hiring program and tenure track system for highly qualified researcher, is working relatively well but still we have to do more, to stand Pakistan in the row of highly developed nations of the world. Till now HEC has done excellent job and I must also acknowledge and appreciate HEC and professor Dr. Atta-ur-Rehman for that.

In this new millennium, the quality of Pakistani citizens' lives is intertwined with the calibre of its national education system. The Ministry of Education (MoE) has identified opportunities to enhance the quality and accessibility of this system, and, indeed, the MoE has stressed these areas of focus within all of its recent policy documents. These include the National Education Policy 1998–2010, the Education for All—National Plan of Action (NPA) (2001–2015) and the Education Sector Reforms (ESR) (2002–2006). The MoE's policies based on loyalties rather than merit. The competition in other parts of the world, including our neighbor India and China is progressing fast. A huge jump in development is needed to compete. Although HEC annual budget for science and technology's has increased hundreds of fold compared with 1999; researchers have an opportunity to more than triple their earnings if they publish also strongly emphasize the promise of public-private partnerships, the potential impact of Educational Management Information Systems (EMIS), and devolution of education administration. The MoE recognizes all of these approaches as key means of attaining the goal of universal education. Pakistan's current education system faces, however, a myriad of challenges in making good

on this commitment. The system must extend the reach of education to all children of school going age. Simultaneously, the MoE needs to upgrade the skills of Pakistani citizens to respond to the demands of a global and exceedingly competitive world. Lack of access to education continues to hamper improvements in our country's literacy rate. Current figures indicate that only 50 percent of the population is literate, with a disproportionate percentage being male. There are not enough schools, especially in rural areas and particularly for girls. Thus, a modest few continue beyond the primary-school stage, and the number of students decreases drastically between the upper primary, secondary, and tertiary levels. The dearth of human resources within the broader education system presents another—and multi-faceted—barrier to excellence. First, there is a shortage of qualified administrators and teachers. Second, in parts of Pakistan, schools often report a high rate of teacher absenteeism. Third, in rural schools, it is difficult to employ and retain female teachers. Fourth, there is a lack of meaningful professional development opportunities that improve administrative oversight and teaching practice, enhance morale, and sustain change at the classroom level. Taken as a whole, and, at times, exacerbated by economic and social issues, these concerns have a negative impact on educational quality. Further, the present system offers only minimal curricular resources for students, and in most primary schools these are restricted to textbooks alone. The majority of schools' pedagogical focus is on lower-level cognitive skills—such as memorisation of material—and the standards of secondary and tertiary education fall below current international standards. Given these facts, it is unsurprising that secondary school programmes produce too few students in disciplines such as science and technology. Pakistan is making good progress in tackling these challenges. Yet, our country is in competition with nations that have formed "knowledge societies". These countries have infused their education systems with information and communications technology (ICT). In China, Estonia, India, Ireland, Macedonia, and Malaysia, the return on investment in ICT is significant. All are moving from a poor, marginalised status to accelerated economic growth and higher standards of living. It is time for Pakistan to join these global ranks and form our own "knowledge society." Thus, in 2004, the MoE took the initiative to explore mainstreaming ICT in education. Its efforts culminated in the development of the NICT Strategy.

It has been argued that high rates of education are essential for countries to be able to achieve high levels of economic growth. In theory poor countries should grow faster than rich countries because they can adopt cutting edge technologies already tried and tested by rich countries. But economist argued that if the gap in education between a rich and a poor nation is too large, as is the case between the poorest and the richest nations in the world, the transfer of these

technologies that drive economic growth become difficult, thus the economies of the world's poorest nation stagnate.

Information Technology in Education

Education is a life long process therefore anytime anywhere access to it is the need, Information explosion is an ever increasing phenomena therefore there is need to get access to this information, Education should meet the needs of variety of learners and therefore IT is important in meeting this need, It is a requirement of the society that the individuals should posses technological literacy, We need to increase access and bring down the cost of education to meet the challenges of illiteracy and poverty-IT is the answer. The pace of change brought about by new technologies has had a significant effect on the way people live, work, and play worldwide. New and emerging technologies challenge the traditional process of teaching and learning, and the way education is managed. Information technology, while an important area of study in its own right, is having a major impact across all curriculum areas. Easy worldwide communication provides instant access to a vast array of data, challenging assimilation and assessment skills. Rapid communication, plus increased access to IT in the home, at work, and in educational establishments, could mean that learning becomes a truly lifelong activity—an activity in which the pace of technological change forces constant evaluation of the learning process itself.

Advantages to having technology in Education

There has been substantial evidence around the world that technology has become one of the most important and vital components to the success of a child's education. Here are some of the advantages that technology helps provide for children today:

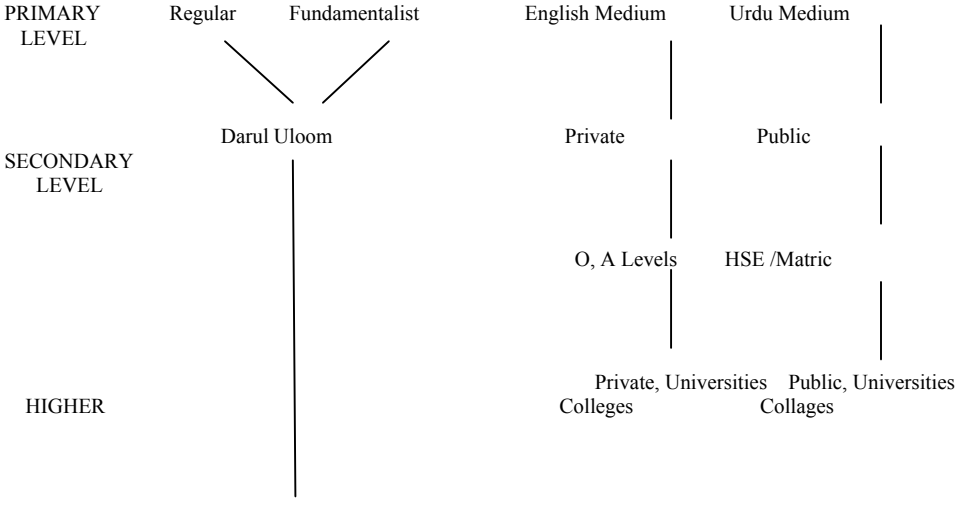
1. **Meeting Students' Targets**. Technology has been proven to help students achieve in reading, writing, and arithmetic. Each year teachers are instructed and challenged to meet AYP's (Adequate Yearly Progress). Technology gives educators one more tool to help them reach those goals. Students become engaged and can often times facilitate parent involvement at home.
2. **Strengthen Professional Career**. Not only does technology benefit students in the education system, it also benefits the educator. There are so many opportunities for teachers to learn and acquire new skills over the internet, keep up with credentials and in return help them improve their teaching abilities.

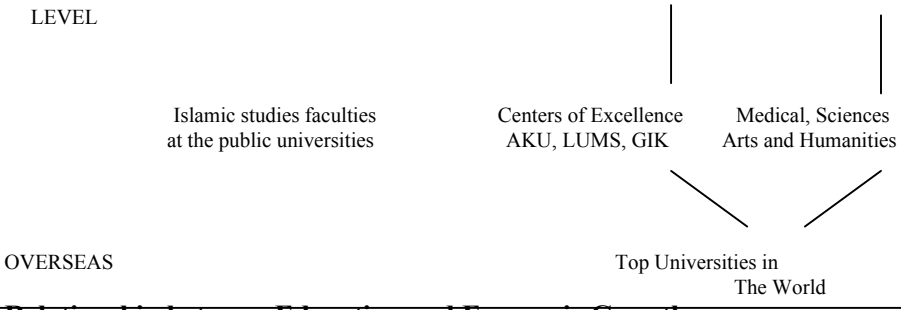
3. **Fulfilling Demands**. Technology, more specifically with assistive technology special needs students, and student with disabilities have been able to achieve in areas and ways that would not have been possible. Technology creates individualized learning environments for students and really can play a major role in special needs ones.
4. **Learning Rights at any Stage**. Technology has also made it possible for those who didn't finish college or high school to get back into things without having to even leave the comfort of their own home. And technology has made it possible for continued education; those wanting to reach a little higher and gain more knowledge in something new or old. Technology brings the learning right to your students; wherever they may be.
5. **Market Value**. And last, but certainly not least, technology has served students well because it has provided them with the skill and knowledge they need to enter the workforce.

Brief overview of four levels of education

Education in Pakistan is divided into four levels: primary (grades one through fives), middle (grades six through eight), high (grades nine and ten, leading to the Secondary School Certificate), other (arts, science and vocational schools). Different categories of these four levels of education can be shown in a diagram in which comparison of Madras and Modern school system is given.

Comparison of Madrasah System and Modern SchoolSystem





Relationship between Education and Economic Growth

Education is a key for economic growth all over the world whereas, in developing countries in particular. The relationship between education and economic growth is positive and this relation is consistent in most parts of the universe. The developments in the economic theory, the role that education can play in generating economic growth and implications likely to be proposed for education will be discussed in other chapter of thesis. If we shed light on the previous Pakistan economic performance we may say that the performance was not satisfactory due to some inevitable factors such as droughts, unsustainable debt, and the macroeconomic instability and unsatisfactory situation of law and order.

Table 1: Human Capital Measures for Pakistan, 1980-2005

Years / **Indicators**	**1980**	**1985**	**1990**	**1995**	**2000**	**2005**
Primary schooling enrollment (%)	32.1	35.8	47.5	57.3	60.5	68.1
Secondary schooling enrollment (%)	6.4	7.3	9.6	12.2	11.6	12.0
Literacy rate (%)	26.1	28.8	33.8	39.6	47.1	52.5
Public spending on education(as % GDP)	2.0	2.7	2.7	2.2	2.0	2.5
Public spending on health (as % GDP)	0.6	0.8	1.0	0.7	0.7	0.6
Life expectancy (at birth)	55.1	57.4	59.1	60.9	63.0	66.0
Computer used						

Years	Growth Rate of GDP (%)	Literacy R (%)
1980-81	6.4	26.2
1981-82	7.6	28.6
1982-83	6.8	34.3
1983-84	3.9	34.3
1984-85	8.7	28.8
1985-86	6.4	35.3
1986-87	5.8	37.9
1987-88	6.4	37.1
1988-89	4.8	32.7
1989-90	4.6	33.8
1990-91	5.6	34.9
1991-92	7.7	36.0
1992-93	2.2	37.2
1993-94	4.5	38.4
1994-95	5.2	39.6
1995-96	5.1	40.9
1996-97	1.3	42.2
1997-98	5.4	43.6
1998-99	4.2	45.0
1999-00	3.9	47.1
2000-01	2.0	49.0
2001-02	3.1	50.5
2002-03	4.7	51.6
2003-04	7.5	53.0
2004-05	9.0	53.0
2005-06	5.8	54.0
2006-07	6.8	55.0

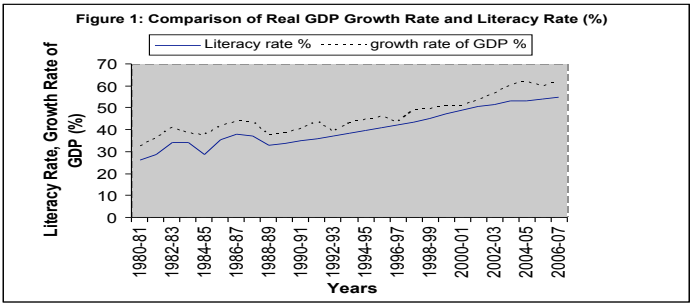
Rate in Pakistan during 1980-2007 (%).

Source: State Bank of Pakistan (2006), UNESCO Yearbook, World Bank (various issues).

Table 1 show that the human capital measures, which is grown positively in Pakistan during the period 1980- 2005, whereas public spending on education and health are poorly administered. It is time to think policy maker to allocate more funding for education and health so that targets can be achieved within specified time period.

Table 2: GDP Growth Rate and Literacy

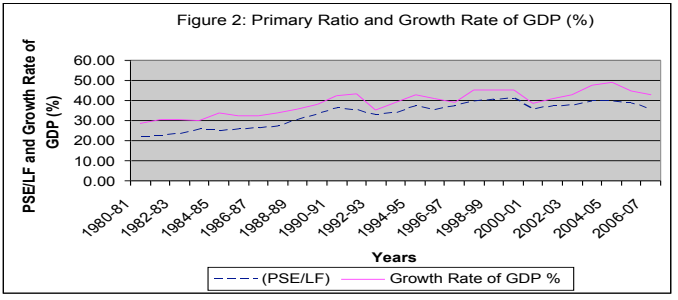
Source: 50 Years of Pakistan Economic Survey (various issues).



It is evident from the Figure 1, that relationship between education and GDP is positively correlated. As the level of education rises, the GDP shows gradual but consistent growth between years 1980 to 2007. Moreover, graphs indicate that there is hardly any decline in GDP during this period of time.

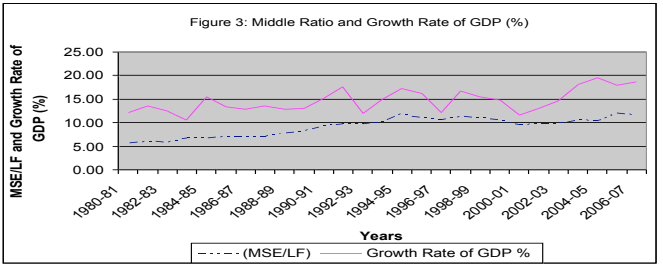
Relationship between four Indicators of Education and Growth Rate of GDP (%)

(a): Primary Ratio as Total Employed Labour Force and Growth Rate of GDP



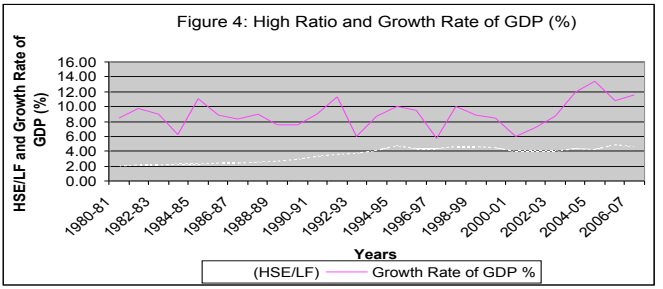
In Figure 2 we can see a positive relationship between primary school enrollment as a ratio to total employed labour force and GDP growth rate. After examining the trend of both the variables it is more likely to say that in general there is an upward trend.

(b): Middle Ratio as Total Employed Labour Force and Growth Rate of GDP



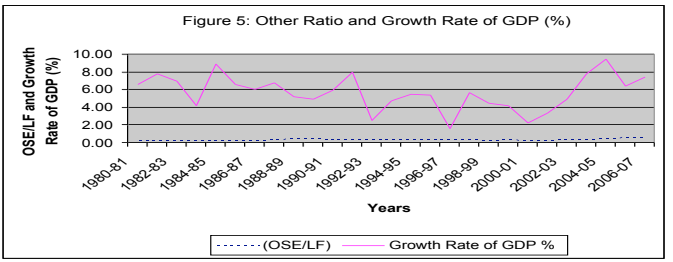
Growth rate of GDP and Middle School ratio are shown in figure 3. We can easily say that middle school ratio has also positively related to the growth rate of GDP but the gap between these two variables are wide than primary education and GDP growth rate.

(c): High Ratio as Total Employed Labour Force and Growth Rate of GDP



In figure 4 shows the gradual increase in higher education measured as the ratio to total employed labour force also wide gap between higher education level and GDP growth rate. As an indicator of educational attainment this measure is obviously unsatisfactory.

(d): Other Ratio as Total Employed Labour Force and Growth Rate of GDP



As to a link between education and economic performance, in figure 5 we plot growth rate of GDP and other educational institutions. This picture is very clear, that the other educational institutions are not strongly associated with the growth rate of GDP.

During the thirty seven years 1980-2007, other level of education does not show any growth and very close to zero through out the study period.

In conclusion, comparing Figure 1 through Figure 5, as the education level rises, gap between the corresponding education level and GDP growth rate is widening, which also indicates two important points. Education level other than

primary are not improving overtime and government investment to higher level is not very promising.
Secondly, even education level are not very improving overtime but growth rate with same fluctuation are getting improve which means that variables other than education are also very important which may not be the time of discussion in this study.

LITERATURE REVIEW

Sawada (1997) explored a distinct gender difference in education in rural households of Pakistan using household panel data for the period of (1986-87 to 1990-91). He estimated regression model using variables entrants and dropouts etc, implied that households in Pakistani villages might be credit constrained. Investment in the education of daughters may not yield much economic returns for parents, due to various customs and traits of the society.
Temple (2000) examined the importance of education on economic growth. He viewed that thereare greater benefit of education resulting high productivity, reflecting positive influence on economic growth. Moreover, he emphasized that the education has central role in the developments of different sectors of economy.
Kerr (2001) explained the importance or the education in generating economic growth in his paper. This conference will be a source for bringing together different views on education policy designs. In designing education policy, the issue is not through which this policy will implemented, the issue is the policies should be a reflection of best advances the country's economic and social goals.
Lattimore (2002) revealed a strong link between education and economic growth for New Zealand during (1952-2002). Before the introduction of "Knowledge Wave[2]" in New Zealand the economic progress was falling down and living standards were also declined. By adopting the education policies and making more investment in education sector has increased the GDP growth rate by six percent in New Zealand.
Stevens and Weale (2003) determined a relationship between education and economic growth through the parameters of the inefficiency model. They used micro and macro level data. At micro level if individuals get higher education they he will also receive higher income. However at macro level study showed the similar percentage of returns ranged from 6-12 percent per annum.
Teles and P. Andrade (2004) developed the relation between public investment in basic education and economic growth. In their paper, they used five

[2] Try to increase the quantity of economic resources, reallocate our resources to more valuable uses and to increase the skills of the workforce.

complementary theoretical models[3]. They conclude that basic education affects agents' decisions over their lifetime, and that the significance of the relation between public spending on education and economic growth is altered by changes in the composition of government spending with regard to basic and higher education.

Babatunde and Adefabi (2005) explained the long run relationship between education and economic growth for Nigeria during 1970 to 2003. The Johansen co integration technique and the vector error correction were applied. The results of the co integrating technique suggested that there is a long run relationship between enrolments in primary and tertiary level as well the average years of schooling with output per worker. They also established long run relations among the other series in the model. Results through vector error correction revealed that a well educated labor force significantly influenced on economic growth both as a factor in the production function and through total factor productivity.

Afza and Nazir (2007) focused on the role of human resource management as a tool to improve the economic competitiveness particularly in Pakistan. Pakistan has not positioned itself to benefit substantially from the opportunities to integrate with the world markets. To make it strong on basic education for all (rural and urban) is the key for securing long-run competitiveness of human resources and for sustainable growth is the main requirement in Pakistan.

Abbas and Peck (2007) investigated the relationship between human capital and economic growth. They have used time series data for Pakistan during 1960 to 2003. They revealed that human capital have accounted for about 40 percent of the increase in GDP per head. Moreover, they expected large value of elasticity of education endowment in Pakistan. Therefore, they suggested that poor quality education, stemming from underinvestment, may erect smaller impact than expected.

Papademos (2007) argued that education played a significant role for the development of financial market in Europe. He viewed that education can further contribute with the implementation of necessary measures to enhance the quantity and quality of education in Europe.

Obradovic in his study established a relationship among education, human capital and economic growth. Education itself represents one of the primary components in human capital, which is an important factor in modeling the economic growth. The role of education is not only to educate people but also create and develop person's capability for innovations, in order to provide effective support to the processes of economic development. Moreover, he

[3] Decreasing marginal returns to the human capital stock in the production function, to hours spent in accumulating human capital, and to public spending on basic education

added that education yield can be defined as a discrepancy between the increase in wage that one worker receives and the bases of one year of schooling compared to others.

METHODOLOGY AND DATA

This section presents a simple growth model that attempts to capture the impact of some of the key macroeconomic variables including education at different levels on output growth in Pakistan. The model is specified as:

$$Y = \__0 X_i^{-i} U_i \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Taking log of equation (1) on both sides, we obtain

$$\text{Log } Y = \log\_{0 +} \__1 \log X_1 + \__2 \log X_2 + \__3 \log X_3 + \__4 \log X_4 + \__5 \log X_5 + \__6 \log X_6 + \__7 \log X_7 + \__8 \log X_8 + \mu_i$$

After taking log we get,

$$y = \__0 + \__1 x_1 + \__2 x_2 + \__3 x_3 + \__4 x_4 + \__5 x_5 + \__6 x_6 + \__7 x_7 + \__8 x_8 + \mu_i$$

Denoting,

$$\text{Log } Y = y, \text{ Log } \__{0 =} \__{0,} \text{Log } X_{1 =} x_{1,} \text{Log } \__{1 =} \__1$$

Where,

y is log of real gross domestic product
x_1 is log of primary school enrollment as a ratio to total employed labour
x_2 is log of middle school enrolment as a ratio to total employed labour
x_3 is log of high school enrollment as a ratio to total employed labour
x_4 is log of other school enrollment as a ratio to total employed labour
x_5 is log of exports as a percentage of GDP
x_6 is log of basic health unit
x_7 is log of literacy rate
x_8 is log of labour force participation
μ_i is error term

Many researchers argued that the quality of schooling is more important than the quantity measured, for example, by years of attainment. The most commonly used indicators for education are school enrollment as ratio to total employed labour force , adult literacy rate, exports as a percentage of GDP, labour force participation and health indicator. In this study, we have used enrolments in primary schools (x_1), middle schools (x_2), high schools (x_3), and other educational institutions (x_4) as ratios of total employed labour. The main dependent variable GDP is normalized by inflation, the main advantage of

normalizing this variable is to eliminate certain econometric problems[4]. Foreign trade variable used in this study namely, exports as percentage of GDP (x_5) of goods. It may be caused openness of Pakistan's economy. Health (x_6), literacy (x_7) and overall labour force participation (x_8) indicators are also included in the model to reach at a decision that which variable has strong effect on the GDP growth rate in Pakistan.

Variable Constructions

In this study, we construct the variables for our estimation based on the study (1980-2007); as follows

(a): Gross Domestic Product

Gross domestic product (GDP) as the market value of final goods and services newly produced with in a nation during fixed period of time.

(b): Education Indicators

Education as a macro determinant of the economic growth is an important variable for each research. Contribution of education to the economic growth can be measured by primary school enrollment, middle school enrollment, high school enrollment, and other school enrollment. In this study, we used primary school enrollment as a ratio to total employed labour force (PSE/LF), middle school enrolment as a ratio to total employed labour force (MSE/LF), high school enrollment as a ratio to total employed labour force (HSE/LF) and also used other school enrollment as a ratio to total employed labour force (OSE/LF).

(c): Exports

Exports of goods are taken as a percentage of gross domestic product at current market price.

(d): Health

Good health is considered as a driving force for the development of economy. In this study, we have included a basic health units (BHUs) in the categories of registered doctors, nurses etc.

(e): Literacy Rate

Literacy rate is taken as a percentage from the Pakistan Household Integrated Survey PIHS (various issue).

(f): Labour Force Participation

There are two types of labour, highly skilled labour force and low educated workers. High-educated workers face lower unemployment risk, earn higher wages, are presumably better in formed and make wider decisions than low-educated workers. Moreover, a high skilled labour force may also foster economic growth through more productivity enhancing innovations and a better adoption of new technology.

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[4] To eliminate the effects of change in base year

Number of studies for example, Denison (1984), Schultz (1981), Psacharopoulos (1973), Becker and Lewis (1992) and barro (2001) found that higher education is more important than other types of education level.

Table 3: Summary of the Variables

Code	Variables	Definition	Units of Measurement
Y	Real GDP	Gross domestic product is divided by inflation.	Million Rs.
X_1	PSE/LF	Primary school enrollment as a ratio to total employed labour force.	Percentage
X_2	MSE/LF	Middle school enrollment as a ratio to total employed labour force.	Percentage
X_3	HSE/LF	High school enrollment as a ratio to total employed labour force.	Percentage
X_4	OSE/LF	Other school enrollment as a ratio to total employed labour force.	Percentage
X_5	Exports	Exports of goods as a percentage of gross domestic product.	Percentage
X_6	BHUs	Basic health unit.	Number
X_7	Literacy rate	Literacy rate.	Percentage
X_8	LFP	Labour force participation rate.	Percentage

Source: 50 Years of Pakistan Economic Survey (various issues).

RESULTS AND DISCUSSIONS.

This section explains the results of an empirical investigation of the factors that influenced economic growth in Pakistan during the period 1980-2007. The results emerged from the linear regression model for annual growth rates of real GDP are reported in Table 5. The over all results showed satisfactory that implies the estimated coefficient's signs are as expected and they are statistically significant at the traditional levels of confidence. A summary and more detail of the results of the explanatory variables are given below.

Table 5: OLS Estimates of Growth Functions, 1980-2007
Dependent Variable: Real GDP Growth Rate

** denotes statistical significance at 5 percent.

Explanatory Variables	Estimated Coefficients	t-statistics
Constant	-3.09**	-1.73
x_1 (Lagged 2 Years)	2.67**	3.32
x_2 (Lagged 2 Years)	-3.15**	-2.39
x_3 (Lagged 2 Years)	2.80**	2.86
x_4 (Lagged 2 Years)	0.26	1.11
x_5	0.04	0.06
x_6	0.00	0.01
x_7	2.13**	4.32
x_8	2.29**	2.02

R^2 = 0.986 **Adjusted R^2 = 0.980**
F-statistics = 149.76 **Prob (F-statistics) =0.000**
Durbin-Watson stat = 2.032

MACROECONOMIC DETERMINANTS OF GROWTH.

Four main Indicators of Education.

Table 5 indicates that real GDP growth rate is positively related to primary school enrolment (x_1) taken as a ratio to total employed labour force (PSE/LF). The estimated coefficient of (x_1) is 2.67 which imply that one percent increase in primary school enrolment-labour force ratio on average the real GDP goes up about by 2.67 percent per year. This finding supports the idea of Barro (1991), Becker at al (1990), and Barro and Becker (1989), who argued that primary school enrolment-labour force ratio leads to higher economic growth. Similarly, the estimated coefficients of enrolments in high schools (x_3), and other educational institutions (x_4) as ratios to total employed labour force are statistically significant. The result shows that estimated coefficients of (x_3) are 2.80 which depicts that one percent increase in high school enrolment raises the real GDP growth rate on average by 2.8 percentage points per year which shows that real GDP growth is very responsive to high enrolment rate. Whereas the estimated coefficients of enrolments in other educational institutions (x_4) as ratio to total employed labour force are significant at 10 % level of significance as well. Moreover, estimated coefficient of middle schools enrolment (x_2) as ratio of labour force is also statistically significant.

EXPORTS.

Two main variables of foreign trade are namely exports and imports. In this model, we have used export variable (x_5) only as percentage of gross domestic product which represents openness of Pakistan' economy. The foremost reason for taking export variable was to check that how much export variable will affect the growth of real GDP in Pakistan. The result reveals that the estimated coefficients of exports (x_5) is 0.03, implying that one percentage increase in export as percentage of GDP raises real GDP by 0.03 percent per year. It is obvious from these findings that export (x_5) has positive but not very high affect on real GDP in Pakistan. In addition, technological advancement, from access to goods and services, embodied technology, and discovery of new natural resources (which can be exported) may raise output growth because it shifts the production possibilities frontier out, exogenously. So, this would suggest that, in this regression model, the export variable seems to be picking up effects which run through the level of total factor productivity.

Health

The estimated coefficient of (x_6) Basic health units (BHUs) as shown in Table 5, is 0.01. which indicates that one percent increase in basic health unit raised the real GDP by 0.01 percent per annum.

Literacy Rate

Literacy is an important and very basic indicator of education. Empirical evidences show with an increase in the level of this variable; this might have impact, on the growth of GDP, in the long run, which could ultimately prove important indicator of welfare as well. The estimated coefficient of literacy rate (x_7) is 2.13 which is statistically significant, and can be interpreted that one percent increase in the growth of this indicator, the real GDP on average will increase by 2.13. It implies that literacy rate has very strong impact on the growth on real GDP.

Labour Force Participation.

This is a very important indicator of the economy. With the participation of this indicator we can judge whether a economy is progressing or not. The estimated coefficients of the labour force participation (x_8) is 2.29 implies the real GDP grew by 2.29 percent with 1 percent increase in labour force participation during the study period.

Absolute and Relative Contribution of Macroeconomic Policy variables to Economic Growth

It may be useful to evaluate relative and absolute contributions of each explanatory variable to growth rates. Relative and absolute contributions of key policy variables to growth rates of real GDP have been estimated and are shown in Table 6. Following Hicks (1979), the absolute contribution is calculated as the estimated coefficient of all explanatory variables multiplied by the standard deviation of the respective explanatory variable. The relative contribution of

each explanatory variable is calculated by dividing the estimates of absolute contribution to growth by the standard deviation of the dependent variable.

Table 6: Absolute and Relative Contributions of Explanatory Variables to Growth

Explanatory Variables	Growth Rate of Real GDP y			
	Estimated S.D of Explanatory Variables (%)	Estimated Coefficients (1)	Absolute Contribution to Economic Growth (2)	Relative Contribution to Economic Growth (3)
x_1	0.08	2.67	0.21	0.43
x_2	0.10	-3.15	-0.32	-0.65
x_3	0.13	2.80	0.36	0.73
x_4	0.14	0.26	0.04	0.08
x_5	0.07	0.04	0.00	0
x_6	0.25	0.01	0.00	0
x_7	0.09	2.13	0.19	0.39
x_8	0.02	2.29	0.05	0.10

Table 6 (column 2) shows the absolute contributions of each explanatory variable to growth rates of real GDP. The results of column (2) show that the absolute contribution of eight explanatory variables, in which seven explanatory variables have significantly positive impact on real GDP while one explanatory variable is statistically significant but having a negative sign. Education indicators (defined as primary, middle, high, other, schools enrollment as a ratio to total employed labour force). The largest positive absolute impact (HSE/LF) which is x_3 (0.36), (PSE/LF) x1 (0.21), literacy rate x_7 is (0.19), labour force participation x_8 (0.05), (OSE/LF) x_4 is (0.04), exports as percentage of GDP x_5 (0.00), basic health unit x_6 (0.00). On the other hand, the one explanatory variable which is (MSE/LF), x_2 is (-0.32) has negative impact on real GDP.

The calculated relative contributions of the same eight explanatory variables on real GDP growth, based on regression are also shown in column (3). It is interesting to note that the sequence of relative effects of explanatory variables on real GDP growth remains the same as in the case of coefficients based on regression[5]. For example, HSE/LF (0.73), MSE/LF (-0.65), PSE/LF (0.43), literacy rate (0.39), labour force participation (0.10), OSE/LF (0.08), exports (0), basic health unit (0).

[5] It is worth mentioning that relative impact of independent variables on real GDP growth is same as emerged by the coefficient of regression.

CONCLUSIONS AND POLICY IMPLICATIONS.

In order to generate balance of economic growth, the changes on labour market must be monitored as well as the request for knowledge and skills that are being established in an economy. The whole system of education should create and develop person's capability for innovations and their acquisition in order to provide effective support to the processes of economic development. The investment in education is not only the need to increase human capital stock but also a necessity to achieve higher living standard.

In recent years, Pakistan's economic growth has remained unsustainable to an alarming extent, which has caused serious concern to policy-makers, professionals, and foreign donor agencies. The main purpose of this study was to examine the effects of some of the key macroeconomic variables on Pakistan's economic growth. Regression analysis has been done to see the effect of key macroeconomic factors on growth during the period 1980-2007.

The results estimated have led us to the following major conclusions. The quantitative evidence shows that real GDP growths are positively related to the primary school enrolment-labour force ratio. It implies that primary education is an important prerequisite for accelerating growth. Therefore, primary education must be considered as the foundation-stone upon which the economic development in Pakistan can be erected. The Government must provide primary education to all school-age children to improve the literacy rate within a minimum time-span. It is noted that the average annual share of primary school enrolment in total enrolment has been about 90 percent during the period under consideration. Higher and other school enrollments –labour force ratio have shown a greater contribution in the economic growth. Similarly, our study shows that labour force participation variable is a significant predictor of economic growth and it would helped to contribute to real GDP growth of the economy. Thus, the Government must ensure the provision of labour force participation through giving the employment opportunities, better health condition etc, in order to sustain economic growth. In addition, our health indicator reveals a insignificant result, which might be due to a poorly administered basic health units in Pakistan. Moreover, literacy showed very strong impact on economic growth which shows the positive sign for sustainable economic growth and strengthens the education return of economy to some extent.

The policy makers suggest that the measures should be adopted to improve the primary education system in Pakistan, so that a universal enrolment rate in primary education may be achieved in near future. In addition to it

measure may also be taken to enhance the literacy rate in the country to give boost to economic growth in Pakistan.

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