

**Household Human Capital Investment Behaviour and Economic
Growth: A Case Study of Khyber Pakhtunkhwa
(2001-2010)**



BY
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Ph.D
Session 2008-09

**DEPARTMENT OF ECONOMICS
UNIVERSITY OF PESHAWAR
2013**

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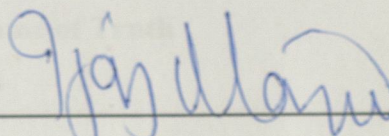
Household Human Capital Investment Behaviour and Economic
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BY
AMJAD AMIN

A dissertation submitted to the University of Peshawar in partial fulfillment
of the requirement for the degree of
DOCTOR OF PHILOSOPHY IN ECONOMICS

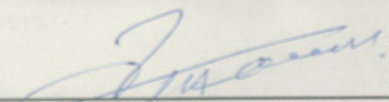
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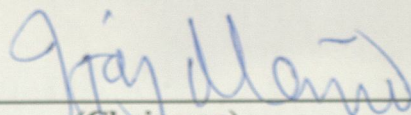
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2013

Dedication

TO

My Beloved Parents For Their Long Loving Support, Wishes, Patience,
Understanding and Prayers,

Who

Candle Into My Soul the Flame of Truth
And Trustworthiness

And to

My Honorable Teachers

Who

Helped Me Wherever And Whenever I Faced Difficulty In My Life

Acknowledgements

First and the foremost, I am thankful to Allah, the Almighty, for bestowing upon me the potential for completing this research.

A collective effort of a great number of people belonging to various spheres of life rendered valuable support and facilitated the task considerably by the grace and considerateness of their friendly cooperation. I feel pleasure to place on record my deep sense of thankfulness and indebtedness to my honourable supervisor, Prof. Dr. Ijaz Majid, Department of Economics, University of Peshawar, for his critical insight, consistent advice, technical guidance, personal interest and supervision despite his tight schedule of engagements.

My debt to my parents is immeasurable, who helped me out in every step of this study from data collection to its completion. Indispensable to the entire study was the support of Dr. Waqar Hussain Shah, Assistant Professor, Institute of Management Sciences, Peshawar and Qazi Muhammad Naeem, who have been unfailingly helpful to me at all times. In addition, I must not forget my friends who have always been very supportive and encouraging throughout my study.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Public and private expenditure on education, health, and nutrition is called human capital investment. Provision of goods and services related to education, health, and nutrition is referred to as human capital investment. Job trainings (both on-job and off-job), clean water, sanitation, youth development and strengthening of the Commission for Human Development lie in the definition of human capital investment (Government of Pakistan 2008). Human capital investment can be divided into two types i.e. public and private. Public investment is the expenditure of government and its related institutions on provision of goods and services related to health, education, and nutrition. Private investment is the expenditure of the households on these goods and services.

Most third world nations believe that provision of educational opportunities is the key to development. The quantitative as well as qualitative education accelerates growth, raises living standards for the poor, generates employment opportunities and encourages modern attitudes. Investment in formal and informal education at all levels, contribute towards more socially productive activities and thus act as an accelerator for national development (Government of Pakistan 2008). Education is considered as the only avenue of hope for poor to escape from poverty. Education has contributed to economic growth by (1) producing more productive labor force;

(2) creating employment and income generating opportunities; (3) producing educational leaders; and (4) providing training and education that promotes literacy and skills. Educating girls has higher return as compare to other investments in the developing countries. Educating women yields high returns in terms of healthier children by cutting vicious circle of poverty.

Another important component of human capital formation is to spend improve the health indicators of the population. Improving the health status of nation lead to longer life expectancy, shifts the labor supply curve upward, and increases labor productivity in other forms of human capital, like education. Health conditions and survival status of the children in any country are two main indicators of social well-being. These indicators are these days a subject of great concern. Indicators of health such as fertility rates and mortality rates, show that Pakistan needs improvement in the health status of the population. Women's role in enhancing their own as well as their children's health status is seen as a consequence of improved women's socio-economic status.

The statistics show that in Pakistan, male's literacy rate is 70% while for female it is 51%. In Khyber Pakhtunkhwa, the total literate population is 47.4%, out of which males are 63% and females are 30.8%. According to 2009 estimates, literacy rate is 54% in Pakistan [UNESCO 2009 report]. Health indicators in Pakistan also need improvement. In Pakistan, mortality rate and infant mortality

rates are 80 and 72/1000, respectively. Under-5 deaths are 465 out of 100 annually, infants with low birth-weight are 32%, and the number of households using iodized salt is 17%, 90% have access to clean drinking-water and developed sanitation (UNICEF 2009 report).

Human capital investment has been considered important in achieving development goals like growth, structural change, and reducing poverty. The importance of human capital in achieving these goals has been recognized in policy related perspectives on economic development like World Bank and UNDP (World Bank 1990-91, UNDP 1990), and in more academic perspective of "New Neoclassical Economic Growth Models" (Romer-1986, Lucas-1990, and Azariadis and Drazen-1990). There is strong relation between investment in human capital and growth. Accumulation of human capital helps in the accumulation of physical capital, exploits natural resources, builds institutions and organizations, and thus helps in national development. The development of a nation is closely linked to the development of skills and knowledge of its people and its effective utilization in the national economy. The economic growth of the west is demonstrated not only by its physical capital but also by its human capital. Since human knowledge and skills depends on advancements in technology and scientific development, development of a country depends on the accumulation of human capital. Schultz noted that the rate of growth in output exceeded the rate of growth in inputs (Labour and physical capital) suggested that this difference is

mainly due to investment in human capital (Schultz-1961). Uzama and Rosen also emphasized the role of human capital in high rate of economic growth (Uzama-1965, Rozen-1976). Phelps (1966) analyzed that the ability of nation to invest in humans and have access to new technology from abroad depends on its own human capital stock. Growth models such as Romer and Lucas, analyze that investment in human capital is important contributor to economic growth. Human capital may act as an engine to attract other factors like physical investment, which contribute to increase in per capita income (Romer-1986, Lucas-1976). If investment in human capital is low, the productivity of physical capital is low since technical, professional, and administrative experts are required. Lucas analyzed that physical capital could not flow the poor countries just because poor endowments of human capital (Lucas-1990).

The main objective of the study is to analyze the household expenditure on education, health and nutrition. The study will point out the reasons that why human capital investment is low in our country. A cross-sectional data from the selected areas of Khyber Pakhtunkhwa was analyzed for this purpose. The research will be helpful in providing information to the educationists, policy makers, and other organizations.

1.2 Problem Statement

Human capital investment helps in attracting new physical capital investment, and ultimately brings economic growth. Very little quantitative work has been carried out in this regard in the past and especially in Khyber Pakhtunkhwa, no analytical work has been carried out so far to study the household's behaviour of investing in humans. It helps to study those factors responsible for changes in the behavior of the household. This research analyzes the relation of human capital to the process of growth, and highlights incentives how to persuade the household to investment in humans. The research provides a sound footing to further researches in the field of human capital investment, to the policy makers and students.

1.3 Objectives of the study

The study has the following main objectives:

- i) To compare the behavior of different households in urban and rural areas of District Peshawar;
- ii) To determine the impact of different socio-economic variables on human capital investment behavior of rural and urban household in Peshawar;
- iii) To analyze the effect of human capital on economic growth of the country for the period 2001-2010;
- iv) To determine the factors responsible for the low human capital investment in the country;
- v) To give suggestions and policy recommendations on the basis of findings.

1.4 Research Hypotheses

The research aims to test the following hypotheses:

- i) Household income, family educational background, quality and the supply of the goods and services related to human capital investment and expected rates of return have positive impact on the household behavior for human capital investment.
- ii) Price of the goods and services related to human capital investment negatively effects the household behavior for human capital investment.
- iii) Human capital investment has a positive impact on the economic growth of the country
- iv) Human Capital Investment has a significant impact on attracting physical capital.

1.5 Research Methodology

To obtain correct and reliable data, many steps have been taken, which includes research area selection and appropriate sample size and sampling techniques, data collection and analysis methods and specification of the appropriate models.

1.6 Significance of the study

The focus of this research is Khyber Pakhtunkhwa. Primary data is collected from district Peshawar. However, the conclusions based on the results of the study can

be generalized as a whole to the overall conditions prevailing in other areas of the country. This research provides a sound footing for further researches in the same field, to the policy makers, and to the students at large.

1.7 Limitations of the study

Both primary as well as secondary data was used for analysis. Due to some constraints like time and resources, the study was restricted to three villages of District Peshawar which represent rural area and three towns of District Peshawar which represent urban area. However, the study can be expanded to other parts of the district as well as of the country.

Further, majority of the respondents of the rural areas were illiterate and less educated and were not expressing their opinions freely on some questions because of their over-care and thus concealed the facts to their advantages. For example, majority of the respondents refused to provide information regarding their gross and net income, the sources of their income, and the amount of their total consumption and total savings. Majority of the respondents had to be visited repeatedly to get information. While interviewing, the respondents raised the first question of their personal advantage like what they will get in return.

To use school enrolment rates and health indicators like number of patients per bed and per doctor, mortality rates, fertility rates etc. as proxy variables for human

capital itself have several problems to be used as measure of the stock of human capital. This is because the educational process is spread for many years, very long lag between flows and stocks. Due to mortality and migration, the exact enrollment rates are not known for underdeveloped countries. The gross enrollment rates are having errors related to revision of grades and dropouts, which are normally very high in underdeveloped countries. There may be upward bias. Another source of upward bias is the availability of data, which comprise only the registered number of students each year. This may not give the actual number of students that attend the school throughout the year.

1.8 Organization of the study

The study consists of seven chapters, as mentioned below:

Chapter-1 provides a brief introduction to the problem, objectives and hypotheses of the study;

Chapter-2 reviews the relevant literature;

Chapter-3 consists of research methodology;

Chapter-4 includes human capital investment in retrospect;

Chapter-5 is related to the specification of the models;

Chapter-6 includes analysis of the data; and

Chapter-7 provides conclusions and recommendations based on the findings of the study.

CHAPTER 2

REVIEW OF LITERATURE

2.1 INTRODUCTION

This chapter scrutinizes the work done by different economists and research scholars in this field. There is enough qualitative and quantitative work on the topic which is as under;

Schultz (1961) carried the pioneering study in the field of human capital. Schultz was the first economist who classified human beings as capital. After his work, literature proliferated. He argued that human skills and knowledge cannot be denied as part of capital. Further, it is analyzed that there is substantial growth in human capital and is a source of distinction for many economies. The author views that although economists are aware of people as an important contributor to the wealth of the nations but social and spiritual barriers like characteristics, values and beliefs may have prevented them from recognizing human beings as capital. In fact, economists including Mill had denied considering people as wealth because such treatment would cause degradation to them. However, he rejected this view and argued that investment in humans has economic concern and such investments prominently lead for the productive advancement of developed countries. He suggested high returns from human capital investment. He examined human activities like health, education, on-the-job-training, adult literacy, and

migration that lead to high productivity of human beings. Finally, he argued that it is not possible take benefits of modern agriculture and industry without making investment in human beings.

Hicks (1980) estimated the relation between human capital and growth, taking data from 1960 to 1977 for 83 developing countries. The results found that in terms of expectancy and literacy, the economic growth as strongly dependent on human capital. He defined life expectancy as one of the important indicators of human capital development. However, estimating the relationship between human capital and growth, he made no adjustment for possible effects of other related variables.

Wheeler (1980) estimated the impact of human resource development on growth by utilizing simultaneous equations model for 88 developing countries. Doing this, he was better able to analyze that human resource development is a cause of as well as result of economic growth. The results suggested that human development contributes to growth both directly- by improved productivity and efficiency, and indirectly- by enhancing investment in physical capital. It was found that education affects output more significantly than all other variables and this relation is much stronger for African countries.

Easterlin (1981) estimated the relation between education and economic growth of 25 countries of the world. It was found that technology, as important factor for modern economic growth, is largely dependent upon greater potentials and skills of the people; and potentials and skills, in turn, depend on education system. Primary education is found to have important role because it contributes to higher net return as compared to higher education. As the resources are always limited and can be utilized in alternative opportunities, some costs have to be incurred human capital investment is made. That's why the choice of investment is based on cost-benefit analysis. The author is of the view that investment decision should be based on proper techniques as adequate data on education are not available, especially for developing countries. Yet, it seemed that the major hurdle to the growth of developing countries is shortage of skilled manpower.

Psacharopoulos (1984) considered education consumption as well as investment. According to him, education creates immediate benefits and improves worker's skills and knowledge which ultimately leads to increases their productive capacity and higher incomes. Distribution of education opportunities ultimately lead to the distribution of income. It is argued that earlier attempts to analyze the contribution of education to growth, show positive and significant impact of education on growth. It was concluded that high education of labor leads to substantial growth in output, in both developed and under-developed countries. Finally, the author

argues that impact of education on growth is even greater if the link between education and other forms of investment are considered.

Romer (1986) used a long run growth model by considering endogenous technological changes. In the model, he used knowledge and skills as an input that lead to enhance marginal productivity of the labour. Referring to the study carried out by Ramsey (1928), Cass (1965), and Hoopmans (1965), who's results found diminishing marginal returns for capital stock, concluded that the levels of income and the living standards can grow without bound with increasing rate. He stressed that knowledge is a form of capital, which cannot be kept secret. The author is of the view that his model, which specify equilibrium growth model accounts for externalities, increasing return to output, and decreasing returns to new knowledge.

Otani and Villanueva (1989) discussed theoretical and historical aspects of growth for under-developed countries and formulated an aggregate growth model. Their model examined the relative role and importance of different determinants of growth, which includes macroeconomic growth and macroeconomic policies. Besides this the role of expenditures for the development of human capital is analyzed. By analyzing growth and macroeconomic developments which took place in developing countries in the last 15 years, they suggested that utilizing physical and human capital efficiently is one way to analyze disparities in growth

status among these countries. The authors referred to Danison (1962), Lewis (1962), Schultz (1962), Romer (1988), and Grossman and Helpman (1988) who have highlighted human capital as a major determinant of economic growth. They rejected the new classical view of exogenous technical change and asserted that technological progress is endogenously determined and requires large resources to be diverted for the promotion and enhancement of education, training and health.

Kemasl (1989) highlighted that human capital formation is neglected in developing countries where human capital has played an important role in growth process of developed countries. He argued that developing countries, particularly Pakistan, has over-emphasized the importance of physical capital in the growth process, and inadequate attention has been given to human capital formation to achieve the growth objectives. His empirical findings show that about two third of increase in output per person, could not be due to an increase in capital intensity. He argued that about 5.1% of the growth in industrial output in Pakistan for the period 1961-1970 could be because of human capital. He analyzed the interdependence of human capital formation activities and suggested the need for adoption of an integrated approach for the development of human resource in Pakistan. It was viewed that since activities of human capital like education, health, nutrition etc, are organized by different ministries and departments, there is lack of coordination between them. This leads to inefficient allocation of resources of the country. Given the constraints of resources, it is needed to identify clearly

the inter-dependence of various human capital activities and follow an integrated approach.

Becker et al (1990) examined relation between human capital, fertility and economic growth. They discussed different aspects of the activities related to human capital and growth. They specified growth model within which central importance is given to investment in human capital. They suggested strong relation between investment, human capital and growth. They assumed increasing marginal returns to investment in human capital and assumed that relation between the investment and the stock of human capital is positive. They viewed that production process of human capital is a process in which more human capital is used as compared to physical capital i.e. the production process is more human capital-intensive, whereas the production process of physical capital does not seem to be physical capital-intensive. The study analyzed that rates of return on education, health and other human capital formation activities are greater in developed countries as compared to undeveloped countries, both in absolute and relative terms to physical capital. The results seem to suggest relation between human capital investment and family size. It was argued that Malthusian and neoclassical models failed because they did not consider link between population and the growth.

Romer (1990) analyzed that growth is due to technological advancements, which arise from external decisions. The distinguishing feature of the technological advancement is that it is neither a private good nor public good: it has the characteristic of non-rivalry, and to some extent it is excludable good. He considered knowledge and skills as technology. He presented a one-sector "neoclassical" growth model. The model summarizes that an economy with more total stocks of human capital will have faster growth. He suggested that technological change depends on the rate of interest because it takes place when investment is carried out in research projects, which leads to the exchange current costs with the stream of future benefits. He viewed that subsidies to physical capital accumulation may not work well as compared to subsidies that increase the incentives to conduct research. According to him best policy would be to provide subsidies for the accumulation of human capital.

Barro (1991) studied the cross-country evidence of the relationship of growth, fertility, and investment for 98 countries for a period of 25 years from 1960 to 1985. He found that the correlation growth and GDP per capita is close to 0 from 1960 to 1985, but when human capital is kept constant, the correlation becomes strongly negative. This result suggests that there is positive correlation between growth and human capital. He suggested that countries having more human capital have low fertility rate and have greatest physical investment to GDP ratio.

Woo (1991) analyzed the determinants of rapid growth and economic development in Taiwan for a period of 35 years. Though there were industrial and agriculture reforms, but this development is due to careful and efficient planning of the education system of Taiwan. He argued that education has played a major role in rapid economic growth of Taiwan. He analyzes empirically how development and education led to Taiwan success. He viewed that change in the educational system since 1950 has been the dominant source of its Taiwan's phenomenal growth. Educational expansion in Taiwan led explicitly to manpower development plan (MDP), which brought labor education and training programs with it to meet changing needs of the country's manpower. This study was one of the best and carefully planned efforts to correlate educational developments with changing economic needs.

Birdsall et al (1993) investigate the cost Pakistan has paid, in terms of forgone growth in income, because of less investment in human capital since 1970. On the basis of his results, it was suggested that more educational attainments emerged as an essential contributor of economic development. It was concluded that average annual growth in per capita income has strong and positive relation with human capital development. Referring to past empirical studies, they argued that returns to education are strongly linked with returns to physical capital. The author is of the view that education may be necessary but is not sufficient condition for rapid economic growth. The market for labor must be efficient and flexible, so that

labour skills can be productively utilized. Explaining Pakistan's poor performance, they referred government's commitments to education as the prime factor for causing the differences. Comparing male and female education, they found that there is no significant difference for males and females. This concludes that high enrollments for girls will be as effective and stimulating growth as for boys.

Behrma and Schneider (1993) analyzed Human capital Investments in Pakistan for the last 25 years comparing with international perspective. The study related some aspects of the analysis of the factors of the impact of investment in human capital and related policies. He also analyzed various dimensions human capital investment in schooling and health in Pakistan are compared with the external experience for the last 25 years, considering pre-capital income and literacy rates. The study suggested that investment in Pakistan have been skewed toward higher education, physician-intensive cures, males relative to Females and middle and upper income groups. They argued that demand for human capital investment is affected by the level of income of the family, educational background, prices and quality of goods and services, and expected rates of return. The results conclude that except prices all other factors have positive effect on the demand for human capital investment. In this study supply-side factors related to human capital investment are also analyzed.

Yasuyuki, S. (1997) measured aggregate human capital investments of Pakistan by considering educational performance. The results shows that human capital investments are low as compare to other countries of having the same per capita incomes. The study investigated on micro basis the evidence on schooling from rural areas of Pakistan to understand why there are low human capital investments. The results of regressions using panel data of the household indicate that the income changes affect the behaviour of the children's schooling. Hence, human capital investments in rural areas of Pakistan may be negatively affected by poverty, combined with unequal distribution of income.

Richard, B. et al (1999) suggested that human capital is most significant factor in the development of individuals, firms and nations. Particularly, it was consistently found that there are positive returns to education. The results showed that training to result significant wage returns at the individual level. They found that skills have been depreciating over time. There is a strong complementarity among different categories of human capital investments: early achievements and qualifications affect future educational achievements. It is indicated that workers and employers share high returns from training and skills and its costs as well. The available evidence highlights positive contribution of training, and level of education and skills, to the productivity of the firm and its competitiveness. Close relations have been found between the human capital and innovative capacity, and utilization of new technologies. The evidence of the relation of human capital and

productivity growth is analyzed by utilizing regression models. The results found that education is significant, and higher education is the most crucial variable affecting development process.

Yong, J. K. and Jong, W. L. (1999) analyzed the impact of technological changes on enhancement of income and human capital by using a theoretical model. They used an overlapping generation model where the young ones invest in human capital for the purpose to adopt new technologies. The study developed micro-mechanism to analyze the role of human capital to adopt new technologies and the process of human capital production. In their study, an increase in the uncertainty of the changing technology uncertainty reduces growth rates in the level income and human capital accumulation by reducing efficiency in attaining new skills and adaptation of new technologies. The results showed that depending on human capital accumulation and the uncertainty and the risk associated with new technology, every country should follow multiple growth paths. Inflows of new technologies with uncertainty negatively affect the accumulation of human capital and growth in the level of income, which lead low growth of the economy.

Norman, J. et al (1999) seek decisions to investment in both the sector-specific and the firm-specific human capital, when these decisions are made before considering the firm's profitability. They utilized Nash equilibrium and related

this to a first-best allocation. Those managers and firms seeking rent as motive of profit will make sector-specific and firm-specific decisions and not the socially optimum decisions either with respect to the number of investors or the level of each investment they made. The market's integration effect changes with the nature of the skills they have attained.

Abbas (2000) conducted a comparative study of Pakistan and India to estimate the role of human capital investment in accelerating economic growth. He used secondary data for the period 1970-1994. He incorporated school enrollment rates to study the impact of human capital in his analysis. He carried out his study in two ways. First he estimated the effect of school enrollment rates on growth for both the countries and compared the results. He then combined the level of employment with school enrollments to make effective labor and then estimated its effect on the relative growth of both countries. In the second part of the study, he estimated the effect of the school enrollments on the physical capital accumulation that leads ultimately to high economic growth. The analysis shows that human capital by primary school proxy has a positive effect on the growth of India while it is affecting negatively the economic growth of Pakistan. Human capital resources by the secondary enrollment rates have a positive effect on the growth of India as well as Pakistan. Human capital by higher schooling proxy has a significant positive effect on growth of Pakistan while it has negative effect on the growth of India. By combining schooling enrollment rates with employment to

create effective labor it is analyzed that the impact of all the schooling rates has been improved. In this analysis of the impact of human capital on the accumulation of physical capital shows that primary enrollments have positive effect on growth of the accumulation of physical capital for Pakistan only. While in the case of India, none of the education enrollment rates has positive effect on the growth of physical capital.

Figure 3.1: (a) (1994) primary enrollments to human capital accumulation in

Nikolai, R. (2004) developed life-cycle portfolio model with non-tradable labor income and where the agent has the option in selecting invest in human capital through education. The model has many forecasting which are consistent with the financial advice standards for the savings of the people towards a target such as education. Wealthy agents of the community possess a hump-shaped pattern of lifetime risks for holding risky assets. The option generates the behaviour of local risk seeking among less wealthy agents, who show a falling profile for risky assets over the life time. At the end, the model is used to generate profiles of life cycle labor income with levels of educational attainment as the endogenous variable. Financial aids do not affect strongly the demand for liquidity.

Volker, G. (2004) analyzed the role of income distribution for the process of development due to human capital investment depends on the relative shape of the saving function. Evidence from the U.S. suggested that marginal propensity to

save (MPS) is rises with increases in income, a property which was not discussed in the literature so far. The analysis suggests that the effect of the human capital stock is positive on growth. The results of the study rely on positive relation of family income on children's schooling behaviour and the result largely supports the empirical evidences.

Pineda, J. et al (2004) provided political economy models attempting to understand human capital investment, composition as well as level of government expenditure. The models were evaluated to check their capacity to predict the degree of relationship that existent in the data among spending variables and capital shares. The study showed that these relationships may be accounted within a common agency model, which organizes labor and capital groups to influence policies through income contributions. The study concludes that there exists positive relationship between human capital investment and capital shares. The also concludes that there is positive relation between redistribution of income and capital shares. However, the correlations analysis found different of strong negativity.

Fortin, N and Lemieux, T. (2005) examined the relation between population aging and human capital related expenditure of youth. The study is conducted in three steps. In the first step, they estimated Card and Lemieux (2001) model for

Canada by using data from the last five censuses i.e. 1981, 1986, 1991, 1996 and 2001. The results forecast the effect of population aging on returns from education. In the second step, they reviewed existing studies of the factors of human capital investment of youth. Past studies show that return from education is important factor in the youth's decision to acquire more education. They show that policies related to higher education and other demographic factors play very important role in the decisions to acquire more education. In the last step, they combined the estimates of the Card and Lemieux model with estimates of the human capital investment elasticity with respect to size, returns from education, and policy variables.

Andolfatto, D. and Martin G. (2006) analyzed the binding debt constraints individuals are facing, the decision to invest in human capital will be financed by lenders of the private sector. A well-designed fiscal policy will be needed to improve the worst situation of human capital investment. The optimal budget (balanced budget) ensures the provision of education subsidies for the young people by taxing rich. The study demonstrates that the need for optimal policy depends on exogenous debt constraints. If debt constraints arise endogenously, then optimal budget will look different.

Daniele, C. et al (2007) obtained two major results in their paper, which can be summarized as follows: 1. the authors do not find any strong evidence of existing

virtuous cycle between the accumulation of human capital and foreign direct investment (FDI). In their estimates, FDI leads to discourage secondary enrolment in schools while favour tertiary enrolments, but the results show that the overall relation is negative. FDI is attracted more by availability of human capital, but this is true only at the secondary level. There exists a unique combination between stocks of human capital and the foreign capital inflow which lead to a stable economy; 2. They find a strong evidence of brain drain due to skilled worker migration. They were suspecting that their study leads to natural resources exploitation rather than Greenfield investment. In this case the local endowment of human capital is not more relevant and is an incentive for further human capital accumulation.

Eric V. E et al (2007) showed that, in the 1990s, there were a dramatic rise in schooling and a dramatic decline in child labor in rural parts of India. However, those communities who relied on employment before liberalization in protected industries are not having large increase in schooling enrollment rates or decline in the child labor. The results suggest that this failure is linked with a failure to adopt the national trend of poverty reduction. Schooling costs seems to play a major role in this relation between poverty, schooling, and child labor. Their results suggest that about half of India's rise in schooling and fall in child labor during 1990s can be best explained by reduction in poverty and improved capacity to afford schooling.

Mimoun, B. et al (2008) estimated the distribution of human capital investment for educational stages along with the transition process, and the factors responsible for its evolution. The study applied optimal control principles in endogenous growth model with two stages of education. The study showed that with scarcity of developed human capital, the study duration at the higher level should increase to the equilibrium level. They concluded that, if duration of studies is increased at the advanced schooling level, will enhance the economic growth rates of the countries, both in short run and long-run.

Yamauchi, et al (2009) analyzed using panel data from three countries Bangladesh, Ethiopia, and Malawi to study the effects of natural disasters on human capital production. The results suggest that human capital accumulation before a natural disaster helps maintaining of investments in human capital after disaster period. Biological human capital insures resilience to natural disasters by protecting education investments and its outcomes, though it is clear that natural disasters have adverse effects on the investments. In Bangladesh, children are less adversely affected by floods having more biological human capital, high rate of investment is due to increases in the initial human capital stock. In Ethiopia and Malawi, where there are frequent droughts, reduces schooling investments in certain cases, with more adverse effects seen among children with less biological human capital. The study analyses that holding of assets prior to natural disasters helps in maintaining schooling investments same to that of stock of human capital.

accumulated in the children before natural disaster. The results suggest that as the rate of natural disasters increases, the value of investments in children nutrition will increase.

Yang, C. H. et al (2010) used firm-level panel data covering 2005–2007, examined the effects of Research & Development (R&D) and human capital on the level of productivity in China's electronics industry. It is found that both R&D and on-the-job training positively contribute to total factor productivity (TFP). Firms' investment in employees' health insurance and pensions, which are components of workers' compensation, generate a productivity-enhancing effect, supporting the efficiency wage hypothesis. The estimated impact of R&D on productivity varies among different forms of ownership, and foreign-owned enterprises experience higher R&D efficiency than state or private enterprises. After controlling for potential endogenous causality between TFP and R&D, the above findings remain unchanged. They find that on-the-job training leads to improvement in the quality of human capital and helps in the growth of productivity. Therefore, establishing indigenous technological capability through various technological sources is quite important, and the government should devote further effort to investing in human capital.

Mark M. P. et al (2010) suggested that return from investments in education and health varies across males and females in different situations. Health investment

augment the education of women as compared to men, but more increase in the earnings of men as compared to women, while education has high labor-market returns for women. In both developed and underdeveloped countries, women acquire obtain more schooling than men. The study used simple model for human capital investment. The model considers gender differences in the quantity and response of brawn to nutritional intakes in a situation in which different rewards are paid to skill and brawn. Results from the rural areas of Bangladesh, the place where brawn is considered as a prominent factor in economic growth, supports the model and to show the usefulness of the distribution, explaining gender differentials in investment in human capital and its returns. The estimates of the study indicate that nutritional investments raise the rewards of men.

Summary

Sufficient literature is available in this field by scholars from across the world. However, very little work has been carried out in Pakistan and especially in Khyber Pakhtunkhwa, no work has been carried out so far in this field. Most of the available literature is based on secondary data only. Some reviews are based on primary data but have ignored certain aspects of human capital. The literature studied in this chapter is mostly related to public investment on human capital, clearly ignored private investment on human capital. The present study analyzes both private and public investment on human capital. The study compares however, the behaviour of the household in the rural and urban areas of Khyber

Pakhtunkhwa. This study is based on both primary and secondary data and has used all those aspects of the household human capital investment which have not been considered by all the previous studies.

CHAPTER 3

METHODOLOGY OF THE RESEARCH

3.1 Introduction

This chapter is concerned with the methodology of the research and material that was used for analyzing the problem under investigation. To obtain unbiased and correct data concerning the problem of under study, few steps were taken. These include choosing research area, sample size and sampling techniques, methods of data collection and analysis, and selection of appropriate variables in the specifications of models. A questionnaire was developed which contained simple and easily understandable questions. Three villages from the rural area and three towns from the urban area of district Peshawar are chosen as research area. Due to certain constraints like time and resources, the study was restricted to only six areas. Peshawar is the provincial metropolitan which has attracted people from all over the province. Hence a sample selected from Peshawar is more representative of the province. The questionnaire was distributed in these areas and the data was collected according to all aspects of the respondents, which affect their behavior of investing in human capital. The data was then analyzed using different statistical tools like SPSS and Minitab. Econometric models were established, estimated, and the results were tabulated.

3.2 Area of Research

The area of the research is Khyber Pakhtunkhwa province wherein district Peshawar is selected for data collection. Peshawar, the capital of Khyber Pakhtunkhwa has long been known as "Frontier Town" which stands right at the entrance of the Khyber Pass. It is the gateway to the sub-continent.

3.2.1 Location:

The location of the district is between $33^{\circ} 44'$ and $33^{\circ} 15'$ North Latitudes and $71^{\circ} 22'$ and $71^{\circ} 42'$ East Longitude. The district bounded on the North by Charsadda, on the east by Nowshera district, to the south it is surrounded by tribal areas, and to the west it is surrounded by Mohmand and Khyber Agencies. The total area of the district Peshawar is 1257 square kilometers. (District Census Report, Peshawar: 1998)

3.2.2 Physical Features

The district is almost a fertile plain. There is small hilly area of the main Khattak range to the south-east. The highest point of the hilly areas is at Tarakai with a height of almost 700 meters. The central parts of the district Peshawar consist of the fine alluvial deposits. The cultivated land consist of very rich, light, and porous soil, which is composed of mixture of clay and sand, best suited to cultivate wheat, sugarcane and tobacco (District Census Report, Peshawar: 1998).

3.2.3 Climate

The climate of Peshawar district is extreme. The summer season persists from May to September. June is extremely hot and dry. The mean maximum temperature in June and December then rises to over 40°C and 4°C respectively. Rainfall is received both in summer and winter. In March, the largest winter rainfall is recorded, while in August largest summer rainfall is recorded. (District Census Report, Peshawar: 1998)

3.2.4 Population Size and Population Growth

The population of Peshawar district has increased more than five times since 1951. The population is 2019 thousand in 1998 as compared to 391 thousand in 1951, resulting an overall increase by 416.37 percent since then. The population of the district Peshawar is increasing at annual growth rate of 3.56%. Table below shows population and population growth.

Table 3.1

Population and population growth in district Peshawar since 1951

Description	1951	1961	1972	1981	1998
Population (000)	391	529	807	1113	2019
Cumulative increase (%)	-	35.29	106.39	184.65	415.37
Average Annual Growth rate	-	3.08	3.70	3.89	3.56

Source: District Census Report, Peshawar 1998.

The population density of the district was 1606.3 persons per square kilometer in March, 1998.

3.2.5 Household Size

The average size of the household of the district has slightly increased to 8.5 persons in 1998 from 7.3 persons in 1981 despite of the fact that growth rate of population per year has decreased to 3.56% in 1998 as compare to 3.56% in 1998.

3.2.6 Health

Details of medical facilities available to the general public of Peshawar district are provided in the table 3.2 below:

Table 3.2
Health Facilities/Centers, Peshawar District

S.No.	Health Facility/Center	Number
1	Lady Reading Hospital(LRH)	1
2	Khyber Teaching Hospital(KTH)	1
3	Hayatabad Medical Complex(HMC)	1
4	Hospital Class 1, Class 2, Class V	10
5	Rural Health Centers Class 1	3
6	Basic Health Units	50
7	TB Clinics class 1	4
8	MCH Centers	19
9	Leprocy Clinics	1
10	Dispensaries	77

Source: District Census Report, Peshawar 1998.

3.2.7 Education

The government has concentrated more on education and has established many educational institutions i.e. universities, colleges, home economics institutions, technical education schools, Maktab schools and Mosque schools in the district. There are 1032 primary, 89 high schools, 10 colleges and a university for general study. In the district, there is university of engineering and technology, Khyber medical college, an Agriculture University, PCSIR laboratories, and Pakistan Academy for Rural Development (PARD). Islamia College University, Edwards College and Government College are playing its role in providing educational opportunities to the masses. Details of educational and technical institutions are given in table 3.3.

Table 3.3
Educational/Technical Institutions in district Peshawar

S.No.	Institution	Male	Female	Total
1	Degree Colleges	4	3	7
2	Commerce College	1	-	1
3	Polytechnic College	1	1	2
4	Govt Vocational Inst. For	-	1	1
5	Women	11	6	17
6	Higher Secondary Schools	65	24	89
7	High Schools	648	41	689
8	Middle Schools	648	384	1032
	Primary Schools			

Source: District Census Report, Peshawar 1998.

Besides the government institutions, there are also a huge number of private educational institutions which are fulfilling the educational needs of the masses of the district.

3.2.8 Literacy

A person is treated as literate if he is able to read newspaper or journal and able to write a short letter. Literacy ratio of the district for the population of 10 years and above is 41.79%. It has increased by 16.07 percentage points from 1981 when it was only 25.72 percent. The literacy ratio for male is higher at 55.97 percent compared to 25.85 percent for female. Table 3.4 provides literacy ratios by gender and rural/urban divide for 1981 and 1998 census.

Table 3.4

Literacy ratio by gender and rural/urban divides in 1981 and 1998 (%)

Area	1981			1998		
	Both Sexes	Male	Female	Both Sexes	Male	Female
All Areas	25.72	34.00	16.03	41.79	55.97	25.85
Urban	37.84	46.03	27.83	54.09	65.27	41.11
Rural	11.85	19.63	3.19	29.19	46.14	10.74

Source: District Census Report, Peshawar 1998.

3.2.9 Educational Attainments

The total percentage of educated persons is 41.41% of the population age group 10 years and above. Among them 55.63% are male and 25.42% are female. Table 3.5 shows the educated persons by sex and urban/rural origin.

Table 3.5
Educated individuals by gender and urban/rural divide 1998

Area	Educated persons as percentage of population 10 years and above		
	Both Sexes	Male	Female
All Areas	41.41	55.63	25.42
Rural	28.80	45.79	10.31
Urban	53.72	64.95	40.68

Source: District Census Report, Peshawar 1998.

3.2.10 Enrollment Ratio

It measures the percentage of students to the total population of ages 5-24 years. This value is 49.64% for district Peshawar. By gender division this ratio is higher for males which is 57.61% as compared to 40.98% for females. Table 3.6 provides enrollment ratio by gender and rural/urban divided of district Peshawar in 1998.

Table 3.6

Enrollment ratios by gender and rural/urban divide of district Peshawar in 1998

Area	Male	Female	Both Sexes
All Areas	57.61	40.98	49.64
Rural	38.78	14.74	27.23
Urban	77.91	69.62	73.95

Source: District Census Report, Peshawar 1998.

3.2.11 Level of Education

The percentages of the educated students who have passed primary, middle, and matriculation are 24.92%, 19.99%, and 19.61%, respectively. This percentage falls to 8.88% for the intermediate levels, 6.49% for the graduate level, and 3.06% for the post-graduate level.

3.2.12 Economically Active Population

The economically active population of Peshawar district among the population 10 years and above to the total population comprises about 393 thousand souls, 92.51 percent male and 7.51 percent female. The remaining 80.56 percent economically inactive population consists of 32.07 percent children below 10 years, 31.14 percent domestic workers including 64.23 percent female amongst the total females and 1.26 percent male workers amongst total males. The student share is 13.03 percent while all other categories constitute 4.31 percent in the total

economically inactive population of the district. The labor force participation rate as percentage of total labor force to the population aged 10 years and above is computed as 28.62 percent for the district, out of which 50.03 percent are male and 40.55 percent are female. The labor force participation rate is 25.70% in urban areas and 31.63% in the rural areas of the district. Unemployment rate in the district is 17.82 percent. (District Census Report, Peshawar: 1998)

3.3 Sample Size and Sampling Technique

Data has been collected from rural and urban areas of district Peshawar. Three rural areas of the district i.e. Pakha Ghulam, Umeedabad, and Nawan Killi, and three urban areas i.e. Hayatabad, University Town and Gulbahar, are chosen for research. the reason why these areas are selected for data collection are; 1) they are easy to access for a research student having limited time; and 2) these areas are the representative areas of the rural and urban areas of the district.

The sample size is systematically selected by using the formula

$$n = \frac{Ns^2}{(N-1)D + s^2}$$

The formal derivation of the sample size for each of these research areas are given the Appendix at the end of the dissertation

Where

n = Sample Size

N = Population Size

$$s^2 = \text{Sample Variance} = \frac{\sum (Y - \hat{Y})^2}{n-1}$$

$$D = B^2/4$$

B = Bound on the error of estimation

A total of 450 households have been interviewed, 100 each from all the urban areas of research and 50 each from the rural areas of research. The households are selected by using systematic sampling (e.g. every K^{th} unit) from a list of total population of the areas of research. Sample size (n), can be defined as selecting every K^{th} household from the total population (N), arranged in order.

The letter, K, called as the sampling interval can be written as:

$$K = \text{Population size}/\text{Sample size} = N/n$$

Where

N = population size

n = sample size

K = sampling interval

K could be any number nearer to integer (e.g. every tenth or every twentieth unit etc.) and every K^{th} unit from the list of population was selected. Using the above formula for all the three areas, the results are shown in table 3.7 below;

Table 3.7

Table Sample Size and Sampling Technique

Area	N	n	$N/n = K$
Umeedabad	2075	50	41
Nawan Killi	1615	50	32
Pakha Guhlam	1230	50	25
Gulbahar	12411	100	124
Hayatabad	16857	100	168
University Town	14300	100	143

Survey Results: 2010

Table 3.7 above shows that for Umeedabad, Nawan killi, and Pakha Ghulam, every 41st, 32nd, and 25th household is selected for data collection, respectively. While in Gulabahar, Hayatabad, and University Town, every 124th, 168th, and 143rd household has been selected for data collection respectively. Systematic sampling technique was used because of the reason that it saved much of the time and efforts, it was economical, and was convenient to select a sample from the already prepared list of population and just had to tick them.

3.4 Data and Data Collection

Both primary as well as secondary data was used to carry out the objectives. Primary data was collected from the households regarding the household income, education of the household head, employment status and earning status of the household head, family size and structure, number of earners of the household, and the total expenditure per month on education and health. With a view to get reliable and accurate data, a questionnaire was developed including questions covering all the required aspects of the study. The questionnaire included questions in organized way so that to collect information about aspects regarding the study. For secondary data, many sources were used which includes; "Economic Survey of Pakistan, Federal Bureau of Statistics, health department reports, daily newspapers, and other research papers".

3.5 Data Analysis (The Models)

Two models were specified to achieve the objectives. Model 1 analyses the factors responsible for changes in the behaviour of the household investment in human capital in all the rural and urban areas of the research. Model 2 estimates the impact of human capital investment on growth. The data was analyzed using computer statistical programs for social sciences (The models specification is given in chapter 5)

Summary

This chapter provided methodology of the research. Different aspects of the research area are elaborated like location, climate, population size and population growth, household size, health, and education. Selection of the sample size and sampling techniques are explained and methods of data collection are elaborated.

CHAPTER 4

HUMAN CAPITAL INVESTMENT IN RETROSPECT

4.1 Introduction

This chapter comprises of two sections. Section-A deals with the relevance of the human capital investment to economic theories, economic growth of the country, and the actions taken by the Government of Pakistan for the provision of goods and services related human capital investment. Section-B highlights government policies for the promotion human capital investment.

Section-A

Human capital comprises of population, education, skill, talent, attitude, and physical as well as mental powers. There is an urgent need for the improvement of human capital activities like education, training and skills, health conditions, better nutritional standards, clean and safe drinking water and water sanitation etc. Thus the expenditure whereby the knowledge, skills, altitude, aptitude, health and behavior of population is upgraded to suit the world of work and changing environments of the economy is referred to as human capital investment. This is also called "Investment in Man" or Human Capital Development". To make investment in human capital, Professor Schultz (1961) mentioned five methods: (1) the expenditure on education and skill; (2) the expenditure on basic, formal, secondary and higher secondary education; (3) the expenditure on adult education and the expenditure made on extension programs in agriculture; (4) the

technological advances, it is likely to utilize a smaller proportion of labor relative to capital in its production mix. In such societies labor must have the high level of skills and human investment necessary to operate complex capital equipment. The provision of the goods and services is subject to the law of supply and demand as the other sectors of the economy.

Another economic concept in the human capital area is the opportunity cost. By this is meant the cost to an individual in terms of what he is forgoing in the forms of earning for furthering his educational and health related activities. The Cost-Benefit principle is crucial in the human capital area. This means the Rupee amount of benefit derived by the expenditure of a Rupee of cost. Historically, societies at times markedly increase or decrease its support of Human Capital Investments. To some degree, this reflects society's view as to the benefits or returns that it is obtaining from human capital expenditures. Product differentiation is a fact of life in the business world and this concept is also applicable in Human Capital. Human Capital institutions are engaged in differentiating the services related to health and education that they provide. Economies of scale have also economic relevance with Human Capital Investment.

The third concept of economics which can be applied to the investment in human capital is the concept of merit good and externalities. Education and health are

considered as merit goods (Richard Musgare 1958). The provision of merit goods can be made through the market forces but it is the responsibility of the government to provide merit goods to the general public. As merit goods have positive externalities, government should provide education and health to the general public side by side to the private providers.

The above mentioned economic concepts are helpful in understanding the choices that society must make in terms of committing its resources to Human Capital Investments. There are differences when human capital investment is compared to business in general. The first that comes to mind is the concept of production for profit or need. Generally, investing in human capital is undertaken on the basis of need rather than for profit. While economic principles will not give us all the answers, they are generally helpful in understanding of the economic aspects and relevance of investing in human capital.

4.3 Human Capital and Economic Growth

Productivity is one component in the process of economic growth that enhances economic activity through greater efficiency in the use of resources. For this purposes, economic growth is considered to be an increase in real gross national product. Economic growth is important because it results in an expansion of the gross national product, which is the sum of goods and services available to consumers. What factors are responsible for economic growth? Much remains to

be learned by economists and other social scientists regarding the relative importance of the various economic growth factors. The major elements in economic growth process are usually considered to be: (1) Human Capital; (2) Natural Resources; (3) Physical Capital; (4) Entrepreneurship; (5) Government, not necessarily in this order of importance.

Human Capital, which includes the labor force, is one of the four factors of production. The role and importance of human capital in growth process is varied. The skills that population possesses are critical and in some region, there are large number of individuals with very low-skills levels. This type of population is not human asset, but a liability in an era, which is experiencing a decline in the need of unskilled laborers and an increasing demand for skilled workers of various kinds. The labor-force participation is an indication of how much of the total population is contributing to economic production. The entrepreneur is an individual who puts land, labor and capital together. Originally he is a risk taker in the sense that he is the investor of capital. Human capital has significant relation with economic growth of the country. When society spends funds for schools, hospitals, nutrition, and invests in youth, it is referred as investment in human capital. Education and health expenditure widens the individual's horizon so that he becomes more cognizant of local economic opportunities, which enhances the efficient utilization of economic resources. Managerial ability is the most

important factor governing the productivity of labor, given a set of capital facilities and natural resources.

The Committee for Economic Development (CED), which comprises of leading scholars, feels that "the greatest source of any nation is its people. Satisfying greatest economic growth requires that the people be educated, healthy, mobile and motivated to seek improvement of their lives". Economically advanced nations are usually characterized by rapid Human Capital Investment ratio. It is apparent that human capital is important in the economic process and that skills are part of human capital; furthermore, skills are normally obtained through one form or another of education. Schultz (1961), believe that the difference in the human capital is probably the major factor causing differences in growth rates comparing different countries. With the proper proportion of human capital, natural resource utilization tends to be enhanced and outmoded customs and traditions to be weakened. Capacity to communicate is improved and new industries are attracted by skilled labor groups and enlightened consumers. Furthermore, an enlightened citizenry with a high civic awareness can provide a climate that is attractive for industrial location.

4.4 Areas of Investment in Human Capital

What forms can investments in human capital take? These are mainly divided into two groups. One is education and training and the other is health and nutrition.

The education sector is composed of primary, secondary, higher education, teacher's education, vocational education, disabled education and adult education. Investment in training is mostly concerned with on-job training. Health and nutrition investment is concerned with spending on hospital, better food, and doctor's education. Should education be geared to providing skills that are readily usable in the economy, or should it provide well-rounded backgrounds for individuals to enable them to lead richer life? It is apparent that the educational institutions have not always kept abreast of labor-force skills needs, and while the training provided may be sound, it sometime provides individuals with outmoded skills.

On the job training reported by government and industry is a new way of trying to overcome human obsolescence. There are many programs in this area, activated by the basic tenet that individual's skills have not kept pace with technological change and that human resources need to be upgraded, Individuals earn while they learn in most of these programs, which makes the educational retraining process less painful. Should re-training be a burden on the business sector, or does a society have a responsibility to subsidize totally or in part the combating of human obsolescence? Joint ventures of government and business seem to have some value. The business firms normally have some available space and equipment and needs the skills to utilize it and the skills are being taught to be individuals. The

government on the other hand, through subsidization, perhaps in the form of rewards during training, still saves if the business firms provide training facilities.

Adult education programs are geared to providing skills for individuals who are employed but see the need for upgrading. This type of program is offered across the board by various educational institutions. Even labor unions have educational programs of this type, which enable members to enhance their level of knowledge and skills.

The health of population, and in particular of the labor force, is another form of investment. Health expenditures include all activities that have influence on life expectancy, strength, and stamina of the population. Health training can also be a part of the investment process and in some areas even rudimentary investment in sanitation and diet would be extremely helpful. Education for health is assuming new importance in preparing individuals to function and to survive in an economic setting that generally requires more mental than physical efforts.

With rapid changes in our economic structure, it is imperative that individuals be mobile enough to move to where their skills are needed and away from where they are in over supply. Again, it is apparent that spending on human capital helps in making individuals more mobile, and to the extent that this has achieved benefits to the economy.

4.5 Government Actions for Human Capital Development

With the increase in demand for social services, the target of the government should be human resource investment. The main responsibility lies on provincial and district governments. The provincial and district governments have introduced extensive programs for the improvement of service delivery in the education sector, health sector and other social services sector. The government of Khyber Pakhtunkhwa started extensive projects related to health, education and social sector. These projects are supported by structural development credit. The Federal government has transferred the priorities through Federally Funded Conditional Transfers to provinces and district governments. Government is facing challenges of coverage and quality in education sector. More diverse programs which include compensatory programs as well and other projects through public-private partnerships have been started. The Social Action Program (SAP) initiated in 1992-93 was successful in increasing the quantity of schools. The enrollments in private schools are estimated at 30 percent of total. The government has started "Education For All" scheme, the objective of which is to improve the quality of primary education. This resulted in Education Sector Reforms (ESR) Action Plan initiated in 2001-2005. Education Sector Reforms (ESR) are in full integration with Millennium Development Goals. The objective of this is 100 percent literacy in the country through Universal Primary Education (UPE). Establishment of 270,000 Adult Literacy Centers is proposed. The government has initiated the program under the project "United Nations Literacy Decade" for the period 2003-

2012. Till now 300 Teachers Resource Centers (TRCs) are established. Technical/Vocational education centers have been set up throughout the country. To market oriented youth, technical education in 1100 schools is introduced. For output to be according to the requirement of the market, 34 new technologies have been introduced with proper Teaching Learning Materials. The program includes provision of science laboratories in 1000 schools. The government implemented National Education Assessment System to assess learning techniques of students at the primary and elementary levels. The government is manifesting 8000 Madaris during the 5 years. The Government has developed incentive packages both at national and provincial levels to maximize public-private partnerships. Citizens Community Boards and Parent-Teacher Associations have been formed. Fast Track Initiative is a global partnership started by G-8 countries to accelerate program to achieve the goals of universal primary education by the end of 2015.

Higher Education Commission (HEC) has adopted a holistic approach for promotion of higher education throughout the country. The Ph.D. scholarship programs have already been launched to provide a research base in the key important areas of social and economic development.

National census 1998 highlights that 2.49 percent of the total population suffers from many types of disabilities. Efforts are made to adopt a National Action Plan to implement National Policy to manage disability. The government launched

Disabled Persons Ordinance 1981 by reserving one percent quota for disables. The health status of the country is characterized by high rate of population growth, more cases of low birth-weight babies and high mortality rates. Besides this communicable, infectious, and parasitic diseases always remained a danger for the nation. Malaria and Tuberculosis (TB) are continued threats. Providing standard health facilities to majority of population is a tough task. The government is aware of severity of the problem. Through the National Health Policy, the government's objective is to promote gender equity by targeted interventions for example increase in the number of lady health workers. The Lady Health Workers (LHWs) program is predicted to extend to 120,000 by the end of 2010 and will fulfill the need of the whole population.

Other programs are Directly Observed Treatment Schedules (DOTS), a strategy to eliminate TB; Roll Back Malaria (RBM) approach is adopted to combat malaria, prevention of Hepatitis B and C. eliminating neonatal tetanus and Polio, HIV and Aids by immunization and public health awareness.

Preventive health programs are being introduced including National Program for Primary Health Care is established to provide the general public preventive and curative health services at their doorsteps by community based health workers and Lady Health Workers (LHWs). The provincial governments have trying to ensure efficiency in the public health delivery mechanism at the district level. The health

sector adopted the Roll Back Malaria (RBM) strategy in the year 2000 for out rooting Malaria. The Lady Health Workers, health staff, NGOs and volunteers undertake DOTS. The DOTS expansion has the success rate of 77 percent. The government has initiated HIV/AIDS Control Program in 2003 for five years. Nutrition program has been initiated to address the issues like low birth weight babies, malnutrition, micronutrients deficiency and promotion of breast-feeding. National Nutrition Program has been launched. The implementation of Health Management Information Systems (HMIS) is limited to provision of primary health care facilities.

4.6 National Commission for Human Development

National Commission for Human Development (NCHD) aims to accelerate efforts in primary education, literacy rates, income generation and provision of health services, capacity building, and training. NCHD has started its offices at Mardan and Narowal and further extending it to 14 more districts. Pakistan Human Development Fund is established and the commission will be responsible for mobilizing resources globally. It will be a three-way partnership i.e. between government agencies, private sector lenders and international donors. The main objectives of the fund is to support; (a) Universal Primary Education; (b) Literacy and Sustainable Livelihood; (c) Non-formal Basic Education; (d) Primary Health Care and the Family Planning; and (e) Capacity Building and Training. It will

help in capacity building with the help of public-private partnership and the delivery of services will be ensured at the grass roots level.

4.7 Capital Budgeting for Investments in Human Capital

Like other investments, Human Capital Investments involve costs and provide returns. For example, college students incur out-of-pocket expenses or explicit cost of tuitions, books and living expenses, and even larger implicit costs for the earnings forgone by attending college rather than working. A college education, however, also leads to higher lifetime earnings. Thus the validation model can be used to determine the Net Present Value of any investment in human capital, such as investment in a college education. But using the validation model, some time faces a number of substantial problems. For example, some of the expenditures included among the cost of attending the college are more in the nature of consumption rather than investment (as for example, when an engineering student takes a course in poetry). On the other hand, some of the life time earnings attribute to a college education may in fact result from the higher presumed intelligence of the individuals attending college and would probably result even without a college education. There are then some benefits to a college education which are not easily measurable, such as college graduates suffering fewer mental problems, having happier marriages, and so on, than those without a college education. Despite these measurement difficulties, the concept and measurement of human capital is very important and commonly used.

4.8 The Socio-Economic Impacts of Human Capital Investments on Economy

Human capital investments have both the social as well as economic impacts on the economy. These impacts are:

- 1) The impact of schooling duration and better health on wages and on economic productivity is considerable. Though in most developing countries the mean wage rates for females are lower than are those for males even after controlling for schooling, health, and labor market experience but the rates of returns in terms of estimated impact on wages for female human capital investment tend to be as great as those for males.
- 2) The impact of human capital investment on female productivity appears considerable as compare to human capital investment for male.
- 3) The quality of human capital investment has greater impact on labor market outcomes. However, the evidence on its impact on non-market outcomes is very limited.
- 4) There appear to be some positive effects of better health and nutrition on schooling performance and labor productivity. Studies of labor productivity tend to find as strong or stronger effects of longer-run health status with control of simultaneity. The analysis for schooling performance suggest that parents who

have strong interests in child health or low prices of child health inputs also have strong interests in child schooling or face low price for child schooling.

5) Preventive and basic health care seem to have higher returns than case-management curative health care in the initial stages of development characterized by the dominance of the communicable child diseases and malnutrition, but with development there is an epidemiological transition of relative results.

6) There is little systematic empirical evidence on the possible importance of externalities or public good characteristics of the human capital investment, some of these effects may include technological externalities if they pertain to cross household transmission of knowledge or contagious diseases without market intermediation. Giving public subsidies for health and schooling lessened fertility, is likely to have external benefits through lessening the pressure on public resources to provide these services; this externality depends upon the price system. Perhaps the most important public goods phenomenon related to human capital investments is thought to relate to the collection, analysis, and dissemination of information.

7) The attainment of high education leads to increase in the level of income for the household. When more education is achieved, one is able to get better job and hence can increase his level of income.

8) When the level of education in an economy improves the social evils like theft and killing vanishes from the society.

4.9 Comparison of Pakistani Human Capital Investments with Cross-Country Experience

Secondary data was used here to compare human capital investment situation of Pakistan with developing and developed countries. The objective here is to suggest whether Pakistan is below or above the cross country experience with regard to various indicators of human capital investment that are readily available for a large number of countries. Table 4.1 below gives the data regarding human capital for different developing countries.

Table 4.1
Comparison of Pakistani Human Capital Investment with the Developing Countries (2010)

Country	Literacy Rate (2010)	Life Expectancy (2010)	Infant Mortality (per 1000)	Mortality Rates (per 1000)
Pakistan	57.5%	67.2	63.3	89
India	52%	64.4	47.6	69
Sri Lanka	90.2%	74.4	9.7	15
Bangladesh	56%	66.9	50.7	54
China	72.7%	73.5	16.1	21
Nepal	42.2%	67.5	44.5	51
Thailand	93%	69.3	16.4	14
Philippines	94.6%	72.3	19.3	32
Malaysia	83.5%	74.3	15.0	6
Indonesia	83.8%	71.5	27.1	41

Economic Survey of Pakistan: 2010-2011

The above data reveals that Pakistan has the lowest literacy rate after Bhutan.

Thailand, Philippines and Sri Lanka are above the 90% level of literacy rate. It shows that Pakistan is much behind in literacy even among the developing countries. Similarly, Pakistan has the lowest life expectancy i.e. 63 for year 2000. Sri Lanka, Malaysia, and China are above 70. Similarly, Pakistan has very high infant mortality rates and mortality rate (83.3 and 110 respectively) while comparing to Sri Lanka it is 15 and 18 respectively. India, China, and Indonesia, which are the most populated countries, have infant mortality rates and mortality rates as 69.2 and 88, 32 and 39, and 40.9 and 51 respectively. So the data in table 4.1 shows that Pakistan has the lowest human capital investment and large expenditure and efforts are required for the improvement of this sector.

Section-B

This section provides the government policies for human capital development. These policies include education policy, health policy, labor policy, UNDP Human Development Report, and food and nutrition. All these policies are discussed below:

4.10 National Education Policy 2009

Education is a vital for human development and growth. Education policy cannot be complete without considering the effects of social, political, and cultural factors

that directly or indirectly affect the education system. The current education policy highlights some of the challenges faced by the education system and suggests policy alternatives within the broad context of the education system. Studies on the demographic factors reveal that economists are now more concerned on the significance of changing age-structure of the population. More attention in relation to the growth rate of the population and economic growth has gained momentum due to demographic transition which is taking place in third world countries.

According different census reports, the dependent population (population in the age range of 15-65 years) was 51.2% and 53.1% in 1981 and 1998 respectively, which fell to 42.7% in 2004 according to UN population estimates, and it is further projected to be 61.7% by 2015. An education system always is affected by these challenges and opportunities. Global Competitive Index (GCI) reveals the relevance of education and global competitiveness of the different countries, given in the table below. In table 4.2, Pakistan figures are compared with other developing countries in an international context (larger the number given to the pillar, lesser it is showing performance).

Table 4.2
Global Competitive Index (GCI): Pillars and Comparators

Parameters	Pakistan	Bangladesh	China	India	Malaysia	Sri Lanka
Institutions	79	121	80	34	18	82
Infrastructure	67	117	60	62	23	76
Macro-economy	86	47	50	38	31	110
Health and primary	108	90	55	93	42	36
Higher Education and Training	104	108	77	49	32	81
Market Efficiency	54	83	56	21	09	71
Technological readiness	89	114	75	55	28	83
Business Sophistications	67	96	65	25	20	71
Innovation	60	109	46	26	21	53

Source: Ministry of Finance, Government of Pakistan "The State of Pakistan's Competitiveness 2010", Competitive Support Fund, USAID

From the table above looking to the education and health related indicators it can be highlighted that Pakistan is far more behind all the countries. The fact should be considered that the improvement of all other indicators strongly depend on the level of education. The Internet and satellite televisions are the most important sources of education. These are also the potential detriments to achieve the objectives education.

4.10.1 Objectives of the policy

The main objectives of the Education Policy 2009 are:

- i. To streamline the education system, viewing to fulfill social, political, and spiritual requirements of the individuals as well as society;
- ii. To preserve the ideas, that led to the creation of Pakistan and preserve the meaning of the basic ideology provided in the 1973 Constitution;
- iii. To create unity and sense of nationhood and to create a welfare state for general public;
- iv. To create sense of national cohesion through respect of each other's faith, religion, culture and ethnic diversity;
- v. To promote the harmony of society and culture through mobilization of the process of education;
- vi. To ensure educational opportunities to all and to provide adequate facilities for cultural and religious empowerment of minorities to enable them to creatively participate in the development of the country;
- vii. To develop individuals who are capable to think analytically, and act as a responsible member of the society;
- viii. To nurture the personality of the individual by dynamism and creativity to face the truth;
- ix. To raise commitment of the individuals to democratic and moral values, awareness about of the fundamental human rights, openness to new

innovative ideas, a sense of responsibility and to participate in the productive activities of the country;

- x. To bring back confidence of government sector education system through improved quality of education in the state-run institutions;
- xi. To strengthen the education governance and management and improve service delivery through political commitment;
- xii. To develop policy and planning process that helps capture the link among different sub-sectors of the education system;
- xiii. To enable the country to carry out its commitments to attain Dakar Framework of Action (DFA) goals and Millennium Development Goals (MDGs) for education;
- xiv. To ensure education for all and improve quality of education according to the needs of the economy;
- xv. To distribute education by providing special facilities to girls and boys equally, marginalized groups of the society and handicapped students and the adults;
- xvi. To bring illiteracy to zero in the least possible time by improving quality of elementary education combined with institutionalized adult literacy programs;
- xvii. To enable individuals to earn their livelihood honestly by improving skills and contribute to the national economy;

- xviii. To diversify general education to tertiary education to transform education system to demand-oriented education and prepare the population for work;
- xix. To enhance research in educational institutions to accelerate growth of the country; and
- xx. To organize educational development process to reduce disparities among provinces and rural urban areas and to support coordination and share experiences.

4.10.2 Policy Actions

An action programme chalked out for the purpose is summarized below:

- i. Provinces and the area governments were called upon to attaining universal education by 2015;
- ii. Provincial and district governments were made responsible to develop plans to achieve the goals, which includes enrollment targets and estimation of the needed resources like financial, technical, human and organizational;
- iii. To promote commitments of the government towards education for all;
- iv. Special measures to be used ensuring inclusion of special persons in the stream of education, literary and TVE programmes;
- v. The government shall try to improve quality and standards of education services at all levels;

- vi. National standards for education shall be determined. An authority for ensuring the quality of education shall be established;
- vii. Education shall be comprehended to the challenges and opportunities of globalization. Strategies need to be developed for maximizing opportunities and minimizing potential negative externalities;
- viii. The governments shall allocate 7% of the GDP towards education by 2015;
- ix. Human Resource Development (HRD) policy be implemented to integrate all kinds and branches of HRD institutions nursery to higher education;
- x. Education shall be organized at federal and provincial levels to assess rationalization and various streams shall be controlled by one authority;
- xi. Students and teachers exchange program shall be strengthened among the provinces for promoting harmony, social-integration and brotherhood;
- xii. Decentralization of the decision making shall be pursued and shall be moved to the school, which shall be made as the basis unit of planning, including budgeting;
- xiii. Available resources with the private sector shall be mapped and ensure the availability of information to all;
- xiv. A unique curriculum framework shall be provided to the educational institutions in public as well as private sector. Government shall ensure

- to bring public and the private sector in harmony to each other by common standards, quality and regulations;
- xv. Non-profit educational institutions shall be given tax incentives;
 - xvi. Governments shall prioritize schools in the more backward areas to allocate more resource and management to improve quality;
 - xvii. A school language policy shall be introduced in collaboration with provincial, district governments as well as stakeholders;
 - xviii. Data-base for literacy shall be introduced;
 - xix. School Management Committees (SMC) shall be established and strengthened by involving students, teachers, parents, and educationists;
 - xx. Head teachers shall be given more training to make them able to involve the community effectively;
 - xxi. All children shall be enrolled in schools by the year ended 2015;
 - xxii. International Development Partners shall be invited for expanding school facilities;
 - xxiii. Schools shall be made attractive by providing good learning environment, facilities and other measures;
 - xxiv. Students shall be supported to prevent them from dropping out due to financial reasons;
 - xxv. Schools shall encourage more student-centered pedagogies;
 - xxvi. Sport tournaments shall be organized in both the secondary and higher secondary levels;

- xxvii. Literacy target of 86% to be achieved by 2015 through adult literacy and non-formal basic education;
- xxviii. A minimum of 3% of budget shall be allocated for literacy and non-formal basic education by the provincial governments;
- xxix. Non-formal education shall be linked with industry and internship programs shall be introduced to enhance economic benefits of participation;
- xxx. Linkages between schools and vocational training institutions shall be promoted;
- xxxi. School buildings shall be used for adult literacy after school timings;
- xxxii. Arrangements shall be made for teachers training, accreditation and certification process shall be standardized and institutionalized;
- xxxiii. Teacher training facilities shall be provided to in-service teachers in the provinces where it needs implementation;
- xxxiv. The needs of the training shall be assessed according to the research and training programs;
- xxxv. The teaching force shall be managed on basis of professional skills and shall be organized as a specialized function;
- xxxvi. Short courses of language skills shall be introduced for rural area's teachers;
- xxxvii. Teacher's associations shall be given utmost consideration in decision on issues related to them; and

4.11 LABOUR POLICY 2010

Social and economic welfare of the population is one of the prime objectives of the government. The aim of the labour policy is to attain the objectives in a best manner suitable to the scarce resources of the country and the current position of the economy. Revitalization of the economy is an utmost need which requires sustained actions to improve the level of productivity, enhancement of investment and providing employment opportunities. This is need of the day to create better awareness of the responsibilities of both workers and employers for national objectives. The government has recognized that both employees and employers should get all benefits sustained by the economy. Keeping all these priorities in mind, the government feels it necessary that a balanced labour policy should have the following objectives:-

- i. Workers should be given the right to form unions and an institutional framework should be developed to create sense of cooperation between employees and employers;
- ii. Equitable distribution of rights between employees and employers must be ensured in harmony, mutual benefit for both employees and the management;
- iii. Consultations should be made more effective between employees and employers on different problems of interest to the management and welfare of employees;

- iv. Jobs should be made secure for the welfare of workers;
- v. Commitments to enhance labour productivity should be created from both employees and employers;
- vi. Promotion be made on the basis of suitability and merit and arrangements should be made available to provide on-job trainings;
- vii. Match between job opportunities available and those seeking jobs be strengthened and streamlined procedure should be established;
- viii. Suitable conditions of work must be ensured for all employees;
- ix. Forced labour must be eliminated in all forms; and
- x. The employment of employee's children to be strictly followed and enforced.

Labour Policy has been divided into four stages, i.e.

- i) Legal Frame Work;
- ii) Advocacy: Rights of Workers and Employers;
- iii) Skill Development and Employment; and
- iv) Manpower Export.

(i) LEGAL FRAME WORK

The government is of the view that an environment of industrial peace and understanding is an urgent need of the day. The government encourages and assists the process with the help of both employees and employers. The policy will

protect rights and interests of employees and employers and will help to minimize the areas of friction. The government's commitment is the welfare and protection of employees. The unions shall be recognized and given protection and provided all available facilities. The government of Pakistan repealed the "Industrial Relation Ordinance 2002" through the "Industrial Relations Act 2008". A new law according to the International labour Standards will be announced.

(ii) Rationalization and Consolidation of Labour Laws

The Labour Laws are more complex, over-lapping, and create confusion for those who are dealing with them. The penalties on offences and non-compliances are small, as these laws were made before independence. Labour laws will be further consolidated and rationalized to five laws i.e.

- i. Laws related to industrial relations;
- ii. Laws related to employment and service conditions;
- iii. Laws related to occupational safety and health;
- iv. Laws related to human resource development; and
- v. Laws related to labour welfare and social security.

(ii)(a) Wages

The government has a commitment to implement minimum wage as a basic element to protect labour. National Wage Commission and a Work Group will be established to recommend specific operational functions and arrangements which

include its relations with provincial authorities of wage-fixation. The Working Group will prepare a detailed policy to develop and implement national wage policy.

The wages shall be reviewed on yearly basis and minimum wage will be periodically increased. The minimum wage was increased from Rs. 4600/- to Rs. 6000/- in 2008, which was further increased to Rs.7000/-in 2010. Wages shall be paid to every employee through banks.

(ii)(b) Women Empowerment and Gender Equality

International Labour Organization (ILO) has initiated a project “Women Employment Concerns and Working Condition in Pakistan (WEC-PK)” in cooperation with Ministry of Labour and Manpower to improve the quality and quantity of women employment in the country with the goal of socio-economic empowerment of women in both rural and urban areas. Few successful programs are completed aiming at creating conducive work conditions for women, in getting decent employment; improving gender equality and enhancing women's participation, membership and leadership in Trade Unions. Similarly another project “Towards Gender Parity” was launched in January 2010 in cooperation with Ministry of Labour for one year to minimize gender inequality.

(ii)(c) Young Workers

Workers of age 14 to 18 years will be given safe working conditions that and not in those conditions that adversely affect the physical, mental and moral development of the child. Children workers will be prevented from hazardous environment such as mining, tanneries, bricks making, construction work, and glass works etc. Special programmes to be started whose focus will be young workers working in the private sector. Minimum wage rate shall also be ensured for young workers.

(ii)(d) Mine Workers

Most of the employees in mining industry are hired on contract basis. Mine workers are protected by special legislation that ousted them from the mainstream labour laws. Mine workers will be given the same protection as other employees. They can be benefited from minimum wage, social security and safety in their working environment.

(ii)(e) Eradication of Bonded Labour

Federal and provincial governments shall take action to abolish bonded labour and shall be making required amendments in legislation to make it stringent and implemented and to safeguard the welfare of forced workers.

(ii)(f) Construction Labour

For every economy, construction industry acts as the back-bone of all productive activities and employs about two million workers (ILO 2010). Since the industry is rapidly expanding, health and safety hazards in the construction industry are posing new challenges and issues. In order to minimize these hazards and provide the workers safe environment in this sector, the government shall enforce suitable laws and provide all benefits available such as compensations, social security, old-age pensions etc.

(ii)(g) Contractual Employees

The federal government has taken actions to regularize those workers who are working on contract. All contract employees in the government sector will be given regular status within shortest time period.

(ii)(h) Child Labour

Government shall take legal actions to regularize and control chilled labour in certain occupations which are hazardous to their health.

(ii)(i) Agriculture Labour

Mechanization in the agriculture sector is very fast and it requires more technical skill. As a result, the unskilled workers are becoming out of job. As the labour laws are not applied to agriculture sector, therefore, they remain deprived of

various benefits available to them under welfare legislations to other labours in industries. The government proposes to enhance the coverage of "Workmen's Compensation Act 1923" providing compensations in injury as well as death to workers.

(ii)(j) Informal Economy Workers

Providing protection to the labour working in the large informal sector is a big challenge for the government. The informal sector employs millions of people undertaking low-paid, low-productivity jobs, in harsh, unhealthy and hazardous working environment. Informal sector work force is not protected by labour laws. Government is trying its best to take the initiative how to reach out to such workers and protect them by providing them advisory services. Workers of the informal sector will be benefited from improved safety and health programmes, social security arrangements and minimum wages. Childrens below 14 years of age will not be employed at any cost and the employment the age group 14-18 will be supervised through legislation and labour laws.

(iii) SKILL DEVELOPMENT AND EMPLOYMENT

The main aspects of "Human Resource Development and Employment Strategy" are highlighted below:

- i. Lack of determined actions to reduce the rate of population growth, actions to increase employment opportunities are predicted to be less successful;
- ii. It is the need to produce 1.25 million more employment opportunities yearly so that to center the growth rate of the economy around 8.3 percent per year;
- iii. Main emphasis to be on enhancement of employment opportunities in rural areas and the small towns by developing physical infrastructure and industries in the rural areas;
- iv. Special actions to be taken for reduction of unemployment among the highly educated persons not only by under-productive employment in government administrative jobs but also through the private sector employment to meet real needs of the economy;
- v. Actions are taken to accelerate development, enhance productive capacity of small-scale enterprises and to increase employment in the most backward regions of the country to remove regional disparities;
- vi. Self-reliance to be considered as cardinal planks of the whole policy package;
- vii. Actions to be taken to improve the female participation rate in productive activities;
- viii. Skilled labour force to be produced to gain significant productivity and efficiency by the cooperation of the private sector;

- ix. Pakistanis seeking employment opportunities abroad to be provided full support and assistance to productively re-absorb of the migrants; and
- x. More opportunities for self-employment to be produced for educated, skilled and entrepreneurship by access to credit facilities.

(iv) Export of Manpower

Human beings are one of the important capitals of any country. In the present times, record foreign exchange is being sent to the country as remittances by the overseas Pakistanis. It is needed to simplify the process of manpower export and streamlined through making required changes in the Emigration Rules. The Overseas Employment Promoters to be given more incentives to make them able improve their performance. Pakistan embassies in all countries to be required to extend the needful co-operation to the delegations during their visits to the labour importing countries so that to procure manpower demands.

4.12 National Health Policy 2010

Making of the health policy is more complex process in a country like Pakistan. The health system of Pakistan has many flaws; so a reform agenda to be implicitly produced in health policy. The diversity, range and the institutions of health system are required to be considered in the whole process. The more complex health governance, many funding sources, and many more external factors that effect health are considered in the policy. Policy options in regard of health are

information systems, health workforce and means of financing. Structural dimensions that affect the health system-decentralization, process of social protection, interventions in the labour market and health to eliminate poverty are few other considerations in the policy. A good health policy to address the realities of world globalization, disease security and the risks associated with health, the negative impacts of trade, and the aid effectiveness.

As a key aspect, a good health policy must possess certain characteristics to have a meaning for fundamental shifts taking place at the national level. This is the right time to examine the role of the government in health sector. Moreover, there is a needful pressure on the government to reduce recurrent non-developmental expenditures, to minimize fiscal deficit and the ministries of health and population to be merged in each other.

There are important objectives expected that a good health policy can attain and areas where the role of federal government in health can be capitalized by a federal government policy instrument. Three such areas are highlighted in this regard. One, as resource mobilization is the mandate of the federal government, a federal policy must deliver an outline increases in public financing sources and revenue generation for health based on provincial agreed cost. The policy must integrate resources from the revenue pool to help attain health objectives.

Second, a good health policy must spell the principles for health services delivery. Many management re-engineering experiments are being introduced by the health

departments of all the provinces, and also by the other public sector institutions. Primary healthcare infrastructure serves as laboratory. However, these experiments can only bear returns if the evidence is considered in planning to ensure that the government investments are targeted to achieve the equity objectives.

Third, the area of consolidating evidence, information and bridging the deficiencies in health information system is a vital area because of the threats of infections in Asia. Implementation of agreements like "Framework Convention on Tobacco Control and International Health Regulations 2005" is one of the important areas the health policy must consider in health and coordinating donors' contributions. The government also has a significant role in health regulations related to price, quantity and quality in the delivery of health services, medical education and pharmaceutical industry.

To conclude, a health policy must consider the structure of the country and constitutional stipulations. The policy must signal policy positions in regards of the core, but difficult issues which highlight the role of the government in health services provision and mention that how health ministry will utilize its own capacity to overcome these issues. However, the operational details of relevance to health service delivery to be left to the provincial governments.

4.13 Human Development Report 2010

Human Development Report, a flagship study conducted by the United Nations Development Programme (UNDP) each year. Human Development Index (HDI) is part of this report. The Human Development Report 2010 was released at the UN headquarters, New York. The title of the report was "The Real Wealth of Nations: Pathways to Human Development". The rankings on the HDI 2010 cover the period 2005-2010 using adequate data and technology.

The table below gives HDI of some of the countries;

Table 4.3

Ranks of different countries according to HDI, 2010

Country	Rank	Norway	1 st	Congo	165 th
Pakistan	125 th	Australia	2 nd	Niger	166 th
India	119 th	New Zealand	3 rd	Burundi	167 th
Sri Lanka	99 th	United States	4 th	Mozambique	168 th
Bangladesh	129 th	Ireland	5 th	Zimbabwe	169 th
Maldives	107 th				
Nepal	138 th				
Bhutan	-				

Source: Human Development Report, 2010 UNDP

Looking to the table 4.2 the rank of Pakistan is 125th, India 119th, Sri Lanka 99th, Bangladesh 129th, Maldives, 107th and Nepal 138th. Bhutan did not provide any data to the UNDP this year. Norway, which is considered as the country having best quality of life topped the ranking and stood at 1st on the HDI 2010, followed by Australia, New Zealand, United States and Ireland. Zimbabwe has the least quality of life and stood last behind Mozambique, Burundi, Niger and Congo.

This report also highlighted that most of the developing countries has attained dramatic but under-estimated gains in the field of health and education, though there are inequalities within and between countries. The report reviewed trends over the last four decades with the conclusion that people today are more healthy, wealthy and better educated than those in 1970.

Both primary and secondary school enrolment rates have increased from 55% to 70% during the same period. Though all the regions contributed in this progress, but showed wide variations in their scope; like life expectancy increased by 18 years in the Arab countries but 8 years in the Sub-Saharan Africa. Top ten countries which showed significant improvement are Oman, Nepal and Laos. Ethiopia, Cambodia and Benin are among 20 countries which the report described as no success stories.

The Human Development Report, 2010 provided some good news for those who are concerned with the structured human welfare of the society and its

improvement in Pakistan. However, current events in Pakistan leads human development to the dark for the coming few years. Human Development Index, 2010, shows that despite of political and social issues, Pakistan attained marginal improvement in the areas of human development and social welfare.

Rank of 125th out of 169 countries, Pakistan was assessed for its improvements in income and health outcomes during the period 2005-2010. Improvement in Pakistan's ranking is due to strong macroeconomic growth. The health statistics showed high investment but weak returns to individual health while education statistics did not show any improvement in the country.

HDI, 2010 suggests that Government of Pakistan requires resist against easy conflation of wealth, social and human welfare. Given the devastated effects of the previous year, both the federal and the provincial governments need to concentrate their efforts to ensure the distribution of economic recovery to the whole population.

4.14 Food and Nutrition

Food and nutrition are major components which can lead to good human capital. Food rich with all its major components leads to good health and in return healthy labor. So it is important to study the major components of food.

4.14.1 Major components of food

Like all living organisms, human beings require food for carrying out different metabolic activities. Food provides energy when it is broken during catabolism and also provides raw material for growth during anabolism. Major functions of the food and its components are as follow:

- i. Food provides energy which is released during cellular respiration;
- ii. It provides building materials for essential substances e.g. enzymes, hormones etc;
- iii. It provides different substances for growth and development of the body; and
- iv. It helps in the repair of the damaged body parts.

Almost all human beings depend directly or indirectly on plants for their nourishment. They eat plants or their products and flesh of other animals, which also depend on plants.

The major components of food are given below:

- i. Carbohydrates
- ii. Proteins
- iii. Fats
- iv. Vitamins
- v. Minerals
- vi. Water

4.14.1(a) Carbohydrates

Carbohydrates are the primary products of photosynthesis. Carbohydrates are abundantly in living organisms, including both plants and animals. The examples of carbohydrates are cellulose, cotton, paper, starches, cane sugar etc.

Carbohydrates consist of carbon, hydrogen and oxygen atoms. They are called hydrated carbon because they contain hydrogen and oxygen atoms in a ratio similar to that of hydrogen and oxygen atoms in water. They are also called saccharides (derived from Latin word "Saccharum" meaning sugar) and are of three types:

1. Monosaccharides;
2. Oligosaccharides; and
3. Polysaccharides.

A common example of monosaccharides is glucose which is present in almost all fruits such as grapes, mangoes, dates etc. Normally our blood contains about 0.08% of glucose. About 7176 Kcal (Killo Calories) of solar energy is used by the green plant for the synthesis of 10g of glucose. One gram of glucose produces about 3800 calories of energy. Oligosaccharides contain two to ten units of monosaccharides or simple sugar. Examples of Oligosaccharides are maltose, lactose, and sucrose. Polysaccharides are starch, glycogen and cellulose etc. they give rise to simple sugar on hydrolysis. Starches are found in fruits, grains, seeds,

and tubers. Glycogen is called the animal starch and is found abundantly in liver and muscles. Cellulose is the most abundant carbohydrate in nature and is present in every plant cell.

4.14.1(b) Proteins

Proteins are large organic molecules and are composed of carbon, hydrogen, oxygen, nitrogen, and sulphur. Proteins are made up of polypeptide chains and each polypeptide chain is composed of units called amino acids. There are over 10000 types of proteins in human body. There are 20 different types of amino acids which make them. Each protein has specific properties which are determined by the number and specific sequence of amino acids in it.

Protein makes up a good proportion of our food. It serves as a source of energy but only when sugar and fats are exhausted in the body. Their main role is to build material in the body i.e. proteins help in growth and repairs the body parts during healing. They make up the structure of the body like nails, hair, and muscles. Most important and active substances like enzymes, hemoglobin, antibodies, blood clotting substance, and some hormones are made up of proteins. Enzymes speed up metabolic process. Hemoglobin carries oxygen from lungs to different cells of the body. Antibodies protect our body against many invading microorganisms e.g. bacteria. Hormones regulate the activities of different parts of the body. Fibrinogen helps in clotting of blood during bleeding.

Different sources of proteins are egg albumin, meat, soybeans, pulses etc. one gram of protein produces about 4000 calories of energy.

4.14.1(c) Fats

Fats and oil are high energy food components. Most of the fats are made up of smaller chemical units, fatty acids, and glycerols. The fatty substances may be solid at room temperature e.g. animal fat or oils such as corn, cotton seed, groundnut and mustard oils etc. cotton seed oil is used for making vegetable ghee. The sources of fats are both animals and plants. Fats can be obtained from animals and plants. From animals they are obtained in the form of animal's fats, butter, desi ghee etc. excess of fat is stored in our body in the form of fat bodies.

Fats and oils are high energy storage molecules and store more energy than proteins and carbohydrates. They are the building materials and in combination with carbohydrates and proteins build up different parts of the cells e.g. cell membrane. They also act as heat and nerve insulators. One gram of fat produces about 9000 calories of energy.

4.14.1(d) Vitamins

Vitamins are organic compounds required by the animals in minute quantities. They are not the source of energy, but help in regulating functions of different body parts. Their absence in our diet results in serious malfunctions. Vitamins can

be classified into two main groups i.e. “fat soluble” and “water soluble”. Fat soluble are A, D, E and K, and water soluble are B₁, B₆, B₁₂, and C.

Some selected vitamins, along with their sources and functions are given in the table below.

Table 4.4
Vitamins their sources and functions

Vitamins	Sources	Functions
A	Milk, fish, liver oil, carrots, tomatoes, bananas, plums etc	Good for skin and sight etc.
B (B ₁ , B ₆ , B ₁₂)	Wheat, meat, rice, green vegetables etc.	Good for normal growth, nervous system, proper functioning of red blood cells etc
C	Most fresh fruits and vegetables	Helps in healing of wounds and protection against cancer
D	Fish, liver oil, sunlight and ultraviolet light	Makes bones strong by helping in absorption of calcium in them
E	Lettuce, wheat grains etc.	Increase fertility
K	Liver, tomatoes etc.	Prevents bleeding

Health Department, Khyber Pakhtunkhwa, 2010

4.14.1(e) Mineral salts

Besides energy rich compounds and vitamins, mineral salts are also very important components of our food. Although mineral salts are needed in small quantities but are very important for the normal functioning of the body. Some of these minerals are sodium, calcium, magnesium, potassium, chlorine, iodine and iron.

Some of the important minerals, with their sources and functions are given in the table.

Table 4.5

Some minerals, their sources and functions

Minerals	Sources	Functions
Sodium	Table salt	Functioning of nerve and muscle cells
Calcium	Milk and its products, vegetables, meat, fruits etc.	Strengthening, growth of bones and teeth
Iron	Carrots, apple, liver, yolk of egg etc.	Formation of blood particularly hemoglobin.
Potassium	Vegetables, fruits, nuts etc.	Functioning of nerve and muscle cells.
Phosphorus	Fish, oysters, eggs, milk, cheese etc.	Regulating the metabolism of proteins and development of bones and teeth.
Iodine	Sea foods, iodized salts etc.	Growth and proper development of body.
Fluoride	Dissolved in water and sea foods.	Protection against tooth decay.

Health Department, Khyber Pakhtunkhwa, 2010

4.14.1(f) Water

Water exists in largest quantity in all organisms. Human body contains about 20 percent water in bone cells and 85 percent in brain cells. All the metabolic reactions occur in the presence of water, e.g. process of digestion is possible only in the presence of water. Water makes possible the flow of blood in our circulatory system and hence is responsible transportation of different substances from one part of the body to another. Water helps to regulate body's temperature and also helps in the elimination of metabolic wastes (urea) from the body. Undoubtedly water is the medium of life.

4.14.2 Foods and Energy

Energy is required to power all body functions. Carbohydrates and fats are the principle energy sources and to a lesser extent protein, in our diet. All these components of food undergo oxidation during intracellular respiration resulting in the release of energy. Fats contain double energy than that of proteins and carbohydrates.

The major food components and energy released by them is shown in table below

Table 4.6

Major food components and energy released by them

Food components	Energy Kcal/g
Carbohydrates	3.8
Fats	9.0
Proteins	4.0

Health Department, Khyber Pakhtunkhwa, 2010

There are many sources of food components. Different sources provide us different amounts of energy. Table below shows different sources of food components and the amount of energy released.

Table 4.7
Different Foods and their Food value

Raw Food (100g)	K calories	Main components	Raw Food (100g)	K calories	Main components
Rice	360	Carbohydrates	Mutton	153	Proteins
Wheat	348	Carbohydrates	Fish	176	Proteins
Eggs	163	Carbohydrates	Beans	35	Proteins
Butter	716	Fats	Potatoes	100	Starches
Milk(cow)	65	Proteins	Banana	155	Carbohydrates
Milk (Buffalo)	120	Proteins	Orange	45	Carbohydrates
Sugar	387	Carbohydrates	Beef	183	Proteins

Health Department, Khyber Pakhtunkhwa, 2010

4.14.3 Human Energy requirements

In human beings energy requirement is different from individual to individual. It also varies with age, sex, body size, climate, and working conditions. If the development of body is fast, energy requirements will be more. If working conditions are hard, their will be greater requirements of energy. During exercise one needs more energy than at rest. Similarly pregnant and feeding women need more energy. Energy requirements also increase with the increase in size of the body. Human male needs more energy than the female of the same age under normal conditions. At puberty boys and girls both need greater amount of energy because they develop rapidly. In cold climate humans need more energy to combat the cold in their environment while people living in warmer climate need less energy.

Energy requirements of different age groups are given in table below

Table 4.8
Different age groups and their energy requirements

Age Groups	Age in years Working body conditions	K. calories required/day
Children	1-3	1200
	4-6	1600
	7-10	2000
	11-12	2500
Women	23-50	
	Doing no or less work	2200
	Pregnant	2500
	Lactating	3000
Men	23-50	
	Doing no work	2500
	Doing light work	3000
	Doing hard work	4200

Health Department, Khyber Pakhtunkhwa, 2010

4.14.4 Balanced Diet

Balanced diet is the combination of all the kinds of energy containing food components along with the essential minerals and vitamins in an appropriate ratio, fulfilling the needs of healthy growth. Different kinds of balanced diet with a certain nutritive value (required number of calories) are needed for babies, young and old, pregnant and feeding mothers. All these kinds are discussed in more detail as under.

(a) Balanced Diet for Babies

The best balanced diet for new born babies is the mother's milk. It contains all the necessary nutrients including carbohydrates, fats and proteins along with minerals and vitamins. It is an easy digesting food. At the age of four months infants should

also be given a supplement semi-solid food such as mashed potatoes, rice, banana, eggs etc. the quantity of this food needs to be increased with regular intervals until the age of one year. At the age of one year not only the quantity of food is increased but also some other materials are added in diet e.g. cereals, fruits, meat etc. Later on with the increase in age, height, and size, semisolid food is converted into solid food. It is advised in the Holy Quran and the scientists that mother should feed her baby up to the age of two years.

(b) Balanced Diet for Young

During the young age up to the age of twenty five years both boys and girls are usually involved in different activities such as playing, studying etc. these activities need a lot of energy which should be fulfilled by a balanced diet containing all the nutrients for the body but with a greater proportion of major food components. When a person reaches puberty (12-16 years), the body starts growing vigorously. This age is accompanied with several body changes. These changes need more energy which is supplied by rich food containing higher proportion of all essential components. This type of food can be provided by milk and its products, fat rich food, cereals, meat, vegetables, fruits etc. children need proper guidance during this age to utilize their energies for betterment of the society.

(c) Balanced Diet for Old

With the advent of old age, the activities of the body decline and so the energy requirement of the body also decreases. At this stage muscular activities reduce along with many other activities of the body. Old people should rely on food with less calories. At the age of fifty the diet must be without fat or less fat and less carbohydrates but with more minerals and salts. Diet including high fiber food (vegetables, whole grains, and fruits) is recommended. Food rich with fats should be avoided and light regular exercise such as walking should be made part of life.

(d) Balanced Diet for Pregnant Women

A pregnant mother has more dietary needs as compared to other women of her age. She has to feed herself as well as baby in her womb and so has high energy requirements. With the development of the baby in womb of the mother, the need for food increases. Balanced diet for pregnant women includes extra proportion of major food components along with additional minerals and vitamins. Her diet must contain meat, liver, milk and its products, eggs, fresh vegetables, fruits and cereals. Deficiency in any component of her diet may lead to weakness and complications.

(e) Balanced Diet for Feeding Mothers

At the birth of child, the infant is fed on mother's milk. To feed the infant, mother needs extra food, rich in all energy containing food components, minerals and

vitamins. A healthy mother will always bear a healthy child. Her food must be more in quantity as well as in calories. Her balanced diet must include milk, butter, fish, egg, meat, liver, fresh vegetables, cereals and fruits. Production of mother's milk depends upon the quality of her diet.

Summary

In this chapter, public investment on human capital is explained and is linked with different economic principles and growth of the country. Government policies for the promotion of human capital are elaborated in this part. The study has highlighted those areas of human capital where the government is concentrating and those areas where the government lacks concentration. Education Policy 2009, Health Policy 2010, Labour Policy 2010, and Human Development Report 2010 are elaborated here to highlight those areas where more government concentration is needed. Finally, different ingredients of food like vitamins, proteins, and fats are explained for the awareness of the readers.

CHAPTER 5

SPECIFICATION OF THE MODELS

5.1 Introduction

This chapter of the study deals with the modeling of the determinants of human capital investment and its impact on the growth of the country. The first part of this chapter shows the model related to the determinants of human capital development while the second part shows the impact of the human capital accumulation by considering it as factor of production on the economic growth of the country.

5.2 Determinants of the Human Capital Investment

Some of the existing studies like Behrman and Schneider (1993) and Siddiqui (1995) have used the same method as used in this research to analyze the behavior of the household for spending on health and education. However both of them have used different variables. Behrman and Schneider (1993) have used household income, prices, quality of goods and services, family educational background and the expected returns from investment in human capital. They estimated the model by taking the data of Pakistan. Siddiqui (1995) has taken the socio-economic determinants for the health related expenditure like the level of income, education, and urbanization for Pakistan. However, in this study, household level of income, family educational background, expected rates of return, prices, quality and the easy availability of goods and services are taken as variables.

To analyze the data, the model was formulated which shows the responsiveness of Human Capital Investment behavior of the households to different socio-economic factors. It can be shown that Human Capital Investment behavior of the individuals vary with the following socio-economic factors:

- i. Household level of income;
- ii. Household size;
- iii. Dependency Ratio;
- iv. Family educational background;
- v. Prices of goods and services;
- vi. Quality of goods and services;
- vii. Expected return; and
- viii. Availability of goods and services.

The theoretical model is explained as follows; the household behaviour to invest in human beings has positive relation with household income, family educational background, easy availability of goods and services, quality of goods and services and the expected rate of return, while it is negatively related to price of goods and services.

Mathematical form of the model can be expressed as:

$$HCI = \beta_0 + \beta_1 Y + \beta_2 DFB + \beta_3 P + \beta_4 DQ + \beta_5 DRR + \beta_6 DEA + \beta_7 HS + \beta_8 DR + \Omega \quad (5.1)$$

Where

HCI = Human Capital Investment. Expenditure on education, health, and nutrition of the household will be taken to measure human capital investment.

Y = Family level of income

DFB = Dummy taken for family educational background. Its value is "1" if family is educated and "0" if not educated.

P = Prices of goods and services

DQ = Dummy variable taken for the quality of goods and services. Its value is taken as "1" if goods and services are of high quality and "0" if low quality.

DRR = Dummy variable taken for expected rate of return. Its value is taken as "1" if the investment has high expected rate of return and "0" if not.

DBA = Dummy variable taken for easy availability of goods and services. Its value is taken as "1" if goods and services are easily available and "0" if not.

HS = Size of the household

DR = household dependency ratio

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and $\beta_6, \beta_7, \beta_8$ are the parameters used which show the responsiveness of the household behavior to invest in education and health to household income, educational background, prices, quality and easy availability of goods and services and expected return from it, respectively.

β_0 = the Y-intercept

Ω = error term

The same model is also applied by

Abbas, Q. (2000). The Role of Human Capital in Economic Growth: A Comparative Study of Pakistan and India, *The Pakistan Development Review* 39(4), 451-473.

For estimation of the model, the data was taken from the household selected from rural and urban areas of district Peshawar related to household head income, household size, educational background, prices of goods and services, quality of goods and services and availability of the goods and services, the dependency ratio, household size, and the rate of return, the households are expecting after investing in human capital.

5.3 Justification of variables of the Model

This model includes eight socio-economic variables. These are income level, educational background, prices of goods and services, quality of goods and services and availability of the goods and services, dependency ratio, household size and the expected return from such investment. The effect of all these variables is based on the assumption that "other things remain the same". The justification of considering these variables for this study is as under:

5.3.1 Level of Income

Family income has a significant and huge effect on human capital investments. The families having high levels of income seem to be more conscious about their children education and health. Those who cannot afford to enroll their children in schools send them to work because of the high opportunity cost of sending them to school. Similarly, high-income families have high expenses on the health of the family. When a household obtains more income, they increase their food

expenditure almost proportionately. So it can be analyzed that the level of income of the household head is one of the important determinants of the behavior of the household to spend on education and health.

5.3.2 Household Size

Household size is another important factor which affects the behavior of the household human capital investment. The larger the size of the family, the lesser is the saving of the household and hence very low affordability to enroll their children in schools, other things remaining constant. Normally seen, large families send their children to government schools because they can not afford to send them to private schools.

5.3.3 Dependency Ratio

Dependency ratio is the number of the family members who depend on the income of the household head. Dependency ratio varies from family to family and from urban areas to rural areas. The greater the dependency ratio of family, the lesser is the amount of money spent on human capital, other things remaining the same. The greater the dependency ratio, the lesser is saving and hence can not spend more on human development programs.

5.3.4 Family Educational Background

Inter-generational associations between investment in human capital like schooling and health are strong, but in substantial part parental human capital investments represent not the investment themselves but family background characteristics. Intergenerational association between parental schooling and health and child health and schooling usually are strong, probably somewhat stronger for mothers than for father's human capital and perhaps within than across sexes. In substantial part, parental schooling and health represent more the general family background and not the effects of schooling and health themselves.

5.3.5 Prices of Goods and Services Related to Human Capital Investment

Price responses appear to be fairly substantial and probably, larger for poorer than for richer household. Such results contribute to studies of other outcomes that suggest that most people, particularly poor people, respond to price and other incentives. This means that the incentives created by pricing policies and by institutional arrangements are likely to have important effects on the behavior of customers, as well as of suppliers, of goods and services. It also means that if some prices or user fees are increased as part of price reforms, the poor are likely to reduce their use of related services relatively more than those who are better off. If there are distributional reasons for which society wishes to assure that the poor utilize such services then, it may be necessary to target some subsidies related to the services to the poor in order to induce the desired level of use. In our society,

majority of the population is below the poverty line which is price conscious not quality. A little change in the prices of these goods and services will affect the demand of the poor people more than proportionately.

5.3.6 Quality of Goods and Services

Human capital investment seems elastic to the quality of the social services that are available. The limited available evidence on this question suggests that human capital investment increases with better quality of educational and health services. Quality improvements in such services, therefore, may be a major means of increasing human capital investment. However, substantial and widespread quality improvements may occur at a reasonable cost only with institutional and price reforms. Most part of our society is price conscious; however, the rich families are not. They are quality conscious. Their demand for the goods and services do not vary with the changes in prices but with the changes in the quality. The better the quality of the goods and services, the more they will demand for these goods and services.

5.3.7 Availability of the Goods and Services

Easy access to schooling and health facilities is responsive to human capital investments behavior of the household. The schools and colleges within the city area and which are easily approachable have high rates of enrollments. Similarly, people avail those health facilities, which are nearer to them. So one can say that

availability of the goods and services is more responsive to the investment in human capital. The rural areas of Pakistan lack these facilities. That is why the enrollments rate is lesser there. This problem becomes very severe in case of female education. In our society it is not deemed good for girls to go to schools and colleges, which are far away from their homes. This is more severe in the rural areas. Most of the girls and even the poor boys cannot get the education and health facilities because of the non-availability of the goods and services within their reach.

5.3.8 Expected Rate of Return

Human Capital Investments seem responsive to expectations regarding the rates of return on such investments. Testing the response to expectations concerning the rate of return to investments is difficult because it is difficult to know what expectations people have. Therefore, empirical tests of such effects are combined tests of how such expectations are formed and what the responses of such expectations are. Nevertheless, the limited available evidence is consistent with responses to such expectations that are large. This means that human capital investment choices are likely to be responsive to the nature of labor markets and to the perceptions regarding the general development of the economy. By the labor market is meant the employment opportunities. The expectations regarding the human capital investment are nothing but the chances of getting better employment. In the rural areas of the country, the employment opportunities are

very little so most of the people are illiterate and involve in the agriculture sector. So expectations play significant role in the determination of the demand for household investment in human capital.

5.4 Human Capital and Economic Growth

The objective of this research is to estimate the impact of human capital in the growth of the country. The increase in the amount of capital plants and natural resources is normally considered as a necessary condition for economic development. While the non-physical and non-material capital like increase in skill, education, training, improvement in health facilities, better housing and clean water facilities, anti-pollution programs, epidemic control campaigns, and better calories intake etc. are considered as sufficient condition for economic development. Human capital is considered as factor of production to develop the model. This analysis is carried out in the following three ways:

5.4.1 Analysis by considering human capital growth as factor of production;

5.4.2 Analysis of growth with human capital combined with labor to make effective labor input; and

5.4.3 Analysis by considering human capital growth as factor of physical capital.

Human capital investment mainly includes education and health, so here enrollment rates are taken as proxy variables for education. Using enrollment rates as proxies for education, enrollment rates at all the three levels (primary, secondary and higher) will be taken into consideration. Number of patients per doctor and per bed are taken as proxies for health.

5.4 Human Capital

The models for all the three cases are discussed as follows:

5.4.1 Analysis by considering human capital growth as factor of production

Cobb-Douglas production model is used in this study. Gross Domestic Product (GDP), represented by Y , is the dependent variable, three independent factors i.e. labor (L), Physical Capital (K), and Human Capital (H) are considered.

The growth model applied in this research is

$$Y = A.K^{\alpha}.L^{\beta}.H^{\gamma}.\mu$$

The same model is used by Abbas (2000), *The Role of Human Capital in the Economic Growth: A Comparative Study of Pakistan and India*. *Pakistan Development Review* 19:4 pp. 451 -473

Where

Y = Gross Domestic Product

A = Exogenous Level of Technology

L = Labor

K = Physical Capital

H = Human Capital

μ = error term

It is assumed that the returns to scale on investment in human capital increase rather than decline as the stock of human capital rises. So it can be noted here that the model assumes constant returns to scale for all the three factors (Capital, labor, Human).

i.e. $\alpha + \beta + \gamma = 1$

Taking log, the equation for growth can be expressed as

$$\log Y = \log A + \alpha \log K + \beta \log L + \gamma \log H + \log \mu$$

$$\log Y = a + \alpha \log K + \beta \log L + \gamma \log H + e \text{ ————— (5.2)}$$

Where

$$\log A = a$$

$$\log \mu = e$$

Because of the data constraints relevant proxy variables are used like physical capital is vital while estimating growth equations, but past studies has utilized gross investment rate as proxy variable for physical capital accumulation. So in this study gross domestic investment is utilized as a proxy variable for physical capital. Similarly, human capital has been highlighted in the past studies by school enrollment rates and health indicators like number of patients per doctor and per bed, mortality rate, fertility rates, and life expectancy rates.

Therefore, schooling enrollment rates are used as proxies for human capital. Similarly, from health side number of patients per doctor, number of patients per bed, mortality rates, fertility rates, and life expectancy are taken as proxy variables for human capital. The eight variables used for human capital are; school enrollment rates at all the three levels (primary, secondary and higher), and number of patients per doctor and per bed, mortality rates, fertility rates, and life expectancy. These school enrollment rates are obtained by considering the total number of students enrolled in the different grades as compare to the total population of the age group.

Thus model (5.2) will be used to estimate the impact of all the eight proxies of education and health to highlight its impact on the economic growth.

5.4.2 Growth with human capital combined with employed labor to make effective labor

In this section, human capital is combined with employed labor to make effective labor input. Labour embodied by human capital performs better than traditional labour in achieving growth in potential output. So the Cobb-Douglas production function (5.2) can be written as:

$$Y = A \cdot K^{\alpha} \cdot (LH)^{\beta} \cdot \mu$$

Taking log of both sides

$$\log Y = \log A + \alpha \log K + \beta (\log L + \log H) + \log \mu$$

$$\log Y = a + \alpha \log K + \beta (\log L + \log H) + e \text{ —————(5.3)}$$

Where

$$\log A = a$$

$$\log \mu = e$$

This equation will be estimated for all proxies i.e. primary, secondary and higher and health proxies i.e. number of patients per doctor and per bed, mortality rates, fertility rates, and life expectancy.

5.4.3 Growth by taking human capital as a factor of physical capital

An alternative channel is analyzed here for human capital to estimate its impact on growth: human capital helps in the accumulation of other factors which are necessary for growth, especially physical investment. The per capita income and investment ratios calculated in growth models of Rebelo (1990) and Barro (1990) move in the same direction. For instance, improvement in productivity leads to increase the growth rates and investment ratio, in the models such as Romer (1990). An increase in the stock of the human capital leads to improve physical investment to gross domestic product ratio.

the following equation is estimated for all proxies of human capital:

$$K = A.Y^{\alpha} .L^{\beta} .H^{\gamma} .\mu$$

Taking log of both sides

$$\log K = \log A + \alpha \log Y + \beta \log L + \gamma \log H + \log \mu$$

$$\log K = a + \alpha \log Y + \beta \log L + \gamma \log H + \mu \text{-----} (5.4)$$

Where

$$\log A = a$$

$$\log \mu = c$$

The model will be estimated for all the proxies of education as human capital and the five proxies of health as the proxies for human capital. Here eight equations were estimated.

Finally, effective labor input is used as proxy for human capital, in which all proxies of education and health have been combined i.e. school enrollment rates at primary, secondary and higher levels and number of patients per doctor and per bed, mortality rates, fertility rates, and life expectancy with employment. More skilled labor creates opportunities for the firms to invest heavily and hence to install new machinery. Effective labor is a good factor for the accumulation of Physical capital, so here in this section the impact of the effective labor is estimated which leads to economic growth.

The following model is estimated for all proxies:

$$K = A.Y^{\alpha}.(L.H)^{\beta}.\mu$$

Taking log of both sides

$$\log K = a + \alpha \log Y + \beta(\log L + \log H) + \log \mu$$

$$\log K = a + \alpha \log Y + \beta(\log L + \log H) + e \quad \text{-----(5.5)}$$

Where

$$\log A = a$$

$$\log \mu = c$$

The equation was estimated for all education levels i.e. primary, secondary and higher and health proxies i.e. number of patients per doctor and per bed, mortality rates, fertility rates, and life expectancy.

5.5 Further Suggestions and Recommendations for Future Research

In this study, only eight factors have been taken, which determine the human capital. There are other factors also which come into the human capital analysis e.g. elementary education, vocational training, teachers training, and nutrition etc. However, for simplicity and saving of time, only these eight factors have been taken. However, it is hoped that further researches will analyze all other factors. This research provides sound footing for further researches in this field.

Chapter 6

Analysis of the data

6.1 Introduction

This chapter of the study is concerned with the analysis of the data. The analysis is carried out in three parts. First part of the analysis provides descriptive analysis about the socio-economic factors responsible for change in investment in human capital by the household. These include only those aspects of the household which directly or indirectly affect the behaviour of the household head to spend on health and education of the offspring. The second part provides correlation analysis between different socio-economic factors and the investment in human capital by the household. This will give a clear picture which variable is affecting more and which variable is affecting less the behaviour of the household to spend on education and health. Third part of the chapter provides regression analysis in which the models specified in chapter 5 are estimated to analyze the relation between investment in human capital and different socio-economic factors. The impact of human capital investment on the growth of the country is analyzed and the results are tabulated.

6.2 Descriptive Analysis

Data is collected from the research area and the results are provided in the form of tables for all those aspects which are related to household human capital investment behaviour.

6.2.1 Household size and Dependency Ratio of the respondents

Household size means number of persons living in a house. Table 6.1 gives information about the size of the household and the dependency ratio.

Table 6.1
Household size and dependency ratio of the selected respondents

	Area	Sample size	Average Household Size	Overall household size (Ave)	Average Dependency Ratio	Overall Percentage (Ave)
Rural	Pakha Ghulam	50	6.4	6.37	0.75	0.76
	Umeedabad	50	6.3		0.75	
	Nawan Killi	50	6.4		0.77	
Urban	Gulbahar	100	4.2	4.5	0.57	0.61
	University Town	100	4.7		0.65	
	Hayatabad	100	4.5		0.61	

Survey Results: 2010

The table shows that the average household size for all the three rural areas combine is 6.37, which means that on average there are more than six family members in each rural area. The average household size of the overall urban areas is 4.5, which means that on average there are more than four family members in urban areas. The average for Pakha Ghulam is 6.4, for Umeedabad is 6.3, and for

Nawan Killi it is 6.4. While for Gulbahar, University Town, and Hayatabad the average household size is 4.2, 4.7, and 4.5 respectively. The maximum size of the household is 14 in rural areas while it is 9 for urban areas. It can be concluded that household are spending less on education and health because household size is very large and can not afford to send children to schools. Dependency ratio is an important economic variable, which has attained much importance in the studies based on the household behavior for investing in education and health for the last few years. Dependency ratio has been defined as "the household size minus the number of earners in the household divided by the household size. Table 6.1 highlights that overall dependency ratio in the rural areas is 0.76 while that in the urban areas is 0.61. The greater the dependency ratio means that the greater number of the family members depend on the earning of the household. The average dependency ratio for Pakha Ghulam is 0.75, for Umeedabad is 0.75, and for Nawan Killi it is 0.77. While the dependency ratio for Gulbahar, University Town, and Hayatabad is 0.57, 0.65, and 0.61 respectively. It can be seen from the table that the dependency ratio is greater for rural areas and smaller for urban areas. This is one reason that household in the rural areas are spending less on education and health.

6.2.2 Educational profile of the respondents

The overall literacy rate in district Peshawar is 41.79% according to 1998 census. The literacy rate is higher for male (55.97%) than for female (25.85%). The education profile of the sampled respondents is given in the table below:

Table 6.2
Educational Profile of the sampled respondents

Rural Areas

Education	Pakha Ghula	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Illiterate	9	18	8	16	16	32
Primary	11	22	8	16	13	26
Matric	24	48	27	54	12	24
FA/FSc	5	10	4	8	5	10
BA/BSc	1	2	2	4	3	6
MA/MSc and Above	0	0	1	2	1	2
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Illiterate	0	0	0	0	0	0
Primary	3	3	1	1	8	8
Matric	24	24	7	7	9	9
FA/FSc	19	19	13	13	14	14
BA/BSc	30	30	27	27	35	35
MA/MSc and Above	24	24	52	52	34	34
Total	100	100	100	100	100	100

Survey Results: 2010

The table shows the number of respondents with their percentages having different levels of qualification. The majority of the respondents (24) in the rural areas have just passed high school. This makes a percentage of 48. Same is the case with Umeedabad. In Nawan Killi the situation is worst. Highest number of respondents lies in the category of illiterate. In urban areas the majority of the respondents have qualifications MA/MSc and above. The second category is of those having qualification BA/BSc. These two categories include about two-third of the respondents. In all the selected urban areas no respondent is illiterate. From here it

can be concluded that education of the family head plays vital role in the investment in human capital.

6.2.3 Employment status of the respondents

In this study, employment status of the household is divided into four categories i.e. Self-employed, Government employed, private sector employed, and unemployed. The table below gives the employment status of the selected respondents in the selected areas:

Table 6.3
Employment Status of the household head

Rural Areas

Education	Pakha Ghula	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Self Employed	31	62	33	66	25	50
Govt Servant	6	12	6	12	13	26
Private Sector Employed	2	4	2	4	4	8
Unemployed	11	22	9	18	8	16
Total	50	100.0	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Self Employed	33	33	31	31	25	25
Govt Servant	24	24	42	42	47	47
Private Sector Employed	24	24	11	11	16	16
Unemployed	19	19	16	16	12	12
Total	100	100	100	100	100	100

Survey Results: 2010

Table 6.3 shows that majority of the respondents (62%) in the rural areas are self-employed. These self-employed people are either working in farming sector, or having their own business in the form of small shops, few of them having large businesses. Some of the households (11) are unemployed, which means that the household head is not earning anything. In the urban areas again majority of the respondents (33) are self-employed, followed by Government employed (24) and private sector employed (24). So the employment status of the household head is an important factor to affect the behaviour of investment in human capital.

6.2.4 Per month income Range of the household

Income range means the minimum and maximum levels of income of the respondents. The table 6.4 gives the range of the per month income of the respondents for all selected areas of the research.

Table 6.4
Per month income range of the household head

Area	Sample Size	Average	Standard Deviation	Overall (Ave)
Pakha Ghulam	50	11000	11200	11100
Umeedabad	50	9800	9800	
Nawan Killi	50	12000	9600	
Gulbahar	100	28000	8500	28000
University Town	100	28000	9100	
Hayatabad	100	29000	9600	

Survey Results: 2010

The table 6.4 shows that the average range of per month income in the rural areas is Rs. 11100 and in urban areas it is 28000. The greater this average means that on average people are earning more income as compared to those areas where the average is low. The average range of income for Pakha Ghulam is Rs. 11000, for Umeedabad is Rs. 9800, and for Nawan Killi it is Rs. 12000. While the average income-range for Gulbahar, University Town, and Hayatabad is Rs. 28000, Rs. 28000, and Rs. 29000 respectively. The table reveals that the income levels are greater in urban areas and smaller in rural areas.

6.2.5 Income profile of the respondents

Household income means the income, which is received regularly by the household or individual household members on annual or frequent interval basis. Household income includes income from self employment and income from employee's salaries, wages, and other related receipts from employers. It also includes bonuses, social benefits, and property income etc. In brief, income includes from agriculture and non-agriculture professions. The table below gives the income profile of the respondents in the selected areas:

Table 6.5
Income Profile of the Sampled Respondents

Rural Areas

Education	Pakha Ghula	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
1-10000	20	40.0	19	38	9	18
10001-20000	13	26.0	18	36	26	52
20001-30000	10	20.0	9	18	10	20
30001-40000	6	12.0	3	6	4	8
40000 Plus	1	2.0	1	2	1	2
Total	50	100.0	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
1-10000	0	0	0	0	0	0
10001-20000	5	5	5	5	7	7
20001-30000	36	36	41	41	33	33
30001-40000	37	37	27	27	27	27
40000 Plus	22	22	27	27	33	33
Total	100	100	100	100	100	100

Survey Results: 2010

The table shows that maximum number of respondents (20) in the rural areas lie in the income group of Rs. 1-10000 per month followed by income group of Rs. 10001-20000 per month. These include either the small shopkeepers or the government servants in lower scales. However, there are some respondents who are earning more than Rs. 30000 per month. Analyzing the results, it reveals that the maximum number of the respondents (37) in the urban areas lies in the income group of Rs. 30001-40000 per month. In Hayatabad, majority of the respondents

(33) are earning income of Rs. 40000 and above. The table shows that in urban areas the people are enjoying relatively high level of income as compared to rural areas.

6.2.6 Consumption patterns of the respondent

Consumption patterns mean the percentage of income spent on different items like food, clothing, rent, repair, transportation etc. The table below gives the percentage of income which the respondents are spending on different items in all the selected areas of research.

Table 6.6

Expenditure on different items (as percent of total income)

Rural Areas

Area	Pakha Ghulam	Umeedabad	Nawan Killi	Overall (%)
Food items	54	51	48	51
Education	8	8	7	7.66
Medical	7	8	12	9
Housing	0	2	0	0.66
Repairs and maintenance	2	2	4	2.66
Utility Bills	9	10	11	10
Clothes and footwear	12	10	10	10.66
Transport	8	9	8	8.33
Total	100	100	100	100

Urban Areas

Area	Gul Bahar	University Town	Hayatabad	Overall (%)
Food items	46	51	48	48.33
Education	12	9	12	11
Medical	9	8	9	8.66
Housing	7	8	8	7.66
Repairs and maintenance	1	2	1	1.33
Utility Bills	9	7	6	7.33
Clothes and footwear	10	10	8	9.33
Transport	6	5	8	6.33
Total	100	100	100	100

Source: Survey Results 2010

Table 6.6 shows that in Pakha Ghulam about 70% of the household income is spent on food, health, and education. Same is the case with other two areas. In both Umeedabad and Nawan Killi, 67% of the household income is spent on food, health, and nutrition. In all these areas clothing and footwear, and transportation and utility bills are also the items on which the consumers are spending large portion of their income. In urban areas, the percentage of income spent on food, health, education is also about 70% of their income. However, in urban areas people are spending 7 to 8 percent of their income on housing. The reason is that majority of the respondents in urban areas are living in rented houses and pay very high rents. While in rural areas, majority of the household have their own houses. In urban areas respondents are also spending large sum of their income on utility bills and clothes and footwear.

6.2.7 Monthly saving of the respondent

Saving means "the income not consumed". It provides the most important link between the past, present, and the future of a household as well as of country. The level of saving sets a limit on the level of its gross investment and its growth rates. The table below gives per month saving of the respondents in all the selected areas of research:

systems. The table also shows the overall average number of children per family i.e., 2.15 for the rural areas and 1.41 for the urban areas. The average number of children in different education institutions for Pakha Ghulam is 2.2, for Umeedabad is 2.14 and for Nawan Killi it is 2.12. While for Gulbahar and University Town, the average number of children in different institutions is 1.47, and for Hayatabad it is 1.31, which is the lowest of all the research areas.

Table 6.8
Average number of children per family in different schooling levels

Area	Sample Size	Average	Minimum	Maximum	Standard Deviation	Overall (Ave)
Pakha Ghulam	50	2.2	0	4	1.06	2.15
Umeedabad	50	2.14	0	4	0.95	
Nawan Killi	50	2.12	0	4	0.98	
Gulbahar	100	1.47	0	3	0.76	1.41
University Town	100	1.47	1	2	1.20	
Hayatabad	100	1.31	1	3	0.506	

(Source: Survey Results 2010)

6.2.9 Type of Educational institutions of the children

Two types of educational institutions are available for the schooling of the children i.e. the government schools and the private schools. Normally the government schools are charging low prices (fees) but the quality of the education is not according to the market requirement. The private institutions are charging high prices (fees) but at the same time they are providing high quality education.

The table below shows the type of the educational institutions the children of the respondents are attending in all the research areas.

Table 6.9
Type of the educational institution of the children

Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Govt Institutions	35	70	38	76	37	74
Private Institutions	15	30	12	24	13	26
Total	50	100.0	50	100	50	100
Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Govt Institutions	25	25	28	28	26	26
Private Institutions	75	75	72	72	76	76
Total	100	100	100	100	100	100

Source: Survey Results 2010

The table 6.9 shows that highest number of respondents in the rural areas (70%) are sending their children to government schools/institutions. The reason for this may be that the income level of household is very low and that they have more children enrolled in different educational institutions. In urban areas, 75% of the families have enrolled their children in private schools to avail high quality education. Again the reason may be high income in the urban areas, high levels of saving, low dependency ratio, and small number of children enrolled in different educational institutions.

6.2.10 Satisfaction with educational institutions

It is of more importance whether the parents are satisfied with the educational institutions. The satisfaction of parents with the educational institutions depends on the quality of education, quality of the teaching staff, participation of students in co-curricular activities etc. Table 6.10 highlights the figures of the respondents who are satisfied with the educational institutions of the children and those who are not satisfied.

The table also shows that as majority of the children of the respondent (62%) in rural areas are going to government sector educational institutions, the parents are not satisfied with their education and the services which they are providing. The situation is totally different in urban areas of the research. About 80% of the respondents are satisfied with the education and services of the educational institutions of the children. The reason may be because majority of them are sending their children to private sector educational institutions. Answers of the respondents to the question "Are you satisfied with the institutions working for the promotion of education and health related services?" are given below:

Table 6.10

Satisfaction level with regard to education and health related goods and services

Rural Areas

Education	Pakha Ghula	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
No	31	62	35	70	40	80
Yes	19	38	15	30	10	20
Total	50	100.0	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
No	24	24	28	28	21	21
Yes	76	76	72	72	79	79
Total	100	100	100	100	100	100

Survey Results: 2010

6.2.11 Family Doctor with Qualification

To analyze the health concerns of the households, it is important to know about the family doctor and his qualification. The table below gives information about the family doctor and the qualification of the doctor in different areas of the research. In rural areas more than 80% of the household do not have family doctor. They are using village dispensers for health related issues. If the disease is a fatal one then they go to city area for public sector hospitals like Lady Reading Hospital, Hayatabad Medical Complex etc. However, majority of the families in the urban areas are having a family doctor and his qualification is MBBS with specialization. Majority of the household in the urban areas are taking treatment in the private sector hospitals like Rehman Medical Institute, Doctors Hospital, North West Hospital etc. However, there are some families in the urban areas as well

who still can not afford to go to these private hospitals or private clinics. They are relying on the area dispensers or going to public sector hospitals as mentioned above. The table below furnishes the replies of the respondents pertaining to the question "Do you have family doctor? If yes, what is the qualification of the family doctor?"

Table 6.11
Family doctor with qualification

Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Dispenser	41	82	44	88	42	84
MBBS	5	10	4	8	8	16
MBBS with specialization	4	8	2	4	0	0
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Dispenser	21	21	7	7	10	10
MBBS	33	33	47	47	33	33
MBBS with specialization	46	46	46	46	57	57
Total	100	100	100	100	100	100

Survey Results: 2010

6.2.12 Care regarding Nutrition in food

Some parents are more conscious about nutrition in the food of their children, while others do not have any idea about nutrition. Even some families do not know the requirement of a balanced diet. The table below provides information

about the number of families who are taking care about nutrition in food and those who are not.

The table shows that 60% of the respondents in Pakha Ghulam are unaware of nutrition and they do not consider it important in the food for their children. This number is lowest for other rural areas. For example, for Ummedabad it is 86% and for Nawan Killi it is 82%. In urban areas about 80% percent of the respondents are of the view that they do take care of nutritional level in their food and try to provide them with the food which has more vitamins and proteins. However, they are still of the view that more awareness in the general public is needed for the purpose. The table below contains information regarding the question "Is care regarding vitamins, proteins etc. taken while cooking meal at home?"

Table 6.12

Is care regarding vitamins, proteins etc. taken while cooking meal at home?

Rural Areas

Education	Pakha Ghula	Percentage	Ummedabad	Percentage	Nawan Killi	Percentage
No	30	60	43	86	41	82
Yes	20	40	7	14	9	18
Total	50	100.0	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
No	26	26	24	24	21	21
Yes	74	74	76	76	79	79
Total	100	100	100	100	100	100

Survey Results: 2010

6.2.13 Satisfaction with Government Actions

The respondents were asked whether they were satisfied with the actions taken by the government. This question aimed at knowing the respondent's perception about government policies and actions for the promotion of education and health related goods and services. The table below shows this perception of the respondents in the selected areas of research:

Table 6.13

Satisfaction level with regard to government actions in education and health related goods and services

Rural Areas

Education	Pakha Ghula	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
No	40	80	42	84	45	90
Yes	10	20	8	16	5	10
Total	50	100.0	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
No	44	44	64	64	66	66
Yes	56	56	36	36	34	34
Total	100	100	100	100	100	100

Survey Results: 2010

The table provides information that 80% of the respondents in Pakha Ghulam are not satisfied with the steps taken by the government for the promotion and provision of quality education and health services. Same is the case in Umeedabad, and Nawan Killi. In Umeedabad, and Nawan Killi, 84% and 90% of the respondents respectively are not satisfied with the government actions. In urban areas, there is a mixed situation about satisfaction with government actions.

In Gulbahar, 56% of the respondents are satisfied, while in other two areas, majority of the respondents are not satisfied. The reason behind this is that in urban areas majority of the parents are sending their children to private schools and take private hospitals medical facilities. In rural areas, majority of the respondents are availing government goods and services of education and health. They are not satisfied with the poor quality of the government education and health related goods and services.

6.2.14 Factor responsible for changes in the household human capital investment behaviour

This question was asked from the respondents to know their perception about different socio-economic factors responsible for changes in the household behaviour to invest in human capital. The respondents were asked five options to know the intensity of their satisfaction or dissatisfaction from any determinant. These options were; highly satisfied, satisfied, neutral, dissatisfied, highly dissatisfied.

(A) Expected returns from human capital investment

Table 6.14 shows the response of the respondents regarding expected returns from human capital investment as a factor of the household behaviour.

Table 6.14
Expected Returns from Human Capital Investment

Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Highly dissatisfied	3	6	3	6	0	0
Dissatisfied	3	6	10	20	0	0
Neutral	3	6	7	14	8	16
Satisfied	13	26	14	28	24	48
Highly satisfied	28	56	16	32	18	36
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Highly dissatisfied	0	0	0	0	0	0
Dissatisfied	0	0	0	0	0	0
Neutral	16	16	17	17	24	24
Satisfied	44	44	42	42	41	41
Highly satisfied	40	40	41	41	35	35
Total	100	100	100	100	100	100

Survey Results: 2010

The table shows that about 80% of the respondents in Pakha Ghulam spend on the health and education of the children just because they know that they will have greater return in future. The respondents think that when their children will be educated, they will get good jobs, and will be able to earn more. In Umeedabad, and Nawan Killi, 60% and 80% of the respondents, respectively are of the view that they send their children to schools just to have greater returns in future. The same answer was given by the respondents in rural areas. Almost above 80% of the respondents in all the urban areas of research, say that they are sending their

children to schools or are spending more on their health, just because they will earn more in future.

(B) Prices of goods and services

The table below shows the response of the respondents regarding prices of goods and services as a factor of the household behaviour.

Table 6.15

Prices of goods and services related to investment in human capital

Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Highly dissatisfied	11	21	11	22	11	22
Dissatisfied	21	42	21	42	22	44
Neutral	8	16	9	18	9	18
Satisfied	8	16	6	12	6	12
Highly satisfied	2	4	3	6	2	4
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Highly dissatisfied	22	22	6	6	10	10
Dissatisfied	36	36	38	38	44	44
Neutral	12	12	17	17	18	18
Satisfied	15	15	19	19	20	20
Highly satisfied	15	15	20	20	8	8
Total	100	100	100	100	100	100

Survey Results: 2010

The table shows that in Pakha Ghulam, Umeedabad, and Nawan Killi, 63%, 64%, and 66% of the respondents, respectively, do not think that price of goods and services related to human capital investment matters most in their decision to

spend on education and health. They think if you have enough money, then people send their children to those schools and hospitals where they charge high prices. Same is the case in all urban areas. However, in urban areas about 30 to 40 percent of the respondents are of the view that price is an important factor in determining spending on health and education of the household. They cannot send their children to quality schools and hospital just because they are charging high prices which are above their ability to pay. They suggest that the prices of the goods and services should be reduced by the government to make them affordable.

(C) Quality of goods and services

The table below shows the perception of the respondents regarding quality of goods and services related to investment in human capital as a factor of the household behaviour:

Table 6.16

Quality of goods and services related to investment in human capital

Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Highly dissatisfied	11	21	11	22	11	22
Dissatisfied	21	42	21	42	22	44
Neutral	8	16	9	18	9	18
Satisfied	8	16	6	12	6	12
Highly satisfied	2	4	3	6	2	4
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Highly dissatisfied	14	14	0	0	2	2
Dissatisfied	16	16	18	18	9	9
Neutral	6	6	12	12	13	13
Satisfied	27	27	35	35	34	34
Highly satisfied	37	37	35	35	42	42
Total	100	100	100	100	100	100

Survey Results: 2010

The table shows that about 70% of the respondents in all the rural areas under study have the opinion that quality of goods and services does not effect their decision to spend on education and health. As the people of rural areas have low levels of income, they are more price conscious and not quality conscious. That's why majority of the respondents are sending their children to government sector schools and hospitals for education and health. The case is different in all the urban areas. The respondents in urban areas are more quality conscious rather than price. About 70% of the respondents in all the urban areas of research are of the view that they are sending their children to private schools just because of having high quality of education against the government sector schools.

(D) Family educational background of the household

Family educational background plays significant role in the determination of household behaviour regarding investment in human capital. Table 6.17 below shows the perception of the respondents regarding family educational background:

Table 6.17
Family educational background of the household

Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Highly dissatisfied	20	40	16	32	29	58
Dissatisfied	24	48	26	52	12	24
Neutral	5	10	5	10	5	10
Satisfied	1	2	2	4	3	6
Highly satisfied	0	0	1	2	1	2
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Highly dissatisfied	1	1	3	3	0	0
Dissatisfied	10	10	16	16	0	0
Neutral	15	15	20	20	18	18
Satisfied	38	38	31	31	39	39
Highly satisfied	36	36	30	30	43	43
Total	100	100	100	100	100	100

Survey Results: 2010

The above table shows that in rural areas, family educational background does not matter for them to spend on education and health. About 80% of the respondents in all the rural areas of research are of the view that they are illiterate but still they are sending their children to schools and the reason is that they are aware of the benefits of education. However, in urban areas, about 80% of the respondents are of the view that family educational background is an important factor in determining their expenditure on education and health. In Gulbahar 74% of the respondents think that they are sending their children to schools because they are

educated themselves. The lowest percentage of this opinion is in University Town, which is 61%. However, in Hayatabad, 82% of the respondents think that they send their children to schools because they are educated themselves. So it is clear from the table that family educational background is an important factor in affecting the household behaviour to invest in human capital.

(E) Availability of goods and services

Table 6.18 provides data regarding availability of goods and services as a factor of the household behaviour.

Table 6.18

Easy availability of goods and services related to investment in human capital
Rural Areas

Education	Pakha Ghulam	Percentage	Umeedabad	Percentage	Nawan Killi	Percentage
Highly dissatisfied	11	21	11	22	11	22
Dissatisfied	21	42	21	42	22	44
Neutral	8	16	9	18	9	18
Satisfied	8	16	6	12	6	12
Highly satisfied	2	4	3	6	2	4
Total	50	100	50	100	50	100

Urban Areas

Education	Gulbahar	Percentage	University Town	Percentage	Hayatabad	Percentage
Highly dissatisfied	14	14	9	9	11	11
Dissatisfied	25	25	42	42	43	43
Neutral	18	18	16	16	24	24
Satisfied	26	26	25	25	21	21
Highly satisfied	17	17	8	8	1	1
Total	100	100	100	100	100	100

Survey Results: 2010

The above table shows that in both the urban and rural areas of research, easy availability of the goods and services is not an important factor for the decision of investing in human capital. In Pakha Ghulam, Umeedabad, and Nawan Killi, 63%, 66%, and 66% of the respondents, respectively, are of the view that easy availability is not effecting the decision to spend on human capital. In Gulbahar, University Town, and Hayatabad, this percentage is 39%, 51%, and 54% respectively. However, in urban areas, about 20 to 25 percent of the respondents are of the view that transport charges are very high and that's why they are not sending their children to far-away schools, but have enrolled them in near-by government schools.

6.3 Correlation Analysis

To find out the main factors of the household human capital investment behaviour, Pearson correlation is used and the total expenditure made by the household on education, health, and nutrition for all the urban and rural areas of research.

(A) Pearson Correlation for Rural Areas combined

The Pearson correlation results are given in table 6.19 for all the rural areas combined.

Table 6.19
Pearson Correlation for all Rural Areas Combined

Variables	Expenditure on education, health and food	Expected rate of return	Price of goods and services	Quality of goods and services	Family educational background	Easy availability	Monthly income of the household	Number of earning members
Expenditure on education, health and food	1							
Expected rate of return	.010	1						
Price of goods and services	-.091	.000	1					
Quality of goods and services	.091	.000	1.000	1				
Family educational background	.217	.034	-.028	-.028	1			
Easy availability	.091	.000	1.000	1.000	-.028	1		
Monthly income of the household	.787	.012	.091	.091	.271	.091	1	
Number of earning members	.427	-.103	.010	.010	.308	.010	.568	1

Survey Results: 2010

The Pearson Correlation in table 6.19 above shows that there is direct relation (0.010) between expected rate of return and investment on education and health with the assumption that other things remain the same. This value is very low as people do not know the returns from health expenditure. The greater the expected rate of return, the more people spend on education and health of their children. Investment on education and health is negatively related (-0.091) to prices of the goods and services. When the prices of goods and services increase, people send less and less children to schools. The reason is that they have very low level of income. Similarly with other factors like family educational background (0.217),

easy availability of goods and services (0.091), quality of goods and services (0.091), monthly income of the household (0.787), and number of earning members (0.427), all have direct relation with household behavior to invest in health, food and education. Those who are earning more spend more on health, education and food. Those families where the household head is educated, their children will also be enrolled in high standard schools. Monthly income of the household is the variable which has very strong relation with household investment in human capital followed by the earning members of a household. The earning members, quality and easy availability of goods and services have positive relation with household human capital investment behaviour which is according to the economic theory.

(B) Pearson Correlation for all the urban areas combined

The same variables are considered to find out the Pearson correlation for the urban areas as well. The Pearson correlation results are given in table 6.20 for all the urban areas combined.

Table 6.20

Pearson Correlation for all Urban Areas Combine

	Expenditure on education, health and food	Expected rate of return	Price of goods and services	Quality of goods and services	Family educational background	Easy availability	Monthly income of the household	Number of earning members
Expenditure on education, health and food	1							
Expected rate of return	.034	1						
Price of goods and services	-.169	-.074	1					
Quality of goods and services	.117	.000	-.263**	1				
Family educational background	.068	.007	-.061	.013	1			
Easy availability	.032	.021	-.084	.069	.106	1		
Monthly income of the household	.680	-.019	.109	.085	.045	-.010	1	
Number of earning members	.087	-.123	.098	.056	.046	.045	.100	1

Survey Results: 2010

The Pearson Correlation table shows that there is positive relation (0.043) between expected rate of return from education and health and expenditure on education and health but this relation is very weak. The greater the expected return, the more people tend to invest in education and health. The reason behind the weak relation is that people living even in the urban areas are unaware of the returns of investment on health, though they know about the returns of investment on education. The investment on education and health is negatively related to prices of the goods and services (-0.169). The reason is that in urban areas most of the

parents are sending their children to private schools and hospitals and they are charging very high prices (fees). Similarly, with other factors like family educational background (0.068), easy availability of goods and services (0.032), quality of goods and services (0.117), monthly income of the household (0.680), and number of earning members (0.087), all have direct relation with household behavior to spend on health, food and education. Those who are earning more, spend more on health, education and food, other things remaining the same. Those families where the household head is educated, the children will also be enrolled in high standard schools, other things remaining the same. Monthly income of the household is the variable which has very strong relation with household investment in human capital followed by the quality of goods and services. The number of earning members and easy availability of goods and services have positive relation with household human capital investment behaviour.

6.3 Regression Analysis

The regression analysis is divided into two sections. Section-A estimates the model related to the socio-economic factors responsible for changes in human capital investment behaviour of the household. Section-B is concerned with the estimation of the impact of human capital investment on growth of the country.

Section-A

Estimation of the model to analyse the factors responsible for changes in the behaviour of the household to invest in human capital in the selected rural and urban areas

To estimate model 5.1 of chapter 5, primary data was used for all the areas of research. The objective was to find out the impact of each determinant on the behaviour of the household to spend on education, health and nutrition.

Model (5.1) is estimated for all the rural areas of the research and the results are tabulated as under:

Table 6.21
Factors affecting household human capital investment behaviour in the rural areas

Variable	Pakha Ghulam	Umeedabad	Nawan Killi
Constant	0.695	-0.686	0.630
Family income	0.482 (10.555)*	0.576 (7.676)*	0.434 (7.260)*
Family Educational Background	0.516 (7.588)**	0.170 (2.615)**	0.310 (7.209)**
Price of related goods and services	-0.530 (-1.388)	-0.453 (-5.080)***	-0.148 (-2.276)***
Quality of related goods and services	0.043 (1.343)	0.167 (1.186)	0.010 (0.434)
Easy Availability of related goods and services	0.006 (0.137)	0.041 (0.732)	0.041 (0.836)
Expected Rate of Return	0.440 (11.891)*	0.143 (2.860)**	0.028 (0.367)
Dependency Ratio	-0.318 (-4.740)**	-1.693 (-2.301)**	-0.203 (-2.759)***
R ²	0.792	0.623	0.573
Adjusted R ²	0.763	0.580	0.524
F	27.33(7, 42)	14.535(7, 42)	11.796(7, 42)
D.W	1.906	2.273	1.935

* Significant at 0.01 levels of significance

** Significant at 0.01 levels of significance

*** Significant at 0.01 levels of significance

Figures in Parenthesis are estimated t-values

The table reveals that income has very significant positive relation with household behaviour to invest in human capital for all the rural areas of research. The greater

the income of the household, the more they are willing to invest in education and health of their children with the assumption of other things remaining the same. The coefficient of income in Pakha Ghulam is (0.482) in Umeedabad it is (0.576), and in Nawan Killi it is (0.434). The relation of family income with the household human capital investment behaviour is significant at 0.01 levels of significance for all the rural areas of research. Prices of goods and services is negatively related (-0.530) to the household behaviour to spend on health and education in all the three areas of research. High prices of goods and services mean that educational and health facilities are expensive and less people have the ability to achieve it. The coefficient of prices of goods and services is significant at 0.10 levels of significance in Umeedabad and Nawan Killi, while it is not significant in Pakha Ghulam. Quality of goods and services is directly related to household investment behaviour in human capital in all rural areas of research i.e. Pakha Ghulam (0.043), Umeedabad (0.167), and Nawan Killi (0.010). However, the relations are not significant in all the three areas of research. Easy availability of goods and services is directly related to household behaviour in Pakha Ghulam (0.006), Umeedabad (0.041), and Nawan Killi (0.041). However, the relation in all the areas is weak and not significant. The reason behind this is that people are willing to go to distant schools and colleges but they do not have the ability to pay. Expected return from human capital investment has a very strong, positive, and significant relation with household human capital investment behaviour in Pakha Ghulam (0.440). It is significant at 0.01 levels of significance. In Umeedabad, this

relation is positive (0.143) and significant at 0.05 level of significance. The relation is positive (0.028) in Nawan Killi but weak and insignificant. The reason is that majority of the household are illiterate and unaware of the returns from investment on health and food. Dependency ratio is negatively related to household behaviour to invest in human capital in all rural areas of research i.e. Pakha Ghulam (-0.318), Umeedabad (-1.693), and Nawan Killi (-0.203) and the result is significant at 0.05 level of significance in Pakha Ghulam and Umeedabad, and at 0.10 level of significance in Nawan Killi. The coefficient of Multiple Determination (R^2) is (0.792), (0.623), and (0.573) for Pakha Ghulam, Umeedabad, and Nawan Killi, respectively. The value of R^2 and adjusted R^2 indicates that the model is good fit and shows strong relation between dependent and independent variables. The calculated F-statistic value is 27.337 for Pakha Ghulam, 14.535 for Umeedabad, and 11.796 for Nawan Killi. According to F-statistic, the overall model is significant at 0.01 levels of significance. To check for autocorrelation, Durbin-Watson test was applied. According to this test, if calculated D.W value i.e. $d^* > (4-d_L)$ where d_L is the lower value of the D.W test, there is autocorrelation in the model. If $d_u < d^* < (4-d_u)$, it is accepted that there is no autocorrelation in the model. For sample size $n = 50$ and $k' = 7$ (7 explanatory variable) $d_L = 1.26$ and $d_u = 1.85$. The estimated D.W values are (1.906), (2.273), and (1.435) for Pakha Ghulam, Umeedabad, and Nawan Killi. The estimated value d^* for all the areas is less than $(4-d_L)$ and lies between d_u and $(4-d_u)$. So we can

conclude that there is no autocorrelation in the model for all the three areas of research.

Model (4.1) is estimated for all the urban areas of research and the results are provided in the table below:

Table 6.22
Factors affecting household human capital investment behaviour in the rural areas

Variable	Gulbahar	University Town	Hayatabad
Constant	0.573	0.658	0.520
Family income	0.566 (8.133)*	0.480 (11.260)*	0.413 (9.883)*
Family Educational Background	0.339 (6.647)***	0.069 (2.017)**	0.027 (0.511)
Price of related goods and services	0.052 (0.873)	0.011 (0.340)	0.013 (0.373)
Quality of related goods and services	0.204 (3.709)**	0.232 (6.628)**	0.162 (4.263)*
Easy Availability of related goods and services	-0.003 (-0.054)	0.058 (1.670)***	0.024 (0.602)
Expected Rate of Return	0.219 (2.670)**	0.157 (2.907)***	0.201 (3.792)***
Dependency Ratio	-0.182 (-2.246)**	-0.074 (-1.804)***	0.421 (3.244)**
R ²	0.459	.623	0.572
Adjusted R ²	0.418	0.594	0.540
F	11.157 (7, 92)	21.673 (7, 92)	17.581 (7, 92)
D.W	1.850	2.134	1.918

* Significant at 0.10 levels of significance

** Significant at 0.05 levels of significance

*** Significant at 0.01 levels of significance

Figures in Parenthesis are estimated t-values

The above table shows that income has a very significant positive relation with household investment behaviour in human capital for all the urban areas of research. The greater the income of the household, the more they are willing to invest in education and health of their children, other things remain the same. The coefficient of income in Gulbahar is (0.566), in University Town it is (0.480), and in Hayatabad it is (0.413). The relation of family income with the household human capital investment behaviour is significant at 0.01 levels of significance for all the areas of research. Prices of goods and services is positively related to the household behaviour to spend on health and education in all the three areas of research i.e. (0.052) for Gulbahar, (0.011) for University Town, and (0.013) for Hayatabad. High prices of goods and services mean people are willing to spend less on health and education. The coefficient of prices of goods and services is not significant in all the three areas of research. Quality of goods and services is directly related to human capital investment behaviour of the household in all urban areas of research i.e. Gulbahar (0.204), University Town (0.232), and Hayatabad (0.162). The values are significant in Gulbahar and University Town at 0.05 levels of significance, while the value is significant at 0.01 levels of significance for Hayatabad. Easy availability of goods and services is directly related to household behaviour in University Town (0.058) and Hayatabad (0.024) while in Gulabahr the relation is negative (-0.003). However, the relation is significant only for University Town and not significant in Gulabahr and Hayatabad. Expected rate of return from human capital investment has a very

strong, positive and significant relation with household human capital investment behaviour in Gulbahar (2.670). It is significant at 0.05 levels of significance. In University Town and Hayatabad, the coefficients of expected rate of return are (0.157) and (0.201) respectively. These values are significant at 0.10 levels of significance. Dependency ratio is negatively related to household behaviour to invest in human capital in Gulbahar (-0.182) and University Town (-0.074) but positive in Hayatabad (0.412). The result is significant at 0.05 levels of significance in Gulbahar and Hayatabad, and at 0.10 levels of significance in University Town. The Coefficient of Multiple Determination (R^2) is (0.459), (0.623) and (0.572) for Gulbahar, University Town and Hayatabad respectively. These values show that the model is good fit and there is strong relation between dependent and independent variables. The calculated F-statistic value is 11.157 for Gulbahar, 21.673 for University Town, and 17.581 for Hayatabad. According to F-statistic, the overall model is significant at 0.01 levels of significance. For sample size $n = 100$ and $k' = 7$ (7 explanatory variable) $d_L = 1.53$ and $d_u = 1.82$. The estimated D.W values are (1.850), (2.134), and (1.918) for Gulbahar, University Town and Hayatabad respectively. The estimated value d^* for all the areas is less than $(4-d_L)$ and lies between d_u and $(4-d_u)$. So it can be concluded that there is no autocorrelation in the model for all the three areas of research.

Section-B

Estimation of the model to analyze the impact of investment in human capital on growth of the country from 2001 to 2010

This section deals with the estimation of the relation between investment in human capital and growth of the country. Cobb-Douglas production function is used to analyze the impact of investment in human capital on the economic growth. For estimation of the model, secondary data is taken and education and health proxies are used for human capital investment. The data is taken for the period 2001 to 2010. The model is estimated in three steps. They are explained as follows:

(A) Economic growth by taking human capital as factor of production

Model 5.2 of chapter 5 is estimated by taking all the education and health proxies of human capital as factors of production for the period 2001-2010. The proxy variables for education are primary education enrollment rates, secondary education enrollment rates, and higher education enrollment rates. The proxy variables for health are population per doctor, population per bed, infant mortality rates, and life expectancy. Model (5.2) is estimated for all the proxy variables. The results are shown in the table 6.23 for all the proxy variables.

Table 6.23

Impact of Human Capital proxies as factor of production to Economic Growth (GDP)

Education Proxy Variables

Variable	Primary Education Enrollment Rates	Secondary Education Enrollment Rates	Higher Education Enrollment Rates
Constant	-1.479	-1.087	-8.816
Log K	113550.354 (11.526)*	137400.680 (5.166)*	130161.099 (2.781)**
Log L	-0.274 (-1.00)	0.168 (0.404)	0.216 (0.400)
Log H	107.229 (3.241)**	-0.717 (-2.076)***	109.120 (1.650)***
R ²	0.997	0.991	0.991
Adjusted R ²	0.995	0.986	0.986
F	604.353 (3, 6)*	218.451 (3,6)*	219.159 (3,6)*
D.W	1.484	1.150	1.018

Health Proxy Variables

Variable	Population per Doctor	Population per Bed	Infant Mortality Rate	Life Expectancy
Constant	6.622	-2.184	-1.677	-1.439
Log K	69049.592 (2.191)***	114930.772 (2.191)***	142173.192 (7.399)*	94666.598 (4.635)*
Log L	-0.215 (-0.634)	-0.504 (4.090)**	0.130 (0.323)	0.326 (1.088)
Log H	-3232.099 (-2.224)***	1677.708 (5.120)**	4870.627 (1.305)***	238755.439 (2.250)**
R ²	0.995	0.993	0.991	0.995
Adjusted R ²	0.993	0.989	0.987	0.993
F	400.110 (3,6)*	277.076 (3,6)*	404.337 (3,6)*	404.337 (3,6)*
D.W	1.135	1.011	1.085	1.085

* Significant at 0.10 levels of significance

** Significant at 0.05 levels of significance

*** Significant at 0.01 levels of significance

Figures in Parenthesis are estimated t-values

Table 6.23 reveals that gross domestic investment has positive relation (113550.354) with growth of the country and the coefficient is significant at 0.01 levels of significance. The employed labor force in the model has negative relation with growth. The reasons behind this may be high population growth, under-employment of the labour, and/or exhaustion of natural resources like natural gas and energy. Primary enrollment rate as proxy variable for human capital has positive relation (107.229) and the value is significant at 0.01 levels of significance. However, secondary enrollment rate has negative relation (-0.717) with growth of the country. This value is significant at 0.10 levels of significance. The reason behind this is that most parents are not willing to send their children to schools and send them to work to support family. In this equation, both employed labour and gross domestic investment has positive relation with growth of the country (0.168 and 137400.680, respectively). The coefficient of higher education as proxy variable for human capital is positively significant at 0.10 levels of significance. Population per bed has negative relation (-3232.099) with growth. This means that the greater population per doctor will worsen the health conditions of the public and will not be able to work more, and hence gross domestic product will decrease. The raw labour has also inverse relation with growth in the equation for population per doctor. Population per bed has positive and significant relation (1677.708) with gross domestic product. However, infant mortality and life expectancy has positive and significant relation (4870.627 and 238755.439, respectively) with growth of the country. The Coefficient of Multiple

Determination (R^2) for all these equations in the table shows that the model is good fit of the data for all the proxy variables and shows strong relation between dependent and independent variables. The adjusted R^2 values for all the equations confirm this relation. According to the calculated F values for all the proxy variables, the overall model is significant at 0.01 levels of significance. To check for autocorrelation, for sample size $n = 10$ and $k' = 3$ (3 explanatory variable) $d_L = 0.61$ and $d_u = 1.79$. The estimated value d^* for all the proxy variables are less than $(4-d_L)$ and lies between d_u and $(4-d_u)$. So it can be concluded that there is no autocorrelation in the model for all the proxy variables.

Overall empirical evidence supports the idea that human capital plays vital role in growth of the country. Moreover, to treat human capital by taking it as factor of production shows that in growth regressions, human capital is affecting positively and significantly, especially at the primary and higher school levels and all the health proxy variables excluding population per doctor. Therefore, it can be concluded that human capital investment effects positively and significantly the growth of the country.

(B) Growth by combining human capital with labor to make effective labor

Model (5.3) of chapter 5 is estimated to analyze the impact of human capital as effective labour by combining all the proxy variables with the employed labour. Human capital embodied labour performs efficiently than ordinary rough labour. Furthermore, this measure of the impact of human capital on growth is better than simple school enrollments and health proxies because it considers the skilled

labour only. Model (5.3) is estimated for all the proxy variables. The results are shown in the table 6.24 below:

Table 6.24

Impact of human capital proxies combined with labour (effective labour) as factor of production to economic growth (GDP)

Education Proxy Variables

Variable	Primary Education Enrollment Rates	Secondary Education Enrollment Rates	Higher Education Enrollment Rates
Constant	-1.370	-1.072	-1.553
Log K	2.966.141 (0.551)	107050.440 (0.331)	435099.246 (0.878)
Log (L + H)	7.922.111 (3.159)**	31136.147 (3.410)**	-281398.980 (-3.813)**
R ²	0.996	0.991	0.991
Adjusted R ²	0.995	0.988	0.989
F	906.117 (2,7)*	372.054 (2,7)*	390.390 (2,7)*
D.W		1.549	1.694

Health Proxy Variables

Variable	Population per Doctor	Population per Bed	Infant Mortality Rate	Life Expectancy
Constant	-9.260	-1.158	-1.121	-1.121
Log K	83.953 (2.453)**	-3.244 (2.079)***	140721.384 (29.139)*	140721.384 (29.139)*
Log (L + H)	52795.442 (1.454)	144474.717 (32.516)*	41.848 (2.560)***	1.492 (2.021)***
R ²	0.995	0.994	0.991	0.991
Adjusted R ²	0.994	0.993	0.989	0.989
F	689.212 (2,7)*	602.912 (2,7)*	849.084 (2,7)*	849.082 (2,7)*
D.W	1.087	1.312	1.592	1.592

* Significant at 0.10 levels of significance

** Significant at 0.05 levels of significance

*** Significant at 0.01 levels of significance

Figures in Parenthesis are estimated t-values

Table 6.24 reveals that gross domestic investment has positive relation (20966.1471) with gross domestic product but the relation is insignificant. The employed labor force is now combined with all the proxy variables of human capital to make effective labour. The primary education enrollment rates embodied labour force has very strong positive relation (70922.191) with growth of the country. The coefficient is significant at 0.05 levels of significance. Secondary enrollment rate embodied labour force has positive relation (31136.147) with growth of the country. This value is significant at 0.05 levels. The coefficient of higher education embodied labour force as proxy variable for human capital is negative (-281398.980) and significant at 0.05 levels of significance. Population per bed combined with labour force has positive relation (52795.442) with growth. Domestic investment in this equation has positive relation with gross domestic product but the relation is not significant. Population per bed embodied labour force has positive and significant relation (1677.708) with gross domestic product. Infant mortality rates and life expectancy have positive and significant relation (41.848 and 1.492, respectively) with growth of the country. The coefficient of population per doctor embodied labor is significant at 0.01 levels while the value of the coefficients of infant mortality rates and life expectancy are significant at 10% levels of significance.

The Coefficient of Multiple Determination (R^2) for all these equations in the table shows that the model is good-fit for all the proxy variables and shows strong

relation between dependent and independent variables. The adjusted R^2 values for all the equations confirm this relation. According to the calculated F values for all the proxy variables, the overall model is significant at 0.01 levels of significance. For sample size $n = 10$ and $k' = 2$ (2 explanatory variable) $d_L = 0.54$ and $d_U = 1.22$. The estimated value d^* for all the proxy variables are less than $(4-d_L)$ and lies between d_U and $(4-d_U)$. So it can be concluded that there is no autocorrelation in the model for all the proxy variables.

It can be concluded that human capital embodied labour performs more efficiently to estimate the potential output growth than the simple proxy variables. By applying this channel of measurement to human capital for Pakistan for the period 2001-2010 suggests not only the importance of human capital on growth of output but also this channel out-performs the simple proxy variable method.

(C) Economic growth with human capital as a factor of physical capital

Model (5.4) of chapter 5 is used to estimate the relation of human capital and physical capital. Human capital encourages accumulation for other inputs which are necessary for the growth, especially physical capital investment. As Lucas (1990) suggested, lack of human capital as one reason that physical capital does not flow to under developed countries. The larger the human capital stock in a country, the more they can attract physical capital. In this part of analysis, the

impact of human capital stock on the accumulation of physical capital is estimated, which effect economic growth. This analysis is divided into two sections; (a) effect of human capital stock on the accumulation of physical capital as proxied by education and health proxy variables; (b) effects of human capital stock on the accumulation of physical capital as measured by effective labor by combining all the education and health proxy variables with employed labour force.

Model (5.4) is estimated for all the proxy variables and the results are presented in the table below:

Variable	Population per Day	Initial Mortality Rate	Life Expectancy
0.002	1225	1.948	1.381
0.004	1291	0.232	0.704
0.007	1369	17.509	1.200
0.010	136,000	1,115,735	1,100,000
0.013	14,100	70,331	11,150
0.017	14,034	731,679	191,218,394
0.021	1,270	1,000	0.3475
0.024	1,044	0.750	0.013
0.031	0.796	0.470	0.172
0.040 (1.0)	1,571,151	7,941,120	0.713 (1.0)
0.075	1,934	1.136	0.118

Table 6.25

Impact of Human Capital proxies as factor of production to Physical capital
(Gross Domestic Investment)

Education Proxy Variables

Variable	Primary Education Enrollment Rates	Secondary Education Enrollment Rates	Higher Education Enrollment Rates
Constant	-1.180	20.590	-1.691
Log Y	-0.522 (-10.038)*	0.158 (1.736)***	0.120 (0.400)
Log L	64471.188 (1.076)	-17158.523 (-0.287)	53282.575 (-2.293)***
Log H	107.060 (2.554)**	244.387 (2.231)**	-957.598 (-2.293)***
R ²	0.846	0.791	0.877
Adjusted R ²	0.769	0.687	0.816
F	11.002 (3,6)*	7.580 (3,6)*	14.281 (3,6)*
D.W	1.026	0.996	1.311

Health Proxy Variables

Variable	Population per Doctor	Population per Bed	Infant Mortality Rate	Life Expectancy
Constant	6.548	2.225	-1.048	1.101
Log Y	-0.293 (-4.725)**	0.361 (6.446)*	0.132 (7.765)*	0.506 (1.088)
Log L	-1430.597 (-0.094)	-7506.640 (-0.156)	13515.735 (0.221)	-15688.001 (-1.117)***
Log H	-2971.597 (-3.139)**	-1960.934 (-2.274)**	7312.676 (2.008)**	-191228.354 (-3.111)**
R ²	0.834	0.844	0.780	0.813
Adjusted R ²	0.751	0.766	0.670	0.872
F	10.049 (3,6)*	10.797 (3,6)*	7.094 (3,6)**	8.723 (3,6)**
D.W	1.135	1.336	1.126	1.168

* Significant at 0.10 levels of significance

** Significant at 0.05 levels of significance

*** Significant at 0.01 levels of significance

Figures in Parenthesis are estimated t-values

Table 6.25 shows that gross domestic product (GDP) is negatively related (-0.522) to gross domestic investment and the coefficient is significant at 0.01 levels of significance. The employed labor force in this equation has positive relation with physical capital. Primary enrollment rate as proxy variable for human capital has positive relation (107.060) and the value is significant at 0.05 levels of significance. Secondary enrollment rate also has positive relation (244.387) with physical capital. This value is significant at 0.05 levels of significance. In this equation GDP, has positive relation with physical capital and employed labour has negative relation (0.158 and 17158.575 respectively). The coefficient of higher education used for human capital is showing negative relation but the value is significant at 0.10 levels of significance. The reason behind this is that most families cannot afford to send their children to colleges and universities because of high prices and not easily available goods and services. Population per bed has negative relation (-2971.597) with physical capital. This is in accordance with the economic theory. The raw labour has also inverse relation with growth in this equation. Population per bed also has negative and significant relation (-1960.934) with gross domestic investment. However, infant mortality rates have positive and significant relation (4870.627) with physical capital accumulation. Finally, life expectancy is negatively related (-191228.354) to physical capital and the coefficient is significant at 5%.

The Coefficient of Multiple Determination (R^2) for all these equations in the table shows that the model is good fit for all the proxy variables and shows strong relation between dependent and independent variables. The adjusted R^2 values for all the equations confirm this relation. According to the calculated F values for all the proxy variables, the overall model is significant at 0.01 levels of significance for primary enrollment rates, higher enrollment rates, population per doctor, and population per bed while for secondary school enrollments, infant mortality and life expectancy, the over-all model is significant at 0.05 levels of significance. For sample size $n = 10$ and $k' = 3$ (3 explanatory variable) $d_L = 0.61$ and $d_u = 1.79$. The estimated value d^* for all the proxy variables are less than $(4-d_L)$ and lies between d_u and $(4-d_u)$. So it can be concluded that there is no autocorrelation in the model for all the proxy variables.

Finally, model (5.4) is estimated by taking human capital proxy variables combined with the employed labour force to make effective labour. The results are presented in the table below:

Table 6.26

Impact of Human Capital proxies combined with labour (effective labour) as factor of production to Physical capital (Gross Domestic Investment)

Education Proxy Variables

Variable	Primary Education Enrollment Rates	Secondary Education Enrollment Rates	Higher Education Enrollment Rates
Constant	-1.225	-1.582	-4.982
Log Y	-0.606 (-1.219)	0.120 (1.558) ^{***}	0.232 (0.6283)
Log (L + H)	83181.654 (2.530) ^{**}	7487.666 (3.355) ^{**}	-7389.172 (-8.586) [*]
R ²	0.830	0.770	0.770
Adjusted R ²	0.781	0.705	0.705
F	17.094 (2,7) [*]	11.736 (2,7) [*]	11.733 (2,7) [*]
D.W	1.134	1.071	1.118

Health Proxy Variables

Variable	Population per Doctor	Population per Bed	Infant Mortality Rate	Life Expectancy
Constant	-3.345	-1.004	-1.125	-1.112
Log K	0.262 (0.579)	0.182 (4.664) [*]	0.169 (2.113) ^{**}	0.170 (2.125) ^{**}
Log (L + H)	-11.328 (-3.152) ^{**}	-1.586 (-1.699) ^{***}	1.159 (1.452) ^{***}	1.010 (1.086) ^{***}
R ²	0.771	0.773	0.770	0.770
Adjusted R ²	0.705	0.708	0.704	0.704
F	11.885 (2,7) [*]	11.885 (2,7) [*]	11.687 (2,7) [*]	11.687 (2,7) [*]
D.W	1.060	1.110	1.089	1.090

* Significant at 0.10 levels of significance

** Significant at 0.05 levels of significance

*** Significant at 0.01 levels of significance

Figures in Parenthesis are estimated t-values

The table shows that gross domestic product (GDP) is negatively related (-0.606) to gross domestic investment and the coefficient is insignificant. The employed labor force combined with primary enrollment rates as proxy variable for human

capital has positive relation (83181.654) and the value is significant at 0.05 levels of significance. Similarly, secondary enrollment rate embodied labor force also has positive relation (7487.66) with physical capital. This value is significant at 0.05 levels of significance. In this equation, GDP has positive relation (0.120) with physical capital and the coefficient is significant at 10%. The coefficient of higher education as proxy variable for human capital combined with employed labour is negatively related to physical capital but significant at 0.01. Again the reason behind this may be that most families cannot afford to send their children to colleges and universities because of high prices and not easily available goods and services. Population per bed has negative relation (-11.328) with physical capital. As the number of patients per doctor increases, their physical condition will deteriorate and will not be able to attract more physical investment. This is in accordance with the economic theory. Population per bed also has negative and significant relation (-1.586) with gross domestic investment. Infant mortality and life expectancy has positive relation (1.159 and 1.010 respectively) with physical capital accumulation. Both coefficients are significant at 10%.

The Coefficient of Multiple Determination (R^2) for all these equations in the table shows that the model is good fit for all the proxy variables. The adjusted R^2 values for all the equations confirm this relation. According to the calculated F values for all the proxy variables, the overall model is significant at 0.01 levels of significance. For sample size $n = 10$ and $k' = 2$ (2 explanatory variable) $d_L = 0.54$ and $d_U = 1.22$. The estimated value d^* for all the proxy variables are less than (4-

d_u) and lies between d_u and $(4-d_u)$. So it can be concluded that there is no autocorrelation in the model for all the proxy variables.

The estimation of these models shows an improvement as compared to the results of simple proxy variables as factor of production for physical investment. Therefore, it can be concluded that human capital stocks positively affects the growth of physical capital and hence with the economic growth of the country. The results of the study prove the role of human capital as a vital agent to attract physical capital investment. Further, the analysis supports Romer's (1990) model of endogenous growth. The larger stocks of human capital attract more investment in physical capital, which generates economic growth.

Summary

The data collected through questionnaire and the secondary data is analyzed in this chapter. Different factors of the household investment behaviour in human capital are analyzed. Family income, family educational background, expected return from human capital investment, easy availability, household size, dependency ratio, quality and prices of goods and services have significant impact on the household investment behaviour in human capital. Human capital as factor of production is used to analyze its on economic growth of the country. School enrollment rates and health indicators are used for human capital. Finally, the role of human capital stock in attracting physical capital investment is analyzed.

CHAPTER 7

RECAPITUALIZATION, CONCLUSIONS, AND RECOMMENDATIONS

7.1 Introduction

This chapter provides a brief summary of what has been done in this research. The main findings are summarized here. The main results of the analysis are provided in more detail in the conclusions portion. Suggestions and policy implications are given in the recommendation part. Finally, future research areas in the field are highlighted.

7.2 Re-Capitalization

Human capital investment has been considered to have vital role to attain development goals like growth, structural change, and eradication of poverty. Human capital helps in the accumulation of physical capital, exploits natural resources, builds institutions and organizations, and helps in national development. If the investment in human capital is low, it is limited to utilize additional physical capital as technical, professional and administrative labour force is required for the productive utilization of physical capital. There are two kinds of investment in human capital; public and private. Public investment is the spending of government and the related institutions on goods and services related to health, education and nutrition. Private investment in human capital is the expenses/investment of the households or the individuals on these goods and

services. The objectives of this study are; to compare the investment behaviour of households in rural and urban areas of district Peshawar; for estimation of the impact of socio-economic variables on the behaviour of the household to invest in human capital, to estimate the impact of human capital stock on economic growth of the Pakistan for the period 2001-2010; and to highlight the reasons responsible for the under investment on human capital in the country. The hypotheses of this research are; income, family education background, quality and the availability of the goods and services and expected returns have positive effect on the behavior of the household to invest in human capital, price of the goods and services affects negatively the behavior of household to invest in human capital, human capital stock has positive impact on growth of the country, and human capital stock has significant impact to attract physical capital.

To test the hypothesis and achieve the objectives both primary and secondary data is used in this research. For this purpose district Peshawar is selected as research area. Three villages i.e. Pakha Ghulam, Umeedabad and Nawan Killi are taken as rural areas and three towns i.e. Gulbahar, University Town and Hayatabad are selected as urban areas of research. From each rural and urban area of research 50 and 100 sample size is taken, respectively. To analyze the impact of education and health proxies used for human capital on growth of the country, secondary data for the period 2001-2010 is analyzed.

7.3 Main Findings

- The average size of the family for all the three rural areas combined is 6.37 while for all the three urban areas combined it is 4.5.
- Average dependency ratio in rural areas is 0.76 while in urban areas it is 0.61.
- In rural areas majority of the respondents are illiterate while in urban areas majority of the respondents are either BA/BSc or MA/MSc.
- About 62% of the household head are self-employed in the agriculture sector or in the informal sector. In urban areas about 50% are government employees and or private sector employees.
- In rural areas about 60% of the household heads are earning monthly income of 1-20000 range, while in urban areas more than 60% of the household head are earning an income of 30000 plus per month.
- Percentage-wise the consumption patterns of the respondents are the same in both urban and rural areas.
- In urban areas majority of the respondents (about 60%) are saving part of their income, while in urban areas about 60 % of the respondents are saving nothing due to low income.
- The average number of children enrolled in different government and private sector educational institutions are 2.15 in all rural areas combined, while it is 1.41 in all urban areas combined.

- About 75% of the respondents in all the urban areas send their children to government institutions while about 75% of the respondents in all the urban areas send their children to private sector institutions.
- About 80-90% of the respondents in the rural areas are of the view that they are not satisfied from government actions for the promotion of goods and services related to education and health, while in urban areas this percentage is from 60-70.
- The regression analysis shows that in Pakha Ghulam dependency ratio and prices of the goods and services effects negatively the behaviour of the household to invest in human capital, while family income, family education, quality and availability of goods and services, and expected return effects positively human capital investment. Same results occur in other two rural areas i.e. Umeedabad and Pakha Ghulam.
- In Gulbahar, easy availability and dependency ratio are negatively related, in University Town only dependency ratio is negatively related and in Hayatabad, no variable effects negatively human capital investment behaviour of households.
- The primary enrollment rates, higher education enrollment rates, population per bed, infant mortality rates, and life expectancy are positively related to growth while population per doctor and secondary enrollment rates are negatively related when human capital is used as factor of production.

- When these proxy variables are combined with employed labour, to make effective labour, only higher education has negative relation with growth.
- To analyze the impact of these proxy variables on physical capital accumulation, it is concluded that higher education enrollment rates, population per doctor, and population per bed have negative relation with gross domestic investment while the rest of the proxy variables have positive relation.

7.4 Conclusions

The main objective of this study is to analyze the household investment on education, health and nutrition. The data was collected through a questionnaire and analyzed and the results are tabulated.

The results of the analysis show that the average size of the family for all the three rural areas combined is 6.37 while for all the three urban areas combined it is 4.5. Average dependency ratio in rural areas is 0.76 while in urban areas it is 0.61. In rural areas majority of the respondents are illiterate while in urban areas majority of the respondents are either BA/BSc or MA/MSc. About 62% of the household head are self-employed in the agriculture sector or in the informal sector. In urban areas about 50% are government employees and or private sector employees. In rural areas about 60% of the household heads are earning monthly income of 1-20000 range, while in urban areas more than 60% of the household head are earning an income of 30000 plus per month. Percentage-wise the consumption

patterns of the respondents are the same in both urban and rural areas. In urban areas majority of the respondents (about 60%) are saving part of their income, while in urban areas about 60 % of the respondents are saving nothing due to low income. The average number of children enrolled in different government and private sector educational institutions are 2.15 in all rural areas combined, while it is 1.41 in all urban areas combined. About 75% of the respondents in all the urban areas send their children to government institutions while about 755 of the respondents in all the urban areas send their children to private sector institutions. About 80-90% of the respondents in the rural areas are of the view that they are not satisfied from government actions for the promotion of goods and services related to education and health, while in urban areas this percentage is from 60-70. The regression analysis shows that in Pakha Ghulam dependency ratio and prices of the goods and services effects negatively the behaviour of the household to invest in human capital, while family income, family education, quality and availability of goods and services, and expected return effects positively human capital investment. Same results occur in other two rural areas i.e. Umeedabad and Pakha Ghulam. in Gulbahar, easy availability and dependency ratio are negatively related, in University Town only dependency ratio is negatively related and in Hayatabad, no variable effects negatively human capital investment behaviour of households. Analysis of the impact of human capital investment proxy variables shows that primary enrollment rates, higher education enrollment rates, population per bed, infant mortality rates, and life expectancy are positively related to growth

while population per doctor and secondary enrollment rates are negatively related when human capital is used as factor of production. When these proxy variables are combined with employed labour, to make effective labour, only higher education has negative relation with growth. To analyze the impact of these proxy variables on physical capital accumulation, it is concluded that higher education enrollment rates, population per doctor, and population per bed have negative relation with gross domestic investment while the rest of the proxy variables have positive relation.

7.5 Recommendations

7.5.1 Specific Recommendations (Policy Implications)

The following suggestions are made on the basis of results of the analysis

1. In majority of the under developed countries, investment in human capital is under-rated and neglected. But the distinct characteristic of our economic system be the enhancement of human capital, without which there is only poverty;
2. Human capital must be considered as a vital and pre-requisite to attain scientific and technological innovations;
3. The communities are benefited from the enhancement of human capital investment because more stocks of human capital help improve the character of society and promote the quality of decisions;

4. For Pakistan economy to be tracked on the path of development, physical capital to human capital ratio should be minimized. Human capital is a vital factor of growth;
5. In view of the inadequate education and health facilities in the rural areas, the government should take firm actions for the provision and promotion of human capital related goods and services to all the areas of the country;
6. Allocation of budget for health and education is very low. For example in budget 2010-11, education was allocated a budget of only Rs 34.5 billion and health was allocated a budget of only Rs 4.2 billion. This allocation is not enough for the promotion of human capital;
7. The private sector dealing in goods and services related to human capital investment are charging very high prices which is not in the reach of the common man. There should be an authority to control these prices or the government should subsidise in education and health sector as it is providing subsidies in other sectors;
8. Gender discrimination should be eliminated so that one half of the population can take part in the productive activities of the country;
9. The literacy in the rural areas is very low because there are no opportunities of employment in the rural areas of the country. Steps should be taken to create employment opportunities in the rural areas by industrialization in the rural areas;

10. The provincial government needs to rationalize allocation of expenditures within the suggested increase by increasing non-salary expenses. improvements in the existing infrastructure, provision of high standard services such as teacher's training, incentives for girls, and other incentives such as free text books, uniforms, transport facilities, provision of scholarships and in-kind payment to the deserving students;
11. Government should encourage private sector to maximize its contribution, which at present is only 16% of the total contribution in educational resources;
12. The provincial and federal governments should create more opportunities for those areas that have been ignored from the mainstream development in the past and participate in the national growth processes to ensure more equitable human resource development across the country; and

7.5.2 General Recommendations

The following are general recommendations;

1. All types of racial and religious hindrances should be removed or, at-least, minimized. The policy alternatives should be developed to eliminate racial and religious obstacles in the growth process;
2. Student loan schemes should be initiated in the private and government sector. Students should be given excess to the long-term private and public loans so that those families who cannot afford to enroll their children in

higher education be able to do so. These loans should be provided free of interest;

3. Presently, the terrorist activities in the country and especially in the Khyber Pakhtunkhwa are targeting girl's schools and colleges. Some of the families have received threatening letters from the terrorists not to send their females to schools and colleges. Actions should be taken by the government to provide security to the general public and minimize the terrorist activities in the province;
4. Such plans be introduced to provide equality in education with the objective to eliminate social exclusion and promote national cohesion. More opportunities shall be created for marginalized groups of society, especially girls;
5. Both the governments (provincial and district) should introduce monitoring and evaluation schemes to guarantee quality education throughout the province;
6. Steps should be carried out to make education relevant to the labor market and promote innovations in the economy;
7. The government should launch awareness campaigns, at the District, Tehsil, Union Council level, to aware communities regarding their role in the development of education and health.

7.6 Future Research Areas

Due to time and financial constraints, the study was restricted to three villages and three towns of District Peshawar. Further studies can be carried out in this field by taking other districts of the province and/or comparing the behaviour in any two provinces of the country. A more exhaustive study could be carried out by comparing the impact of human capital on growth between two or more than two countries. Few proxy variables of education and health are taken in this research. Further studies in this field can take into account the effect of other proxy variables like enrollment in technical education, teacher's and on job training, research and development expenditure in health etc.

7.7 Summary of the study

The socio-economic differences in urban and rural areas are caused due to the differences in the behavior of the household to invest in human capital in both areas. Due to low income, low saving, high dependency ratio, greater number of children attending schools etc. in the rural areas have compelled the people not to spend more on human capital formation. The case is different in urban areas. Factors such as expected rate of return, family educational background, family income, have positive relation with household behaviour to invest in human capital. Dependency ratio and prices of goods and services is negatively affecting this behaviour. Quality is not effective factor in rural areas but it is effective factor in urban areas. Primary enrollment rates, higher education enrollment rates,

population per bed, infant mortality rates, and life expectancy are positively related to growth while population per doctor and secondary enrollment rates are negatively related when human capital is used as factor of production. Higher education enrollment rates, population per doctor, and population per bed have negative relation with gross domestic investment while primary education, secondary education, infant mortality, and life expectancy positively effects gross domestic investment.

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APPENDICES

University of Peshawar, Peshawar. The title of the dissertation is
"Business Growth, Capital Investment, Inflation and Economic
Growth: A case study of Khyber Pakhtunkhwa 2001-2010"

The author of the dissertation is required to provide the needed information. The
author of the dissertation can be contacted for any other information.

Signature of the author
Date
Name of the author
Address

Appendix 1
Questionnaire

The Scholar is working for his PhD in economics. The title of the dissertation is
**“Household Human Capital Investment Behavior and Economic
Growth: A case study of Khyber Pakhtunkhwa 2001-2010”**

The honourable respondents are requested to provide the needed information. They are
assured that the information will neither be used for any other purpose nor will be
supplied to any one.

Name _____ Area: Rural/Urban Date: ----/----/----

- (1) Age of the respondent: _____
- (2) Marital Status: _____
- (3) Present Address: _____

- (4) Number of the household members: _____
- (5) Number of earning members: _____
- (6) Monthly income of the household: _____
- (7) Annual Income of the household: _____
- (8) Years of education of the household head: _____
- (9) Earning status of the household head: (i) Earner _____ (ii) Non-Earner _____
- (10) Employment Status of the household head:
(i) Self-employed
(ii) Government Servant

(iii) Private sector employment

(iv) Unemployed

(11) Do you own a house? (i) Yes _____ (ii) No _____

(12) If yes, what type of the house is: (i) Pakka (ii) Semi Pakka (iii) Kaccha

(13) Members of the family with age, education, and income:

(i) _____ age _____ Education _____ Income _____

(ii) _____ age _____ Education _____ Income _____

(iii) _____ age _____ Education _____ Income _____

(iv) _____ age _____ Education _____ Income _____

(v) _____ age _____ Education _____ Income _____

(vi) _____ age _____ Education _____ Income _____

(vii) _____ age _____ Education _____ Income _____

(viii) _____ age _____ Education _____ Income _____

(ix) _____ age _____ Education _____ Income _____

(x) _____ age _____ Education _____ Income _____

(14) Presently how many children are enrolled in schools _____

(15) What is type of their school/College/University: (i) Govt _____ (ii) Private _____

(16) Do you have family doctor: (i) Yes _____ (ii) No _____

(17) If yes, what is his qualification?

(i) MBBS with specialization _____ (ii) MBBS _____ (iii) Nurse/dispenser _____

(18) Expenditure (per month in rupees)

- (i) Expenditure on Food and Drinks _____
- (ii) Expenditure on Education _____
- (iii) Expenditure on Medical care/Medicine: _____
- (iv) Expenditure on Housing: _____
- (v) Expenditure on Repair and maintenance: _____
- (vi) Expenditure on Electricity/gas/telephone: _____
- (vii) Expenditure on clothing and footwear: _____
- (viii) Expenditure on Transportation: _____
- (ix) Expenditure on other customs and traditions: _____

(19) Is care regarding vitamins, proteins etc. is taken while cooking meal at home?

(i) Yes ____ (ii) No _____

(20) Do you think that you spend enough for the health of your children?

(i) Yes ____ (ii) No

(21) Per month saving of the household: _____

(22) What factor/reason compel you to invest on the education and health of the children:

(A) Expected rate of return:

(i) Highly Satisfied

(ii) Satisfied

(iii) Neutral

(iv) Dis-Satisfied

(v) Highly Dis-Satisfied

(B) Price of goods and services:

- (i) Highly Satisfied
- (ii) Satisfied
- (iii) Neutral
- (iv) Dis-Satisfied
- (v) Highly Dis-Satisfied

(C) Quality of goods and services:

- (i) Highly Satisfied
- (ii) Satisfied
- (iii) Neutral
- (iv) Dis-Satisfied
- (v) Highly Dis-Satisfied

(D) Because I was my-self educated:

- (i) Highly Satisfied
- (ii) Satisfied
- (iii) Neutral
- (iv) Dis-Satisfied
- (v) Highly Dis-Satisfied

(E) Easy availability of the service:

- (i) Highly Satisfied

(ii) Satisfied

(iii) Neutral

(iv) Dis-Satisfied

(v) Highly Dis-Satisfied

(23) Are you satisfied with the institutions working for the promotion of education and health related services? (i) Yes _____ (ii) No _____

(24) Are you satisfied with the actions taken by the Government of Pakistan and provincial government for the promotion and provision of human capital investment related goods and services? (i) Yes _____ (ii) No _____

Appendix 2

Formal Derivation of the Sample Size for all the Selected Areas

The sample size is systematically selected by using the formula for Pakha Ghulam

$$n = \frac{Ns^2}{(N-1)D + s^2}$$

Where

n = Sample Size = ?

N = Population Size = 1230

s^2 = Sample Variance = $\frac{\sum (Y - \hat{Y})^2}{n-1} = 0.0325$

$D = B^2/4 = 0.000625$

B = Bound on the error of estimation = 0.05

Putting the values

$$n = \frac{1230 (0.0325)}{(1230-1)0.000625 + 0.0325} = 49.967$$

$n = 50$

Similarly sample sizes for all other areas are obtained by using the same formula.

For Umeedabad,	$n = 50$
For Nawan Killi,	$n = 50$
For Gulbahar,	$n = 100$
For University Town,	$n = 100$
For Hayatabad,	$n = 100$

Furnishing and License Rates
for the period 1961-1965

Year	License Rates	Primary Furnishing Rate (1961)	Secondary Furnishing Rate (1961)	Other Furnishing Rate (1961)
1961	\$8.00	14.50	10.00	10.00
1962	\$8.00	14.50	10.00	10.00
1963	\$8.00	14.50	10.00	10.00
1964	\$8.00	14.50	10.00	10.00
1965	\$8.00	14.50	10.00	10.00

Appendix 3

Data for Analysis

Furnishing and License Rates and Total Revenue
for the period 1961-1965

Year	License Rate	Primary Furnishing Rate	Secondary Furnishing Rate	Other Furnishing Rate
1961	\$8.00	14.50	10.00	10.00
1962	\$8.00	14.50	10.00	10.00
1963	\$8.00	14.50	10.00	10.00
1964	\$8.00	14.50	10.00	10.00
1965	\$8.00	14.50	10.00	10.00

Enrollment and Literacy Rates
for the period 2001-2010

Year	Literacy Rates	Primary Enrollment Rates (000)	Secondary Enrollment Rates (000)	Higher Enrollment Rates (000)
2001	49.0	14105	1565	124.944
2002	50.5	14560	1574	276.274
2003	51.6	15094	1589	331.745
2004	56.4	16207	1800	423.236
2005	56.4	18190	1936	471.964
2006	56.6	17757	2188	521.473
2007	56.9	17993	2373	605.885
2008	57.2	18360	2484	741.092
2009	57.4	18468	2556	803.507
2010	57.7	18715	2700	948.364

Source: Economic Survey of Pakistan 2009-10

Gross Domestic Product Growth Rate and Total Investment
for the period 2001-2010

Year	GDP (at MP)	Gross Domestic Investment	Unemployment Rate (%)
2001	4027777	632134	3.2
2002	4222976	658070	3.6
2003	4534149	617731	6.6
2004	4881796	701392	3.5
2005	5183371	840977	3.6
2006	5477948	955140	3.6
2007	5565375	1024696	3.1
2008	5767536	908856	2.7
2009	6018865	890300	2.7
2010	6163318	941651	2.9

Economic Survey of Pakistan 2009-10

Health Proxy Variables
for the period 2001 to 2010

Year	Population per Doctor	Population per Bed	Infant Mortality Rates (per 1000)	Life Expectancy
2001	1529	1456	85	62
2002	1516	1427	85	62
2003	1466	1454	83	62.2
2004	1404	1479	83	63
2005	1359	1492	82	63
2006	1310	1483	77	63.3
2007	1254	1508	76.7	63.4
2008	1245	1544	76.7	63.7
2009	1212	1575	68.2	64.1
2010	1183	1592	73.5	64.5

(Source: Economic Survey of Pakistan 2009-10)

Labor Force, Employed Labor and Unemployed Labor
for the period 2001-2010

Year	Labour Force (Million)	Employed Labour Force (Million)	Unemployed Labour Force (Million)
2001	39.40	36.32	3.08
2002	42.39	38.88	3.51
2003	43.80	40.60	3.20
2004	45.5	42.00	3.50
2005	47.32	43.90	3.42
2006	50.05	46.95	3.10
2007	50.33	47.65	3.68
2008	51.78	49.09	2.69
2009	53.72	50.79	2.93
2010	54.92	51.87	3.05

(Source: Economic Survey of Pakistan 2009-10)

Effective Labour Force by combining employed labour force with the selected proxies of education for Human Capital Investment for the period 2001-2010

Year	Effective Labor by Primary Enrollment (million)	Effective Labor by Secondary Enrollment (million)	Effective Labor by Higher Enrollment (million)
2001	50.425	37.885	36.447
2002	53.440	40.454	39.200
2003	55.694	42.189	40.932
2004	58.207	43.800	42.423
2005	62.090	45.836	44.372
2006	64.707	49.138	47.471
2007	65.643	50.023	48.256
2008	67.450	51.574	49.831
2009	69.258	53.346	51.594
2010	70.585	54.570	52.818

(Source: Economic Survey of Pakistan 2009-10)

Effective Labour Force by combining employed labour force with the selected proxies of health for Human Capital Investment for the period 2001-2010

Year	Effective Labour by Population per Doctor (000)	Effective Labour by Population per Bed (000)	Effective Labour by Infant Mortality Rates (per 1000)	Effective Labour by Life Expectancy
2001	36321.529	36321.456	36405	36382
2002	36881.516	38881.454	38965	38942
2003	40601.466	40601.454	40683	40662.2
2004	42001.404	42001.479	42083	42063
2005	43901.359	4391.492	43982	43963
2006	46951.310	46951.483	47027	47013.3
2007	47651.254	47651.508	47726.7	47713.4
2008	49091.245	49091.544	49166.7	49153.7
2009	50791.212	50791.575	50858.2	50854.1
2010	51871.183	51871.592	51943.5	51934.5

(Source: Economic Survey of Pakistan 2009-10)

Appendix 4

Results of Determinants of Household Human Capital Investment Behaviour

Regression Analysis (Factors affecting household human capital investment behavior in Pakha Ghulam)

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.890 ^a	.792	.763	.29748	.792	27.337	7	42	.000	1.906

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household

b. Dependent Variable: Monthly expenditure on food, health and education

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	14.515	7	2.419	27.337	.000 ^a
	Residual	3.805	42	.088		
	Total	18.320	49			

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household

b. Dependent Variable: Monthly expenditure on food, health and education

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.695	.559		1.243	.221		
	Monthly income of the household	.482	.046	.889	10.555	.000	.680	1.470
	Expected rate of return	.440	.037	.770	11.891	.000	.941	1.062
	Price of goods and services	-.053	.038	-.111	-1.388	.172	.752	1.330
	Quality of goods and services	.043	.032	.057	1.343	.293	.872	1.416
	Family educational background	.516	.068	.507	7.588	.023	.741	1.349
	Easy availability	.006	.042	.011	.137	.891	.823	1.214
	Dependency Ratio	-.318	.067	-.044	-4.74	.043	.699	1.431

a. Dependent Variable: Monthly expenditure on food, health and education

Regression Analysis (Factors affecting household human capital investment behavior in Umeedabad)

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
2	0.789	0.623	0.580	0.42546	0.623	14.535	7	42	0.000	2.273

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
2	Regression	13.155	7	2.631	14.535	0.000
	Residual	7.965	42	0.181		
	Total	21.120	49			

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
2	(Constant)	-.686	.633		-1.086	.284		
	Monthly income of the household	.576	.075	.877	7.676	.000	.656	1.524
	Expected rate of return	.143	.050	.085	2.860	.039	.799	1.412
	Price of goods and services	-.453	.089	-.324	-5.08	.076	.723	1.489
	Quality of goods and services	.167	.057	.117	1.186	.140	.680	1.516
	Family educational background	.170	.065	.115	2.615	.015	.752	1.330
	Easy availability	.041	.056	.057	.732	.342	.890	1.214
	Dependency Ratio	-1.693	.736	-.287	-2.301	.026	.551	1.814

a. Dependent Variable: Monthly expenditure on food, health and education

Regression Analysis (Factors affecting household human capital investment behavior in Nawan Killi)

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
3	.757 ^a	.573	.524	.36367	.573	11.796	7	42	.000	1.435

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
2	Regression	7.801	7	1.560	11.796	.000 ^a
	Residual	5.819	42	.132		
	Total	13.620	49			

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.630	.508		1.240	.222		
	Monthly income of the household	.434	.060	.754	7.260	.000	.900	1.112
	Expected rate of return	.028	.076	.037	.367	.715	.963	1.039
	Price of goods and services	-.148	.065	-.101	-2.276	.079	.715	1.426
	Quality of goods and services	.010	.023	.000	.434	.625	.982	1.022
	Family educational background	.310	.043	.257	7.209	.036	.649	1.578
	Easy availability	.041	.049	.020	.836	.196	.970	1.031
	Dependency Ratio	-.203	.054	-.105	-2.759	.096	.764	1.438

a. Dependent Variable: Monthly expenditure on food, health and education

Regression Analysis (Factors affecting household human capital investment behavior in Gulbahar)

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
4	.678 ^a	.459	.418	.56946	.459	11.157	7	92	.000	1.850

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household

b. Dependent Variable: Monthly expenditure on food, health and education

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
4	Regression	25.326	7	3.618	11.157	.000 ^a
	Residual	29.834	92	.324		
	Total	55.160	99			

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household

b. Dependent Variable: Monthly expenditure on food, health and education

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
4	(Constant)	.573	.587		.977	.331		
	Monthly income of the household	.566	.070	.648	8.133	.000	.927	1.078
	Expected rate of return	.219	.082	.113	2.670	.053	.852	1.350
	Price of goods and services	.052	.060	.096	.873	.385	.484	2.067
	Quality of goods and services	.204	.055	.208	3.709	.049	.703	2.087
	Family educational background	.339	.051	.362	6.647	.005	.602	1.508
	Easy availability	-.003	.046	-.004	-.054	.957	.863	1.159
	Dependency Ratio	-.182	.081	-.138	-2.246	.034	.739	1.365

a. Dependent Variable: Monthly expenditure on food, health and education

Regression Analysis (Factors affecting household human capital investment behavior in University Town)

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
5	.789 ^a	.623	.594	.37483	.623	21.673	7	92	.000	2.134

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
5	Regression	21.314	7	3.045	21.673	.000 ^a
	Residual	12.926	92	.140		
	Total	34.240	99			

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
5	(Constant)	.658	.421		1.563	.121		
	Monthly income of the household	.480	.043	.744	11.260	.000	.941	1.063
	Expected rate of return	.157	.054	.091	2.907	.089	.930	1.075
	Price of goods and services	.011	.031	.023	.340	.735	.889	1.125
	Quality of goods and services	.232	.035	.159	6.628	.037	.962	1.039
	Family educational background	.069	.034	.136	2.017	.047	.901	1.109
	Easy availability	.058	.035	.114	1.670	.098	.885	1.130
	Dependency Ratio	-.074	.041	-.014	-1.804	.074	.872	1.329

a. Dependent Variable: Monthly expenditure on food, health and education

Regression Analysis (Factors affecting household human capital investment behavior in Hayatabad)

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.756 ^a	.572	.540	.38204	.572	17.581	7	92	.000	1.918

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
2	Regression	17.962	7	2.566	17.581	.000 ^a
	Residual	13.428	92	.146		
	Total	31.390	99			

a. Predictors: (Constant), Dependency Ratio, Easy availability, Family educational background, Expected rate of return, Price of goods and services, Quality of goods and services, Monthly income of the household
 b. Dependent Variable: Monthly expenditure on food, health and education

Coefficients^a

SModel		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.520	.380		1.368	.175		
	Monthly income of the household	.413	.042	.707	9.883	.000	.910	1.099
	Expected rate of return	.201	.053	.114	3.792	.092	.688	1.426
	Price of goods and services	.013	.035	.027	.373	.710	.908	1.102
	Quality of goods and services	.162	.038	.115	4.263	.006	.930	1.075
	Family educational background	.027	.052	.035	.511	.611	.971	1.030
	Easy availability	.024	.040	.042	.602	.548	.957	1.045
	Dependency Ratio	.412	.127	.390	3.244	.021	.73	1.407

a. Dependent Variable: Monthly expenditure on food, health and education

Appendix 5

Results of Models of Growth and Physical Investment

Primary education enrollment as a factor of production for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.998 ^a	.997	.995	52440.7928 1	.997	604.353	3	6	.000	1.484

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.497E6	211517.479		-7.076	.000
	LogL	-.274	.274	-.055	-1.000	.356
	LogK	113550.354	9851.700	.803	11.526	.000
	LogH	107.229	33.082	.256	3.241	.018

a. Dependent Variable: Y

Secondary education enrollment as a factor of production for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.995 ^a	.991	.986	86971.2769 7	.991	218.451	3	6	.000	1.150

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.087E6	560046.951		-1.941	.100
	LogL	.168	.415	.034	.404	.700
	LogK	137400.680	26599.246	.972	5.166	.002
	LogH	-10.717	5.164	-.006	-2.076	.076

a. Dependent Variable: Y

Higher education enrollment as a factor of production for human capital Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.995 ^a	.991	.986	86832.0147 1	.991	219.159	3	6	.000	1.018

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-881680.008	1.359E6		-.649	.540
	LogL	.216	.540	.044	.400	.703
	LogK	130161.099	46799.703	.921	2.781	.032
	LogH	109.120	66.122	.037	1.650	.091

a. Dependent Variable: Y

Population per doctor as a factor of production for human capital Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.998 ^a	.995	.993	64396.1417 7	.995	400.110	3	6	.000	1.135

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.622	3.465E6		1.911	.105
	LogL	-.215	.338	-.043	-.634	.549
	LogK	69049.593	31516.620	.488	2.191	.071
	LogH	-3232.099	1453.301	-.550	-2.224	.068

a. Dependent Variable: Y

Life Expectancy as a factor of production for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.998 ^a	.995	.993	64060.27759	.995	404.337	3	6	.000	1.085

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.439	5.925E6		-2.429	.051
	LogL	.326	.300	.066	1.088	.318
	LogK	94666.598	20423.250	.670	4.635	.004
	LogH	238755.439	106127.939	.276	2.250	.065

a. Dependent Variable: Y

Impact of human capital on Growth as effective labour
Primary education combined with labor to make effective labor.
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.998 ^a	.996	.995	52438.35813	.996	906.114	2	7	.000	1.172

a. Predictors: (Constant), Log (L+H), Log K

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.370	168922.618		-8.107	.000
	Log (L + H)	90922.191	28779.944	.850	3.159	.016
	Log K	20966.141	38051.233	.148	.551	.599

a. Dependent Variable: Y

Population per bed as a factor of production for human capital

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.996 ^a	.993	.989	77298.49947	.993	277.076	3	6	.000	1.011

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.814	1.401E6		-2.009	.091
	LogL	.405	.099	.082	4.090	.035
	LogK	114930.772	19889.351	.813	5.779	.001
	LogH	1677.708	327.643	.122	5.120	.003

a. Dependent Variable: Y

Infant Mortality Rate as a factor of production for human capital

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.996 ^a	.991	.987	86081.28445	.991	223.033	3	6	.000	1.143

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.677	1.729E6		-.970	.370
	LogL	.130	.402	.026	.323	.758
	LogK	142173.192	19214.187	1.006	7.399	.000
	LogH	4870.627	3734.919	.036	1.305	.075

a. Dependent Variable: Y

Life Expectancy as a factor of production for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.998 ^a	.995	.993	64060.27759	.995	404.337	3	6	.000	1.085

a. Predictors: (Constant), LogH, LogL, LogK

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.439	5.925E6		-2.429	.051
	LogL	.326	.300	.066	1.088	.318
	LogK	94666.598	20423.250	.670	4.635	.004
	LogH	238755.439	106127.939	.276	2.250	.065

a. Dependent Variable: Y

Impact of human capital on Growth as effective labour
Primary education combined with labor to make effective labor.
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.998 ^a	.996	.995	52438.35813	.996	906.114	2	7	.000	1.172

a. Predictors: (Constant), Log (L+H), Log K

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.370	168922.618		-8.107	.000
	Log (L + H)	90922.191	28779.944	.850	3.159	.016
	Log K	20966.141	38051.233	.148	.551	.599

a. Dependent Variable: Y

Population per doctor combined with labor to make effective labor.
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.997 ^a	.995	.994	60089.90670	.995	689.212	2	7	.000	1.087

a. Predictors: (Constant), Log (L+H), Log K
 b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-926013.227	188987.226		-4.900	.002
	Log K	83.953	34.471	.625	2.435	.045
	Log (L + H)	52795.422	36301.469	.373	1.454	.189

a. Dependent Variable: Y

Population per bed combined with labor to make effective labor.
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.997 ^a	.994	.993	64223.48551	.994	602.912	2	7	.000	1.312

a. Predictors: (Constant), Log (L+H), Log K
 b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.158	183887.193		-6.295	.000
	Log K	-3.244	1.560	-.065	-2.079	.076
	Log (L + H)	144474.717	4443.204	1.022	32.516	.000

a. Dependent Variable: Y

Infant mortality rate combined with labor to make effective labor.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.995 ^a	.991	.989	76397.92479	.991	849.082	2	7	.000	1.592

a. Predictors: (Constant), Log (L+H), Log K

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.121	217721.872		-5.147	.001
	Log K	140721.384	4829.312	.995	29.139	.000
	Log (L + H)	41.848	16.323	.865	2.56	.064

a. Dependent Variable: Y

Life expectancy combined with labor to make effective labor.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.995 ^a	.991	.989	76397.92479	.991	849.082	2	7	.000	1.592

a. Predictors: (Constant), Log (L+H), Log K

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.121	217721.872		-5.147	.001
	Log K	140721.384	4829.312	.995	29.139	.000
	Log (L + H)	1.492	.738	1.143	2.021	.083

a. Dependent Variable: Y

Analysis of the impact of human capital on Physical capital
Using primary enrollment rates as proxy for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.920 ^a	.846	.769	72432.9448 3	.846	11.002	3	6	.007	1.026

a. Predictors: (Constant), Log Y, Log L, Log H

b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.180	752106.817		-1.569	.168
	Log Y	-.522	.052	-2.580	-10.038	.000
	Log L	64471.188	59934.785	2.255	1.076	.323
	Log H	107.060	41.916	1.263	2.554	.035

a. Dependent Variable: K

Using Secondary enrollment rates as proxy for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.890 ^a	.791	.687	84386.6914 5	.791	7.580	3	6	.018	.996

a. Predictors: (Constant), Log Y, Log L, Log H

b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.590	685162.463		.378	.718
	Log Y	.158	.0391	.781	1.736	.070
	Log L	-17158.523	59827.092	-.600	-.287	.784
	Log H	244.387	109.550	.711	2.231	.040

a. Dependent Variable: K

Using Higher enrollment rates as proxy for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.937 ^a	.877	.816	64730.15599	.877	14.281	3	6	.004	1.311

a. Predictors: (Constant), Log Y, Log L, Log H
b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.691	788399.349		-2.145	.076
	Log Y	.120	.300	.595	.400	.703
	Log L	53282.575	48094.871	1.863	1.108	.310
	Log H	-957.598	417.666	-1.616	-2.293	.062

a. Dependent Variable: K

Using Population per doctor as proxy for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.913 ^a	.834	.751	75244.54869	.834	10.049	3	6	.009	1.135

a. Predictors: (Constant), Log Y, Log L, Log H
b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.548	4.385E6		1.493	.186
	Log Y	-.293	.062	-1.448	-4.725	.049
	Log L	-4630.597	49371.160	-.162	-.094	.928
	Log H	-2971.597	946.540	-2.499	-3.139	.038

a. Dependent Variable: K

Using Population per Bed as proxy for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.919 ^a	.844	.766	73011.15029	.844	10.797	3	6	.008	1.336

a. Predictors: (Constant), Log Y, Log L, Log H
b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.225	1.450E6		1.534	.176
	Log Y	.361	.056	1.785	6.446	.003
	Log L	-7506.640	48037.511	-.263	-.156	.881
	Log H	-1960.934	861.970	-.702	-2.274	.042

a. Dependent Variable: K

Using Infant Mortality rates as proxy for human capital
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.883 ^a	.780	.670	86611.54217	.780	7.094	3	6	.021	1.126

a. Predictors: (Constant), Log Y, Log L, Log H
b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.048	1.822E6		-.576	.586
	Log Y	.132	.017	.651	7.765	.008
	Log L	13515.735	61268.287	.473	.221	.833
	Log H	7312.676	3640.728	.268	2.008	.011

a. Dependent Variable: K

Using life expectancy as proxy for human capital

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.902 ^a	.813	.720	79759.07127	.813	8.723	3	6	.013	1.168

a. Predictors: (Constant), Log Y, Log L, Log H

b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.101	9.367E6		1.176	.284
	Log Y	.506	.465	2.499	1.088	.318
	Log L	-15688.001	54045.995	-.549	-1.117	.091
	Log H	-191928.354	61394.837	-1.098	-3.111	.039

a. Dependent Variable: K

Analyzing impact of human capital on physical capital by combining health proxies to make effective labor

Primary enrollment rates combined with employed labor to make effective labor

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.911 ^a	.830	.781	70488.77107	.830	17.094	2	7	.002	1.134

a. Predictors: (Constant), Log (L + H) Log Y

b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.225	729801.326		-1.679	.137
	Log Y	-.606	.497	-2.998	-1.219	.262
	Log (L + H)	83981.654	33188.787	3.883	2.530	.048

a. Dependent Variable: K

Secondary enrollment rates combined with employed labor to make effective labor
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.878 ^a	.770	.705	81951.54190	.770	11.736	2	7	.006	1.071

a. Predictors: (Constant), Log (L,+ H) LogY
b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.582	412151.350		-.384	.712
	Log Y	.120	.077	.595	1.558	.058
	Log (L + H)	7487.666	2231.961	.283	3.355	.043

a. Dependent Variable: K

Higher enrollment rates combined with employed labor to make effective labor
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.878 ^a	.770	.705	81958.36302	.770	11.733	2	7	.006	1.118

a. Predictors: (Constant), Log (L,+ H) LogY
b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4.982	405325.646		-.123	.906
	Log Y	.232	.369	1.146	.628	.550
	Log (L + H)	-7389.172	860.579	-.270	-8.586	.006

a. Dependent Variable: K

Population per doctor combined with employed labor to make effective labor
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.878 ^a	.771	.705	81882.67439	.771	11.762	2	7	.006	1.060

a. Predictors: (Constant), Log (L,+ H) LogY

b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.345	417259.076		-.080	.938
	Log Y	.262	.451	1.293	.579	.580
	Log (L + H)	-11.328	3.594	-.417	-3.152	.047

a. Dependent Variable: K

Population per bed combined with employed labor to make effective labor
Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.879 ^a	.773	.708	81553.62584	.773	11.885	2	7	.006	1.110

a. Predictors: (Constant), Log (L,+ H) LogY

b. Dependent Variable: K

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.004	190936.219		-.526	.615
	Log Y	.182	.039	.898	4.664	.002
	Log (L + H)	-1.586	.933	-.058	-1.699	.071

a. Dependent Variable: K

