Pakistan Economic and Social Review
Volume 50, No. 1 (Summer 2012), pp. 57-69

REGIONAL DISPARITIES IN HUMAN CAPITAL
The Case of Pakistan

M. AZHAR KHAN and HAFEEZ UR REHMAN*

Abstract. This study provides a descriptive analysis of human capital in different regions of Pakistan. Three different categories of human capital like rural, urban and overall are formed for the four provinces of Pakistan. The study finds visible difference in human capital situation between rural and urban areas of Pakistan. The study suggests that skills of workforce can be boosted through investment in human capital that may result in an increase in the marginal productivity of capital. For this purpose, more funds may be allocated to health and education sectors, especially in the rural areas, for uplifting the level of human capital.

Keywords: Human capital, Regional disparity, Technological progress

JEL classification: J24, O31, R10

I. INTRODUCTION

The prevalent vast differences in standard of living between developed and developing countries can be attributed to large differences in nutrition, infant mortality rate, life expectancy and human capital. Human capital is chiefly associated with the fluctuation in the output per worker, which is affected by the knowledge that workers of these economies acquire. According to Solow model, output (Y) depends upon capital (K), labour (L), and knowledge/the effectiveness of labour (A).

*The authors are, respectively, Ph.D. Scholar at International Islamic University, Islamabad/ Assistant Professor of Economics at Government Postgraduate College # 1, Abbottabad (Pakistan), and Professor/Chairman, Department of Economics, University of the Punjab, Lahore-54590 (Pakistan).
Corresponding author e-mail: drhrehmankhan@gmail.com.

$$Y = F(K, AL)$$

More explicitly, as the amount of knowledge grows, there is technological progress. *AL* is termed as effective labour or technological progress. Solow model treats technological progress as exogenous; it assumes that technological progress is the outcome of the allocation of resources to the creation of new technologies. However, new growth theories treat technical progress as endogenous, a key factor to growth. Interestingly, some researchers are of the opinion that differences in human as well as physical capital do not emanate from difference in technologies.

In sum, human capital is an instrumental determinant of growth. Growth miracles of industrialized nations are due to the unprecedented human capital accumulation. A modern vision of growth lays emphasis on the sustained technological and institutional growth. Growth does not solely depend upon human capital and physical capital but high growth is chiefly dependent on viable technological and organizational growth (Chaudhry, 2009). Human capital, however, in modern economies plays a vital and decisive role. Human capital is a stockpile of competencies, knowledge and traits embodied in the workforce so as to make economic value. It is the quality gained by a workforce through education and skill. The countries which succeeded in attaining high economic growth rate laid emphasis on the education and health. Accessibility to higher education is 98% in South Korea, 94% in Finland, and 60% in Israel. Accessibility to higher education in Pakistan for the age group 17-23 is still lowest and is about 7.8%, whereas India enjoys 15% (Laghari, 2011).

Recently focus has been shifted from growth to human capital, because growth has a trickle-down effect in reducing poverty, while human capital has a direct effect on poverty reduction. Human capital enhances productivity which leads to higher remuneration. Increased productivity benefits the workers in terms of getting more wages on one hand and increased overall output on the other. High wages tend to improve living standard, while expansion in output provides the availability of goods and services at lower cost, which in turn curb inflation effectively.

World Bank (2002) report on attacking poverty identifies the following resources:

(*a*) Human assets (*e.g.* capacity for basic labour, good health and skills).

(*b*) Natural resources (*e.g.* land).

(*c*) Physical assets (*e.g.* physical capital and access to infrastructure.

(*d*) Financial assets (*e.g.* formal and informal social security and political power.

All this reveals that human assets hold the key ranking in reducing poverty, accelerating economic growth, generating employment, enhancing productivity and controlling price hike. Unfortunately, the level of human development is the lowest in Asia, as measured by access to education basic health and family planning services, safe drinking water and sanitation.

Ironically, Pakistan witnesses a classical story of human capital due to neglected education and health sector. Pakistan spends just 1.7% of its GDP on education. Within this reduced pie for education, only 0.22% of GDP (about 13% of the total education spending) goes to higher education. Hence, improvement in the quality of education is the need of the hour, so that Pakistani workers can be raised to the world standards.

The main objective of the present study is to analyze the level of human capital in different regions of Pakistan particularly rural-urban comparison. Besides physical capital and labour force, human capital (HC) is an important factor that determines the economic growth and well-being of the region. Human capital is the health and skills acquired through education and learning. Besides other things, health, diet, education and on job training play vital role in the level of human capital. Economists term expenditure on education, training and medical care as investment in human capital. If proper consideration is not given to human investment and adequate allocation of resources, the physical capital does not yield appropriate results and remains under-utilized.

II. LITERATURE REVIEW

A concept widely accepted in domain of development economics is to treat human capital, or average years of schooling of the labour force, as an ordinary input in the production function. The recent work of Mankiw, Romer and Weil (1992) is in this tradition. An alternative approach associated with endogenous growth theory is to model technological progress, or the growth of total factor productivity as a function of the level of education or human capital. It reveals that educated labour force is effective in creating, executing and adopting new technologies, thereby generating growth.

Existing literature on the role of human capital on various sectors of the economy suggests that human capital has significant effect on economic growth. See for example, Becker (1962), Schultz (1971), Sachs and Warner (1997), Rosenzweig (1990), Tanigueshi and Wang (2003), Moser and Eliot

(2005), Malik (2006), Peck and Abbas (2008) and Asghar *et al.* (2012). Romer (1990) postulated that human capital might have direct influence productivity by determining the capacity of notion to innovate new technologies suited to domestic production. Mankiw, Romer and Weil (MRW) (1992) find a support for the human capital augmented model in cross section of countries. However, Pugno (1996) shows strong reservations on these results and argues that model tested by MRW is mis-specified and show structural break. Nelson and Phelps (1966) explored that human capital is instrumental to affect the speed of technological catch-up and diffusion.

The World Bank (1980) concludes that "studies have shown that economic return on investment in education seems in most instances, to exceed returns on alternative kind of investment, and that developing countries obtain higher returns than the developed ones." Abbas (2008) investigated relationship between human capital and economic growth in Pakistan using time series data. The study uses Johansen cointegration approach for estimation purpose and rejects the vision of endogenous growth model. The fitted model indicates that output elasticity of human capital may be expected to increase with technical progress. Higher secondary schooling shows same level of productivity as it is observed in OECD economies, which is against the convergence theory. The reason might be the low level of average schooling in Pakistan. Higher return to health spending compared very favourable with the industrial investment.

Asghar *et al.* (2012) have tried to analyze the relationship between human capital and economic growth in Pakistan using recent advances in dynamic modeling. The results of the study show the existence of positive and strong relationship between human capital and economic growth. The study suggests that spending more on human capital may lead to an increase in sustained economic growth in Pakistan.

Fafchamps and Quisumbing (1998) investigate relationship between human capital and the output and labour allocation of rural household in four districts of Pakistan. The results reveal that educated male households earn higher off-farm income and redirect labour to non-farm work. Furthermore, the study indicates that education has no significant impact on crops and livestock production. In the same way, female education and nutrition do not affect productivity.

Chaudhry (2009) points out that industrial growth depends upon capital whereas increase in labour and Total Factor Productivity (TFP) are major factors having an impact on agricultural growth. The study employs Cobb-Douglas production function for agriculture and translog production function

for manufacturing. The findings of the study reveal that total factor growth averaged 2.48% for translog production function. Howitt (2005) shows that recent theory differs from neoclassical theory in assuming that technological progress is endogenous. Endogenous theory treats technological progress as a driving force behind long-run growth.

Bagde (2008) analyzes the relationship between human capital and growth of Indian software industry. The study through empirical analysis has shown that software engineering baccalaureate has positive effect on growth of software industry in 13 states of India.

Although in the preceding discussion empirical studies produce contrasting results but a large number of studies find that growth of region is influenced by the initial level of human capital.

III. ROLE OF HUMAN CAPITAL: THEORETICAL POINT OF VIEW

According to the neoclassical growth models of 1950s which were mainly developed by Swan (1956) and Solow (1956), output is the result of physical inputs like capital and labour. This model follows the law of diminishing returns to scale; which asserts that the economy slows down as the capital stock increases, and the solution is the regular increase in the technological progress along with the increased capital. Neoclassical growth model considers this technological progress as exogenous.

This model was failed empirically when some of the economies, especially East Asian developing countries grew for more than thirty years. To answer this failure endogenous growth models by Romer (1986) and others are cited. In endogenous growth model human capital is given priority and is considered as part of the capital. It explains that if well-trained and educated persons are employed along with physical capital, there will be increasing returns to investment due to the efficient use of technology in the production process.

HUMAN CAPITAL INDEX

It is difficult to measure and compare the exact level of HC in different regions, but conventionally health and education are considered to be significant determinants of HC, so the current study would also follow the same convention.

To construct HC, the main indicators used are the educational attainment and indicator of health status. The educational attainment index captures the

effects of literacy rate and combined enrollment rate: whereas the health index includes the effects of both infant survival rate and crude birth rate to account for life expectancy at birth. Adopting the procedure used in UNDP (1997) to construct the educational attainment index and health index and by combining the both indices, we get the human capital index for different regions of Pakistan. The data have been collected from Pakistan integrated household survey (PIHS) published by Federal Bureau of Statistics, Statistics Division, Government of Pakistan (various issues), Pakistan Economic Survey, Government of Pakistan (various issues), Demographic and Health Survey published by National Institute of Population Studies (various issues).

Educational Attainment Index (EAI)

For better human civilization education is considered as the key. Education is the most important factor in human progress and development. Education plays its role in the better socialization of individuals. It is considered to be the major factor behind the socio economic development of a society through changes in human mind, attitude and behaviour. Education is an essential tool for the human resource development and for the sustainable socio-economic growth. Educational attainment index (*EAI*) is calculated by using zero as a minimum level and 100 percent as a maximum level of education attainment. Here two third weight is assigned to percentage of literates in labour force (denoted by τ^{l}) and one third weight to combined enrollment rates (denoted by v^{e}).

$$EAI = \frac{\left[\left(\frac{2}{3}\right)\left(\tau^{l}\right)+\left(\frac{1}{3}\right)\left(v^{e}\right)\right]}{100}$$

Health Status Index (HSI)

Second part of the human capital is health and is measured in the form of life expectancy because life expectancy appeared to be significant in many cross country growth regression analysis (Bloom and Canning, 2000, 2001). Due to the non-availability of relevant data for different regions of Pakistan, we adopted an indirect route. The infant mortality rate (*IMR*) and the crude birth rate (*CBR*) are assumed to be good determinants of life expectancy at birth. For this purpose, we took data on the three indicators from 1960 to 2007(unbalanced panel data set, total 73 observations) for the South Asian region (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka) and fitted the following regression:

$$Life\ Expectancy\ =\ 77.3416 - 0.1538\ (CBR) - 0.15923\ (IMR)$$

By putting the values of crude birth rate and infant mortality rate we obtained the life expectancy for the different regions of Pakistan. To obtain health status index, standard procedure given in UNDP, Human Development Report (1997) is followed.

The minimum expected life is 25 years and the maximum is 85 years. 75% weight is assigned to (*IMR*) and 25 % weight to crude birth rate.

$$HSI = \frac{\left[Life\ Expec. - 25\right]}{85 - 25}$$

Human Capital Index

Human capital index (*HCI*) is obtained by simply taking average of educational attainment index (*EAI*) and health status indices (*HSI*):

$$HCI = \frac{EAI + HSI}{2}$$

Using the above mentioned method for human capital Table 1 is obtained, which shows level of human capital for different regions of Pakistan.

IV. HUMAN CAPITAL ANALYSIS

The statistics on human capital index shows that conditions in urban areas are better than those of rural areas. This trend is also present in the initial period and remains persistent during the whole period of the study. The reason is the higher literacy rate in the urban areas, which imparts awareness in the residents about health and education; moreover there is a visible difference in the income as well as expenditure of the residents of urban and rural areas. Both the awareness and opportunity to avail health and education facilities provide better results for urban areas. Statistics on human capital for Pakistan shows this significant difference, where mean human capital for rural areas is 0.46 and for the urban areas it is 0.64.

In this study, the overall regions of provinces with reference to human capital index are ranked in this sequence: Sindh, Punjab, Khyber PakhtoonKhwa (KPK), and Balochistan. This ranking also shows that the urbanization provides a major determinant of this variable. A possible reason for this difference might be the female literacy rate and female participation rate in labour force.

TABLE 1
Human Capital Index

YEARS	PAKISTAN			PUNJAB			SINDH			KPK			BALOCHISTAN		
	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban	Overall	Rural	Urban
1979	0.42	0.35	0.51	0.41	0.35	0.51	0.45	0.35	0.54	0.39	0.33	0.48	0.40	0.35	0.49
1984-85	0.42	0.35	0.54	0.42	0.36	0.54	0.43	0.32	0.55	0.42	0.38	0.48	0.30	0.26	0.47
1985-86	0.45	0.40	0.58	0.45	0.40	0.58	0.47	0.37	0.60	0.44	0.41	0.55	0.35	0.32	0.48
1986-87	0.48	0.42	0.61	0.48	0.42	0.60	0.48	0.40	0.61	0.46	0.42	0.56	0.38	0.34	0.52
1987-88	0.49	0.42	0.62	0.49	0.43	0.60	0.51	0.38	0.64	0.49	0.45	0.58	0.39	0.35	0.56
1992-93	0.53	0.47	0.68	0.51	0.45	0.65	0.54	0.40	0.69	0.48	0.45	0.63	0.40	0.35	0.60
1993-94	0.54	0.48	0.69	0.53	0.48	0.67	0.56	0.42	0.72	0.53	0.51	0.67	0.44	0.41	0.63
1996-97	0.55	0.49	0.69	0.55	0.50	0.68	0.55	0.44	0.71	0.55	0.53	0.65	0.50	0.48	0.65
1998-99	0.57	0.52	0.68	0.56	0.51	0.69	0.56	0.47	0.72	0.57	0.55	0.68	0.50	0.48	0.67
2001-02	0.54	0.50	0.63	0.57	0.52	0.66	0.57	0.49	0.69	0.54	0.52	0.64	0.48	0.45	0.62
2004-05	0.57	0.51	0.70	0.56	0.51	0.68	0.57	0.47	0.68	0.56	0.55	0.63	0.50	0.46	0.64
2005-06	0.56	0.51	0.68	0.61	0.56	0.72	0.58	0.47	0.71	0.55	0.53	0.62	0.49	0.46	0.59
2007-08	0.58	0.53	0.68	0.59	0.55	0.68	0.58	0.49	0.70	0.59	0.58	0.67	0.54	0.50	0.66

Difference between the last and the initial values in the different regions shows higher rate of catch up in the rural areas of Pakistan as compared to urban areas. At provincial level this difference is not persistent for instance Punjab and KPK followed the same trend as that of Pakistan. However, KPK rural area showed significant progress in human capital where in 1979 value of HCI was 0.33 and in 2007-08 it appeared as 0.58. These facts are also depicted in the following figures.

Human capital index for overall areas is plotted against years in Figure 1, where on average, HCI is 0.41 at the initial level and in 2007-08 this value is 0.57. There is a persistent increase from 1979 to 1998-99. Initially, there is no wide gap among regions, but just after 1979 overall Balochistan took downward jump and remained below throughout the study period. After 1984-85, there is an upward trend that persists till 1996-97. After that, mixed trend is observed, where some values increase while others show downward trend.

FIGURE 1

Human Capital for Overall Regions

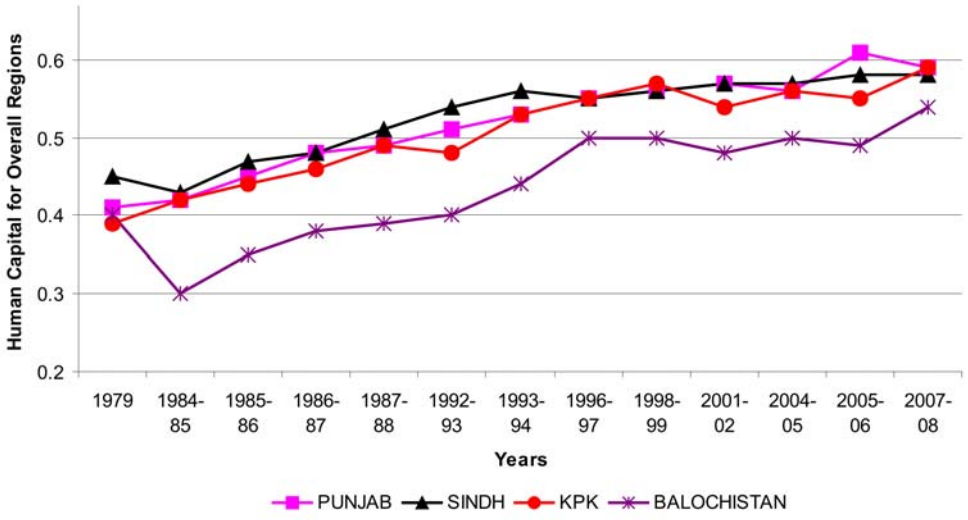

Figure 2 shows that the average HCI for rural areas is 0.34 for the year 1979 and 0.53 for 2007-08. Human capital index for the year 1979 indicates almost the same standard of health and education in rural section of the country. In general, all regions observed upward trend overtime, but after1996-97 rural Balochistan and rural Sindh showed stagnant trend, whereas rural Punjab and rural KPK followed more or less the previous

trend. This divergence is clear in the last years for the rural areas. Most of the time, human capital index in rural Balochistan remained low as compared to other regions, whereas HCI in rural KPK remained dominant throughout the whole period.

FIGURE 2

Human Capital for Rural Regions

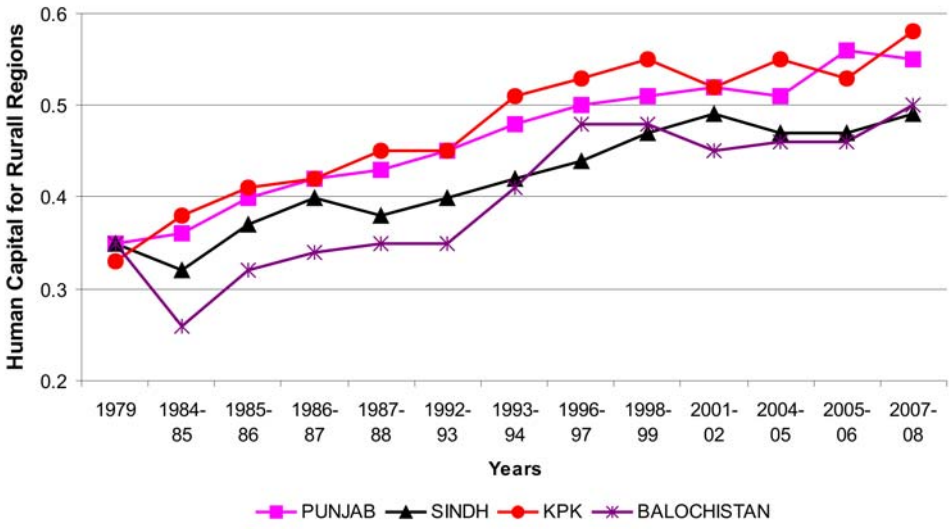

FIGURE 3

Human Capital for Urban Regions

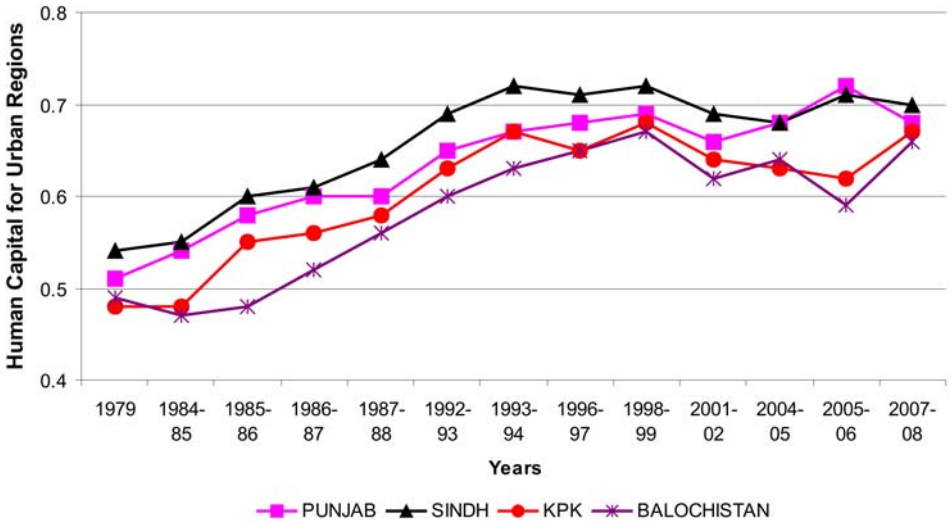

Figure 3 depicts level of human capital index in urban areas where in 1979 average human capital index was 0.51 and in 2007-08 this value rises to 0.68. As expected, the urban areas are achieving higher level of human capital than those of rural areas. Here urban Sindh dominates throughout; which is a clear indication that comparatively standard of health and education in urban Sindh remained well throughout the study period.

Like rural areas, urban regions also show upward trend till 1998-99. After 1998-99 almost all the regions show slight downward trend especially urban KPK and urban Balochistan. However, both regions almost catch urban Punjab and urban Sindh in 2007-08.

HCI statistics for Sindh urban remained above to the other regions except for the last two years. HCI for Balochistan remained low in the entire region for most of the time.

V. CONCLUSION AND SUGGESTIONS

Different regions of Pakistan have some differences on socio-cultural and political basis. These differences are natural, but prolonged differences in provision of health and education facilities and economic conditions among and within regions are posing some serious problems. These differences may cultivate sense of economic deprivation and exclusion and it may bring so many social ills in the society that is dangerous for the social fabric. Growth for the sake of growth is meaningless unless it reduces the suffering and miseries of the masses. To make every person part of development process, it needs to ensure that no one is deprived and marginalized in the society. This can only be done when along with other facilities health and education facilities are provided especially to the rural masses. Majority of the population lives in rural areas where these basic facilities are deficient. In Pakistan less than 2% of GDP is spent on education, which is quite less than the rest of the world. Hence, improvement in the quality of health and education is the need of the hour, so that Pakistani workers can be raised to the world standards.

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