

Economic Growth and Regional Convergence: The Case of Pakistan

MUDDASAR NAZIR SANDILAH and HAFIZ M. YASIN

1. INTRODUCTION

Growth and development are the closely related terms that convey more or less the same message to the general reader. However, where growth theory concentrates on the factors responsible for determination of income, the theory of development focuses on the overall socioeconomic structure and institutional set-up that move ahead with the passage of time. The growth of income is central to the process of economic development; the relationship between the two resembles that of an engine and the carriage. Following the impetus of growth in income/output, the entire social and institutional structure begins to improve and expand in all directions. If the growth process sustains overtime, the social structure moves gradually towards modernisation, democratic attitudes, broadness in outlook, equity in distribution, reduction in poverty and improvement in the standard of living. The borders of growth and development coincide when a researcher intends to investigate the question of equity in distribution across different households and that of convergence across different regions.

The term ‘convergence’ has been used in growth literature to imply a narrowing down of the gaps in incomes across regions and thereby a tendency towards a common equilibrium over time. Although the concept is quite old,¹ the issue came to the surface since the late eighties when the new emerging economies exhibited rapid and sustained growth but the old industrial countries experienced relatively a slowing down. As noted by Abramovitz (1986), it was believed (with a sort of fear) that ‘East Asians Countries’, which embarked on growth path at a later stage, will catch up with their ‘Western’ counterparts in the near future. It was argued that innovation is often difficult whereas imitation is easier. Naturally, a few may be the innovators and leaders in growth, while majority of others may be the imitators and followers. The contrasting arguments were also floated in that the leaders have, after all, an edge over the followers. The evidence,

Muddasar Nazir Sandilah <muddasar.mphil49@iiu.edu.pk> is Research Officer at the Planning Commission, Government of Pakistan, Islamabad. Hafiz M. Yasin <yasin.iiiie@gmail.com> is Associate Professor at International Institute of Islamic Economics, International Islamic University, Islamabad.

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¹The origin of convergence goes back to mid-18th century and important insights can be found in the scholarly writings of Hume (1742) and Tucker (1776), [see Elmslie (1995) for details].

both in favour and against, could now be traced through the vast literature on growth and convergence.²

The hypothesis implies equalisation of per capita income and productivity overtime across the world economies. In this connection, one has to distinguish between absolute and conditional convergence. The former is interpreted as convergence of different economies to a common steady state level, given identical preferences and technologies. This implies that relatively poor regions (should) grow faster than their richer counterparts despite differences in the start-up points. In contrast, if they exhibit significant differences in structural characteristics, then every region will follow an independent path and converge to specific steady state level rather than to a common equilibrium. This latter behaviour is termed as conditional convergence, since the growth rate of an economy is also affected by other features like population growth, nature of technology, political and social characteristics etc. in addition to income. Another important concept often used in the analysis is the dispersion from the steady state (denoted by sigma: σ). If the dispersion or variability of real per capita income across regions decreases with the passage of time, in other words, if they get closer to one another, they are said to exhibit sigma convergence.

The convergence hypothesis has been tested by researchers using different data sources, methodologies and statistical techniques. For large sample of countries (with different socio-economic structures), most of the empirical studies fail to support absolute convergence. Put differently, this kind of behaviour is supported only for 'smaller homogeneous groups' within specific geographic regions. For instance, Barro and Sala-i-Martin (1992), and Mankiw, Romer, and Weil (1992) reject absolute convergence for a diverse group of countries in the global context but do not reject its occurrence for regions like OECD countries, where technologies, preferences and other social structures are more or less similar. In general, most of the studies report in favour of conditional convergence.

2. RATIONALE AND OBJECTIVES OF THE STUDY

The questions concerning the prevalence of poverty, the deepening gulf between rich and poor and the rising trend in other economic disparities across regions, sectors and classes, have always been the burning issues all over the world. These issues, irrespective of their causation (structural or policy discrimination), bear far reaching economic and political consequences. In order to devise appropriate policies for relatively even distribution of the benefits of growth, it is essential to investigate into regional disparities and to understand their causes and impacts. In fact, regional growth is as important for a country as national growth on the grounds of both equity and political harmony. In this connection, the convergence analysis provides an appropriate framework for identification of the nature and causes of disparities. Examples of such attempts are numerous, both for the developed and developing countries.³

²Baumol (1986) was among the pioneer economists who provided statistical evidence of convergence among some countries and also for its absence among others.

³For instance, Juan-Ramon and Rivera-Batiz (1996) analysed the issue for the states of Mexico, Cashin and Sahay (1996) and Bajpai and Sachs (1996) for Indian states, Jian, Sachs, and Warner (1996) and Gundlach (1997) for Chinese provinces, and Hossain (2000) for various regions of Bangladesh.

The Federation of Pakistan displays complex regional diversities, i.e. the geographic regions differ not only in linguistic, cultural, and demographic terms but also reflect evident diversities in the level of social and economic development. During the past half a century, investment in physical and social sectors has largely concentrated in selected parts of the country, particularly big cities like Karachi. This practice has led to large scale migration to cities in search of employment, created economic disparities and aggravated the problems of poverty and inequalities. These disparities have in turn led to development of a sense of deprivations among rural population, weakening of the federation, regional tensions, political instability, terrorism and difficulty in building consensus on issues of national interest.

It may be interesting and useful to investigate the existence of convergence in Pakistan, to identify its nature and to pinpoint the various impediments in its way. A number of indicators like literacy rate, population density, life expectancy, degree of urbanisation, the rule of law etc. speak of much disparity across the socio-political regions. Further, these disparities are increasing over time. This provides sufficient rationale to focus attention on the issue of growth and convergence using the formal models and standard procedures. For this end, we discuss the methodology and analytical framework in the next section. This is followed by a brief discussion of the available data and then an analysis of the main findings. The final section is reserved for conclusions and policy recommendations as usual.

3. ANALYTICAL FRAMEWORK

It seems appropriate to present a brief historical sketch of the models used for the purpose before we concentrate on empirical analysis.

3.1. Historical Background

The neoclassical growth model, pioneered by Solow (1956), which was originally meant to resolve the razor-edge problem of the Harrod model (1939), could also successfully explain as to why certain countries on the globe are so rich and others so poor. At equilibrium, the growth rates of per capita income and capital intensity are closely inter-related. The production function often employed in growth models is Cobb-Douglas, with CRS specification and labour-augmenting technical progress plus the usual neoclassical assumptions. It may be expressed in the reduced form; with all variables in per capita terms:

$$Y_{(t)} = K_{(t)}^\alpha [A_{(t)} L_{(t)}^{(1-\alpha)}] \Rightarrow y_{(t)} = A_{(t)} k_{(t)}^\alpha \quad \dots \quad \dots \quad (1)$$

The symbols carry their usual meaning; ‘Y’ stands for gross output, ‘K’ for capital stock, ‘L’ for the labour force, ‘k=K/L’ for capital intensity and ‘A’ denoting the technology growing exogenously at a rate ‘g’. Next utilising the aggregate saving function ($S_{(t)}=sY_{(t)}$) and the incremental capital-output ratio ($v=dK/dY$), the fundamental equation of motion is readily obtained:

$$dk / dt = A_{(t)} s k_{(t)}^\alpha - n k_{(t)} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

At the steady state equilibrium, the capital intensity stops changing. The time path of this variable depends directly on saving rate 's' and inversely on the growth rate of labour force/population 'n'. This in turn leads to the relationship of per capita income with the same variables/parameters:

$$k_{(t)}^* = \{A_{(t)}s/n\}^{1/(1-\alpha)} \Rightarrow y_{(t)}^* = B_{(t)} \cdot \{s/n\}^{\alpha/(1-\alpha)} = B_{(t)} \cdot \{I/v\}^{\alpha/(1-\alpha)} \quad \dots \quad (3)$$

The symbols with asterisks denote the steady state values of the variables concerned, and the term $B_{(t)} = A_{(t)}^{\alpha/(1-\alpha)}$. It is now straight forward to show the growth rate of per capita income by the relation:

$$\ln y_{(t)} = \ln B_{(t)} + \{\alpha/(1-\alpha)\} \ln s - \{\alpha/(1-\alpha)\} \ln n \quad \dots \quad (4)$$

This relationship conveys an important message: other things remaining the same, countries with high investment and saving rates will grow faster while those with high population density will lag behind in the race. This is the crux of the model.

However, the basic neoclassical model came under criticism from two main angles:

First, the model failed to explain the (large) residual component in growth accounting. Solow attributed this factor to the 'measure of our ignorance'. However, it was believed to arise primarily due to the way technical progress was considered. The controversy during 1960's revolved around the question whether technical progress is exogenous or endogenous and whether it could be considered as embodied or disembodied. Further research led to the introduction of endogenous growth models *ala* Romer (1989) and Barro (1990) that emphasised on the role of human capital in development and growth. This also rejected the hypothesis of secular stagnation.

Second, the original model predicted that economies are likely to converge to the steady state equilibrium overtime. However, this very notion of convergence has been interpreted in different ways. Traditionally, it was believed that every economy may follow an independent growth path and converge to some steady state level peculiar to it. On the other hand, it was argued by some researchers that different economies are likely to converge to some common steady-state equilibrium in the long-run and that the growth rate tends to be inversely related to the starting level of income per capita. Thus, relatively poor economies could grow quickly as compared to their rich counterparts over time. However, the cross-country empirical evidence failed to support this prediction of catching-up. As emphasised by the endogenous growth models, rich economies have to grow faster and indefinitely due to higher rate of capital formation and technological advancement. In other words, the very existence of steady state equilibrium was refuted, given that investment in human capital leads to increasing returns and that human capital is a public good.

3.2. The Framework for Convergence Analysis

The primary source of convergence is believed to arise from the very assumption of diminishing returns to reproducible capital. Other sources of convergence include labour migration from poor to richer economies and the diffusion of technology. The catching-up phenomenon is rationalised on the grounds that imitation and adoption of

discoveries is comparatively cheaper than innovation and discoveries itself. In other words, technical progress may be relatively slower in leaders and rapid in follower economies.⁴

3.2.1. Absolute Convergence

The contemporary studies on convergence generally follow the specification suggested by Barro and Sala-i-Martin (1991, 1992), which provides the following relationships.⁵

$$\ln y_t^\circ = e^{-\beta t} \ln y_0^\circ + (1 - e^{-\beta t}) \ln y_{ss}^\circ \dots \dots \dots \dots (5)$$

In the above equation, y_0° is the initial value of income per effective worker, y_t° is the income at time (t) so that it converges to equilibrium value (y_{ss}°) in the limit as $t \rightarrow \infty$. The parameter ‘ β ’ captures the speed of convergence, which is determined by technology and preferences. If the technical progress is labour augmenting, we may rewrite the variables in per capita units as under, since the terms expressed in efficiency units are not directly observable.⁶ An error term may be added as usual.

$$\ln y_t = gt + (1 - e^{-\beta t}) \ln y_{ss}^\circ + (1 - e^{-\beta t}) \ln A_0 + e^{-\beta t} \ln y_0 + \varepsilon_t \dots \dots (6)$$

Equation (6) provides the framework generally used for testing absolute β -convergence. It can be easily seen that the initial value of output per worker has no implications for its long run value since as $t \rightarrow \infty$, the term $(y_t - y_{ss}^\circ A_0 e^{\beta t}) \rightarrow 0$ in the limit. It may be possible to divide the time span into smaller sub-periods (of length: ‘ d ’) so that the average growth rate of income per worker (between time ‘ t ’ and ‘ $t-d$ ’) for the economy concerned, given by $y^\wedge = (1/d)(\ln y_t - \ln y_{t-d})$, may be regressed on the level of income in the past period. As such, the modified format will be as under:

$$y_i^\wedge = C_i - (1/d)(1 - e^{\beta d}) \ln y_{i,t-d} + \varepsilon_{i,t} \dots \dots \dots (7)$$

The slope parameter captures the speed of convergence (coefficient ‘ β ’) at which the economies are approaching to the common steady state, whereas the intercept term, given by: $C_i = g_i + (1/d) (1 - e^{-\beta}) [\ln y_{i,ss}^\circ - g_{i,(t-d)}]$, captures the effects of technical progress and other unobservable determinants of steady state.

The above specification, however, suits the economies that are closer to one another in structural characteristics (e.g., OECD); and therefore may exhibit absolute convergence. The common intercept in such models constrains all the economies to have the same steady state level, which is a highly restrictive assumption. Obviously, this kind of model may not be suitable for convergence analysis in real world economies, exhibiting vast differences in socio-economic structures.

⁴See Barro and Sala-i-Martin (2004).

⁵For details, see Durlauf, Johnson, and Temple (2004) and Gandolfo (1996), pp. 175–89.

⁶The output per capita (physical labour unit) is given by $y_{it} = Y_{it}/L_{it}$ and that per efficiency worker unit by $y_{it} = Y_{it}/A_{it}L_{it}$, where $A_{it} = A_{i0}e^{gt}$ and ‘ g ’ is rate of (labour augmenting) technical progress (exogenously given).

3.2.2. Conditional Convergence

The occurrence of absolute convergence is a rare phenomenon as compared to conditional convergence, which is most likely to hold. In this case, the economies are expected to converge towards their peculiar steady states rather than to a common equilibrium [Mankiw, Romer, and Weil (1992)]. As such, a single variable (initial level of per capita income) might not be sufficient to explain the differences in growth rates across heterogeneous economies.

Many empirical studies on conditional convergence have used specifications similar to the general format given below. The growth rate of income per capita in an economy ($g_{i,t}$) and for a given period is regressed on the income per capita with one period lag ($y_{i,t-1}$) and the set of conditioning variables ($x_{i,t}$) meant to control for the differences in the steady state of economy.⁷

$$g_{i,t} = \delta x_{i,t} - \beta y_{i,t-1} + \varepsilon_{i,t} \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

However, this general (informal) specification provides no information regarding the values of structural parameters since it is based on reduced form equation. In order to avoid this limitation, it is necessary to introduce explicitly a number of conditioning variables like investment rates, population growth rates, differences in the industrial structures, net migration rate of labour, some proxies for accumulation of human capital and certain dummies to control for other differences across the economies. The researchers have therefore tried to estimate the 'structural' convergence equations derived explicitly from the formal models.⁸ Mankiw, *et al.* (1992) resort to the assumptions of diminishing returns to capital and that technical progress is a public good (diffuses evenly through all economies); both factors being responsible for convergence as discussed above. In what follows, we discuss the fundamentals of the augmented growth model⁹ used for conditional convergence.

The production function may be rewritten in the modified form so as to capture the impact of human capital accumulation. Again, the specification may be Cobb-Douglas and the model may also be written in reduced form:

$$Y_t = K_t^\alpha H_t^\omega [A_t L_t]^{(1-\alpha-\omega)} \Rightarrow y_t = k_t^\alpha h_t^\omega \dots \dots (9)$$

The symbol ' H ' denotes the stock of human capital, assumed to be a public good, and the coefficients α and ω measure the partial output elasticities with respect to factor inputs. The labour force (measured in efficiency units) should grow at the composite exponential rate ($n+g$). The assumption of diminishing marginal returns applies to individual factors, which implies that economy will reach the steady state level overtime. The fraction of income invested in physical and human capital may be denoted by the proportions s_k and s_h respectively such that these sum up to the aggregate saving rate: $s_k + s_h = s = S/Y$. With these manipulations, along with incorporation of the depreciation rate

⁷The researchers have used up to 50 different conditioning variables, following Barro (1991).

⁸Barro and Sala-i-Martin (1992) use the Cass-Koopman's optimal savings version of the neoclassical growth model while Mankiw, Romer, and Weil (1992) derive the specification from Solow-Swan model.

⁹For details please refer to Barro and Sala-i-Martin (2004), and Mankiw (1995).

(denoted by δ), the equations of motion for physical and human capital may be expressed as under:

$$\frac{dk}{dt} = s_k k_t^\alpha h_t^\omega - (n + g + \delta)k_t \quad \text{and} \quad \frac{dh}{dt} = s_h k_t^\alpha h_t^\omega - (n + g + \delta)h_t \quad \dots \quad (10 \text{ a,b.})$$

The steady state equilibrium is said to occur in the long run where the levels of physical and human capital per effective worker stop changing further. Utilising this information and solving for the resultant equations, one gets the steady state values for physical and human capital per effective worker.¹⁰ Substituting these values back into production function, and by taking logs, the determinants of steady state are readily obtained. The steady state income depends on the parameters: $A, s_k, s_h, n, g, \delta, \alpha$ and ω .

$$\ln y_{ss} = \ln A + gt + \left[\frac{\alpha}{1 - \alpha - \omega} \right] \ln s_k + \left[\frac{\omega}{1 - \alpha - \omega} \right] \ln s_h - \left[\frac{\alpha + \omega}{1 - \alpha - \omega} \right] \ln (n + g + \delta) \quad (11)$$

The conditional convergence explicitly takes into account the possible differences in the determinants of steady state and hence demands incorporation of appropriate variables. The important considerations as to, which variables ought to be included, which elements should be allowed to vary and how, and which should be assumed to remain constant across economies; have been debated in growth literature. Conditional convergence then implies that the growth rate of an economy is positively related to the distance between its steady state level and current level of income. To examine the dynamics of regional economies along transition to their steady states, the speed of convergence can be expressed as¹¹

$$d/dt (\ln \overset{\circ}{y}_t) = \lambda [\ln \overset{\circ}{y}_{ss} - \ln \overset{\circ}{y}_t] \quad \dots \quad \dots \quad \dots \quad \dots \quad (12)$$

The parameter ' λ ' $\{= (1 - \alpha - \omega) (n + g + \delta)\}$ implies that an economy with higher level of per worker income at the start exhibits a lower growth rate and vice versa. On solving the above differential equation, we get an expression for convergence as under:

$$\ln y_t^\circ = e^{-\lambda t} \ln y_{t-\tau}^\circ + (1 - e^{-\lambda t}) \ln y_{ss}^\circ \quad \dots \quad \dots \quad \dots \quad (13)$$

In this relation, $y_{t-\tau}^\circ$ is the initial value of income per effective worker and τ is the starting point. Substituting for $\ln y_{ss}^\circ$ from Equation (11), and then transforming the per effective worker terms into per capita terms, we get the following relation:

$$\begin{aligned} \ln y_t - \ln y_{t-\tau} &= -(1 - e^{-\lambda x}) \ln y_{t-\tau} + (1 - e^{-\lambda x}) \left[\left(\frac{\alpha}{1 - \alpha - \omega} \right) \ln s_k + \left(\frac{\omega}{1 - \alpha - \omega} \right) \ln s_h \right. \\ &\quad \left. - \left(\frac{\alpha + \omega}{1 - \alpha - \omega} \right) \ln (n + g + \delta) \right] + [(1 - e^{-\lambda x})gt + e^{-\lambda x}g\tau] + (1 - e^{-\lambda \tau}) \ln A_0 \end{aligned} \quad (14)$$

If the speed of convergence ' λ ' is positive, $\alpha > 0, \omega > 0$ and $(\alpha + \omega) < 1$ as assumed by the model, the signs of the coefficients can be easily predicted.

Mankiew, *et al.* (1992) have also employed the basic neoclassical model to investigate the hypothesis of conditional convergence. The determinants of growth then

¹⁰For details, please see Gandolfo (1996), pp. 286-87.

¹¹See Mankiw, Romer, and Weil (1992).

simply include the technology level and the observable variables like saving rates, initial level of income per worker and population growth rates. The model assumes the following shape and predicts not only the sign of each coefficient but also its magnitude:

$$\ln y_t - \ln y_{t-\tau} = (1 - e^{-\lambda\tau}) \ln A_0 + [(1 - e^{-\lambda\tau})gt + e^{-\lambda\tau}g\tau] - (1 - e^{-\lambda\tau}) \ln y_{t-\tau} + (1 - e^{-\lambda\tau})\left(\frac{\alpha}{1-\alpha}\right) \ln s - (1 - e^{-\lambda\tau})\left(\frac{\alpha}{1-\alpha}\right) \ln(n + g + \delta) \quad \dots \quad (15)$$

3.2.3. The Dynamic Panel Framework

As discussed above, the panel data approach can correct the omitted variable bias by allowing for differences in technologies across regions. Islam (1995) restructures the neoclassical model and interprets the term: $(1 - e^{-\lambda\tau}) \ln A_{(0)}$ as the time-invariant region-specific effect while using the panel framework. Using the notation of panel data approach, we may rewrite Equation (14) for a given region 'i' as:

$$y_{i,t} = \gamma y_{i,t-1} + \sum_{j=1}^3 \theta_j x_{i,t}^j + V_t + \mu_i + \varepsilon_{i,t} \quad \dots \quad \dots \quad \dots \quad (16)$$

where $\gamma = e^{-\lambda\tau}$, $y_{i,t} = \ln y_t$, $y_{i,t-1} = \ln y_{t-\tau}$, $\theta_1 = (1 - e^{-\lambda\tau})\left(\frac{\alpha}{1-\alpha-\omega}\right)$, $\theta_2 = (1 - e^{-\lambda\tau})\left(\frac{\omega}{1-\alpha-\omega}\right)$, $\theta_3 = -(1 - e^{-\lambda\tau})\left(\frac{\alpha+\omega}{1-\alpha-\omega}\right)$, $x_{i,t}^1 = \ln s_k$, $x_{i,t}^2 = \ln s_h$, $x_{i,t}^3 = \ln(n + g + \delta)$, $V_t = [(1 - e^{-\lambda\tau})gt + e^{-\lambda\tau}g\tau]$, $\mu_i = (1 - e^{-\lambda\tau}) \ln A_0$.

The set of conditioning variables (denoted by x_i) capture the differences in the steady states across regions. The ' V_i ' term signifies the time specific effects, which include the rate of technological change. The next term ' μ_i ' is region-specific factor that represents the combined effect of institutions, resource endowment, climate, customs and traditions etc. This component varies across regions and picks up the effect of any omitted variable that does not vary over time in a panel. Finally, ' τ ' is the time interval of four/five year period and ' ε_{it} ' represents the usual error term that varies across regions and time.

4. DATA AND METHODOLOGY

In order to test the hypothesis of income convergence across different regions of Pakistan over time, the appropriate economic unit might be the district or even the union council. However, the requisite data is available only at the provincial level, fortunately with rural-urban disaggregation. The tribal areas (FATA), the northern areas (Gilgit-Baltistan) and Azad Kashmir are excluded due to data constraints. The available information covers the period from 1979 to 2005. The important data sets used in the analysis comprise the household income (instead of GDP per capita, the data for which is not available at provincial level), savings rates, literacy rates, combined enrolment ratios, dependency ratios, population growth rates, crude birth rates and infant mortality rates. The data is derived from official sources for the years concerned like the Economic Survey, the HIES (PSLM), Demographic Survey, the Labour Force Survey, the Education and Development Statistics of the provinces etc.¹²

¹²The data sets used in the analysis can be provided on request.

Human capital is an important determinant of economic growth and convergence besides physical capital and labour force. It is indicated by education, training and experience as well as good health and physique; but it is difficult to measure. Mankiw, Romer, and Weil (1992) have used the secondary school enrolment rate as proxy for human capital, whereas Sala-i-Martin (1997) has used life expectancy at birth as proxy for non-educational human capital and school enrolment rate for educational human capital. We have preferred to construct a composite index of human capital following the construction of Human Development Index (HDI) by the UNDP (1997). The proposed index includes proxies for both education and health.¹³

Panel data estimation is made possible by dividing the available period-wise information for each region into several shorter time spans. We consider a span of four/five years to be appropriate, which is also the standard practice followed in empirical research work. Dividing the total time period (1979–2005) into shorter spans, we obtain a total of six panels for each of the province. The constructed intervals are 1979–1984, 1984–1988, 1988–1993, 1993–1997, 1997–2001, 2001–2005. The dependent variable is the logarithm of per capita (per worker) income by the end point of each time span where the most important explanatory variable is the lagged value of income per capita (in log form). Other variables such as saving rates, labour force growth rates and human capital are averaged over four/five year period for each region.

An important issue that arises while using the panel data is whether the individual region-specific effects should be considered fixed or random. The disturbance term (OLS specification) does not take into account the unobserved differences among the regions, which may be important. The fixed effect specification may then be appropriate choice. The dynamic panel growth model with fixed effect allows us to control for the unobserved differences among the steady states of regions in addition to the observed differences, the later captured by the set of conditioning variables. The empirical work based on single cross-section regressions may suffer from two inconsistencies, i.e. omitted variables and endogeneity bias. The first bias arises when the region-specific effects are assumed to be uncorrelated with other explanatory variables and the second arises when certain explanatory variables happen to be endogenous.¹⁴ The reliability and consistency of the estimates is then a serious issue. Islam (1995) has used a fixed effect specification (least square dummy variable technique) to estimate the panel data model so as to address these limitations. Caselli, *et al.* (1996) suggested that the first difference GMM approach deals successfully with both the issues.¹⁵

¹³First we estimate the education index by giving 2/3 weight to literacy and 1/3 to secondary school enrolment, where the maximum is 100 and minimum is zero. Next we estimate the health index by giving 60 percent weight to infant survival and 40 percent to crude birth rate, where the maximum expectancy is 85 years and minimum is 25 years. The compound human capital index is then the simple average of the two indices.

¹⁴For details, see Caselli, Esquivel and Lefort (1996) and Durlauf and Quah (1999).

¹⁵Durlauf and Temple, *et al.* (2004) point out that omitted unobserved region-specific effects in dynamic panel model cause the least square estimators to be biased and inconsistent. The fixed effect or within groups estimator, which takes into account the unobserved region-specific effects, also provides biased and inconsistent estimates. This is due the fact that the lagged dependent variable is correlated with the mean of individual errors. Bond, Hoeffler, and Temple (2001) and Durlauf and Temple, *et al.* (2004), suggest that the 'least square estimate' may provide the (approximate) upper bound on the coefficient of lagged variable and the 'within group estimate' can be regarded as the (approximate) lower bound. Thus an estimate lying between the two may be consistent.

5. ANALYSIS AND RESULTS

We applied different estimation techniques, discussed above, to the panel data so as to compare the results and find consistent estimates. We confronted the data set to test for absolute as well conditional convergence. The results are discussed below.

5.1. The Absolute Convergence

To see the existence of unconditional (absolute) convergence, the model given by Equation (7) is used. As noted above, the slope parameter captures the speed of convergence. The coefficient on initial level of per worker income, with a negative sign and statistically significant value would imply absolute convergence to the steady state common for all regions and vice versa. By implication, a zero value of the parameter (or non-zero but insignificant) indicates no convergence or divergence, which shows that each region follows an independent growth path. Next we focus on the analysis.

5.1.1. Aggregate Analysis

Table 1 reports the cross-sectional regression results, which cover a period of twenty six years (1979–2005) and correspond to income per worker. We have divided this time span into three sub-periods, (1979–1988), (1988–1998) and (1998–2005) in order to find the evidence of convergence, if any, separately. Another reason for this division into sub-periods is to test whether the political and economic stability (instability) bear any implications for absolute β -convergence.¹⁶

Table 1

Cross-Sectional Tests for Absolute Convergence (Aggregate)
Dependent Variable $\ln(y_t/y_{t-1})$

Periods	(1979-2005)	(1979-1988)	(1988-1998)	(1998-2005)
Constant	4.349	4.318**	0.123	-2.288
<i>Standard Error</i>	3.488	0.668	9.764	5.351
<i>T- value</i>	1.247	6.461	0.013	-0.428
<i>P- value</i>	0.339	0.023	0.991	0.711
Ln (yt-1)	-0.522	-0.533**	-0.018	0.317
<i>Standard Error</i>	0.454	0.087	1.235	0.684
<i>T- value</i>	-1.149	-6.121	-0.014	0.464
<i>P- value</i>	0.370	0.026	0.990	0.688
<i>β=Implied Speed</i>	0.028	0.074	0.002	N/A
<i>R²</i>	0.397	0.924	0.060	0.503

Notes: All regressions are for the four provinces of Pakistan.

** Significant at 5 percent level.

¹⁶The first and third sub-periods represent the military-guided, semi-democratic regimes of General Zia-ul-Haq and General Pervez Musharaf respectively. The second sub-period shows the so called fake-democratic regime. Although the country was ruled by publicly elected governments during this period but these were politically unstable. Four elections were held during 10/11 years but no elected government could complete its tenure.

So far as the entire period is concerned, the coefficient for the explanatory variable is negative but statistically insignificant. Thus, the data do not provide any evidence in favour of β -convergence in Pakistan. For the sub-period (1979–1988), the coefficient is negative but statistically significant. This is a strong evidence of convergence during the period concerned where the R^2 is quite high and the implied speed of convergence is 7.4 percent per annum, which is respectable. The result can be rationalised on the basis of certain ground realities. For instance, the overall economic performance was better relative to other developing countries around the globe; the growth rate was high and inflation rate was mild, which may be seen from the World Bank reports.¹⁷ There was a sharp increase in workers remittances during the era, which boosted up the living standard of masses during 1980's as noted by Haque (1999).

However, this trend could not be sustained during the next decade (1988–1998), where the sign is correct but the value is closer to zero (insignificant). During the third sub-period (1998–2005), the results are just in the opposite direction. The coefficient bears a positive sign, although it is insignificant, which implies a weak signal of divergence. The results support the popular claims that poverty and inequalities have increased across Pakistan during the past decade.

5.1.2. The Urban-Rural Split

The rural and urban areas can be considered as separate entities due to certain obvious differences in their socio-economic and political characteristics. The concept of convergence in rural and urban areas is more difficult to imagine within the existing administrative set up, however the available information allows us to see the dynamics and gain some useful insights. Table 2 is concerned with rural areas. It can be seen that the coefficient for the explanatory variable concerning the entire period (1979–2005) is negative, but significant only at 10 percent level. However, when the time span is divided into three sub-periods, the slope coefficient turns out insignificant but alternates in sign.

Table 2

Cross-Sectional Tests for Absolute Convergence (Rural Areas)

Dependent Variable $\ln(y_t/y_{t-1})$

Periods	(1979-2005)	(1979-1988)	(1988-1998)	(1998-2005)
Constant	3.385*	2.497	-0.530	2.013
Standard Error	1.071	2.327	4.751	3.236
T-value	3.161	1.073	-0.112	0.622
P-value	0.087	0.396	0.921	0.597
$\ln(y_t-I)$	-0.399*	-0.284	0.061	-0.241
Standard Error	0.135	0.316	0.612	0.424
T-value	-2.947	-0.900	0.100	-0.567
P-value	0.098	0.463	0.930	0.628
β =Implied Speed	0.020	0.033	N/A	0.039
R^2	0.685	0.288	0.005	0.577

Notes: All regressions are for the four provinces of Pakistan.

*Significant at 10 percent level of significance.

¹⁷The average real GDP growth rate per annum was 6.15 percent and inflation rate of Pakistan was 6.74 percent during 1980s as compared to the average rates of developing countries: annual real GDP growth rate of 4.49 percent and inflation rate of 34.72 percent during the decade.

Table 3
Cross-Sectional Tests for Absolute Convergence (Urban Areas)
Dependent Variable $\ln(y_t/y_{t-1})$

Periods	(1979-2005)	(1979-1988)	(1988-1998)	(1998-2005)
Constant	4.351***	8.427	9.673**	0.360
<i>Standard Error</i>	0.107	5.986	2.456	2.253
<i>T-value</i>	40.555	1.408	3.938	0.160
<i>P-value</i>	0.001	0.294	0.059	0.888
<i>Ln (yt-1)</i>	-0.489***	-1.035	-1.173*	-0.022
<i>Standard Error</i>	0.013	0.748	0.301	0.273
<i>T-value</i>	-36.457	-1.384	-3.892	-0.080
<i>P-value</i>	0.001	0.301	0.060	0.944
<i>β=Implied Speed</i>	0.026	N/A	N/A	0.003
<i>R²</i>	0.998	0.489	0.825	0.003

Notes: All regressions are for the four provinces of Pakistan.

***Significant at 1 percent level.

**Significant at 5 percent level.

*Significant at 10 percent level of significance.

Again the results can be rationalised easily. The very base and the vital component of our rural economy is the agricultural sector, which primarily depends on the forces of nature. Therefore, the natural shocks in the form of prolonged droughts and floods obviously affect the agricultural produce and hence the living conditions of masses in rural areas. Similar results can be seen in Table 3 that concerns with the urban regions. The regression coefficient for the explanatory variable has the correct sign and it is statistically significant even at 1 percent level for the entire period from 1979 to 2005. The regression has a good fit. However, when the time span is divided into sub-periods, the coefficients turn out to be insignificant, although the signs are correct. In this case, the regression is good fit for the period (1988–98) only.

The implied speed of convergence for the rural and urban economies works out to be 2 percent and 2.6 percent per year respectively, when we consider the entire period. These results indicate that rural and urban economies are not likely to converge to the common steady state; rather they are following their independent growth paths. However, more tests are needed to explain the nature and causes of growth in rural and urban economies separately since the lonely variable (initial per worker income) is not sufficient to explain the complex process of growth and convergence.

5.2. The Conditional Convergence

In the absence of satisfactory evidence on absolute convergence, it is necessary to verify the hypothesis under specific regional conditions. The existence of significant natural, social and historical differences among different geographical regions of Pakistan renders them less likely to converge towards the same equilibrium. This diversity can be seen via a number of indicators like the literacy rate, rate of saving, population density, life expectancy, infrastructure facilities, degree of urbanisation, the rule of law, social and family structure etc. Furthermore, these disparities have been increasing over time across different regions.

We have tried three estimation techniques, namely the OLS estimators, the Fixed or within groups estimators and the GMM estimators meant for the panel data framework. To explore the evidence of conditional convergence, we employ two different specifications of the neoclassical growth model. First is the original neoclassical model due to Solow (1956) and second is the modified version due to Mankiw, Romer and Weil (1992) that augments the former with human capital. Next we focus on the results.

5.2.1. Estimation via the Basic Neoclassical Model

We begin our analysis with the basic neoclassical model without any provision for human capital. The specification for the panel data estimation is provided by Equation (15), in which the intercept captures the region-specific effects. The evidence of convergence rests on the sign and size of the coefficient for lagged real per worker income. A statistically significant value of the coefficient bearing a negative sign implies conditional convergence. Other variables on the right hand side measure differences in the steady state levels.

The results are presented in Table 4. The first column reports the OLS estimation obtained by simply pooling the time series and cross section data. The second column reports estimation through the fixed effects model or Within Groups (WG) estimators. The third column reports the results of first differenced Generalised Method of Moments (GMM) *ala* Arellano and Bond (1991).¹⁸

Table 4

*Panel Data Tests for Conditional Convergence
(Estimation via the Basic Neoclassical Mode)
Dependent Variable $\ln Y_{i,t} - \ln Y_{i,t-\tau}$*

Variables	Least Squares	Fixed Effect (WG)	DIF-GMM
$\ln (y_{i,t-\tau})$	-0.238 (0.148)	-1.262** (0.177)	-0.331*** (0.074)
$\ln (s_{i,t})$	0.012 (0.019)	0.024* (0.013)	0.020* (0.012)
$\ln (n_{i,t}+g+\delta)$	-0.733 (0.457)	-0.260 (0.294)	-0.319* (0.191)
Implied λ	0.054	N/A	0.080
J-statistic			14.402
Instrument Rank			16.000
Sargan Test (p-value)			0.346

Notes: Data used over four/five years intervals between 1979 and 2005.

The symbol (λ) denotes the convergence speed. Standard errors given in parentheses.

* Significance at 10 percent level, ** Significance at 5 percent level, *** Significance at 1 percent level.

The figures reported for the Sargan test are the p-values of the null hypothesis for valid specification.

J-statistic is simply the Sargan test of over-identifying restrictions.

A comparison of the results in the first row reveals that the OLS provides higher estimates than WG method. The signs in both cases are correct. The OLS estimates a value of (-0.238) and WG provides a value of (-1.262) for the coefficient (the initial

¹⁸We report only important parts of GMM results and ignore details about the instruments due to space constraints.

level of per worker income). Fortunately, the value given by the GMM estimator (-0.331) falling within the upper and lower bound and therefore it is more likely to be unbiased and reliable. The validity of the instrumental variables used in the GMM estimation can be checked by Sargan test. The p-value (0.346) strongly suggests that the instrumental variables used in the analysis are valid.

In view of the above, the results obtained from the first differenced GMM technique seem to be appropriate. All the coefficients are statistically significant and bear the expected signs. In particular, the coefficient of lagged per worker income supports conditional convergence across regions. The coefficient of saving indicates that one percent increase in saving rate will lead to a small increase of 0.02 percent in growth of real income. Likewise, an increase of one percent in the growth rate of population will be followed by 0.32 percent decline in growth rate of real income. The speed of convergence ' λ ' can be estimated from the coefficient of lagged income. The implied speed of convergence is 8 percent per year.¹⁹ The results show that most of the regions are nearer to their respective steady states level. The differences across the regions can be explained by the differences in the factors that determine the respective steady states. These factors (or conditioning variables) might not only be different across the regions but also might be changing within a region over time. Thus change in these factors causes a shift in steady state level.

5.2.2. Estimation via the Augmented Model

Human capital is another important variable that is considered in empirical literature on growth besides savings and population growth rates. We estimate an augmented version in which the production function also includes the stock of human capital, as shown in Equation (16) above. The panel data results are reported in Table 5.

Table 5

*Panel Data Tests for Conditional Convergence
(Estimation via the Augmented Neoclassical Model)
Dependent Variable $\ln Y_{i,t} - \ln Y_{i,t-\tau}$*

Variables	Least Squares	Fixed Effect(WG)	DIF-GMM
$\ln (Y_{i,t-\tau})$	-0.238 (0.152)	-1.315*** (0.176)	-0.359*** (0.028)
$\ln (s_{i,t})$	0.011 (0.020)	0.031** (0.014)	0.027* (0.014)
$\ln (n_{i,t}+g+\delta)$	-0.731 (0.472)	-0.256 (0.287)	-0.302 (0.245)
$\ln (h_{i,t})$	-0.009 (0.492)	0.732 (0.539)	0.665** (0.337)
Implied λ	0.054	N/A	0.089
J-statistic			14.106
Instrument Rank			17.000
Sargan Test(p-value)			0.366

Notes: Standard errors are given in parentheses, (λ) denote the annual convergence rate.

* Significance at 10 percent level, ** Significance at 5 percent level, *** Significance at 1 percent level.

¹⁹The half-life of convergence process is given by the formula: $T = \ln(2)/\lambda$, and if $\lambda = 0.08$, $T = 8.67$ years. The estimated half-life of convergence (the time it takes to eliminate half of the gap between steady state and actual real per capita income).

For the first differenced GMM estimator, the coefficient of lagged income is highly significant. It falls between the upper and lower bounds given by the OLS and WG estimates and it is also consistent with the results of Table 4. The p-value (0.366) given by the Sargan test does not reject the validity of the instruments used in the analysis. Likewise, the coefficients of saving and population growth have the expected signs. The coefficient of human capital is positive and statistically significant, which indicates its importance for growth. The speed of convergence ‘ λ ’ is slightly higher than the estimate given by the basic neoclassical model (as shown in Table 4 above).

5.2.3. Estimation via the Restricted Models

In this section, we address the question whether the estimates obtained are consistent with the predictions of growth models or otherwise. The data is considered to support predictions if the estimated coefficients carry the predicted signs and have the expected magnitudes. The signs and magnitudes of the coefficients as predicted by the formal models and shown in Tables 4 and 5 make it convenient to test the models under restrictions. The restricted least squares technique can help in this regard.

First, with reference to the basic neoclassical model, we apply the restriction that the coefficients of saving and population growth rates [$\ln(s)$ and $\ln(n+g+\delta)$] are equal in magnitude but opposite in sign. Although, the concerned estimates reported in Table 4 are a little bit different, however we re-estimate the model by imposing this restriction. This also enables us to find the implied share of physical capital (α). Equation (15) may be rewritten in modified form as under.

$$\ln(y_{i,t}/y_{i,t-\tau}) = \gamma_1 \ln y_{i,t-\tau} + \gamma_2 [\ln s_{i,t} - \ln(n_{i,t} + g + \delta)] + v_t + \mu_i + \varepsilon_{i,t} \quad (15 a)$$

where $\gamma_1 = -(1-e^{-\lambda t})$, $\gamma_2 = \gamma_3 (1-e^{-\lambda t})(\alpha/(1-\alpha))$, $v_t = [(1-e^{-\lambda t})gt + e^{-\lambda t}g\tau]$, $\mu_i = (1-e^{-\lambda t}) \ln A_0$

The regression results, after incorporating the restriction, are reported in Table 6. The p-value (0.0861) for GMM technique given by the Wald test clearly rejects the hypothesis ($\gamma_2 + \gamma_3 = 0$), which implies that our data do not support the predictions of the neoclassical model. The implied value of the share of physical capital estimated in GMM case is 0.064, which is very low.

Table 6

Panel Data Tests for Conditional Convergence
(Restricted Neoclassical Model-Basic)
Dependent Variable $\ln Y_{i,t} - \ln Y_{i,t-\tau}$

Variables	Least Squares	Fixed Effect(WG)	DIF-GMM
$\ln(y_{i,t-\tau})$	-0.0068 (0.0178)	-1.2306*** (0.1707)	-0.2866*** (0.0693)
$\ln(s_{i,t}) - \ln(n_{i,t} + g + \delta)$	0.0154 (0.0192)	0.0236* (0.0133)	0.0197 (0.0155)
Implied λ	0.001	N/A	0.07
Implied α	0.6931	0.019	0.064
Wald test: p-value	0.199	0.131	0.0861

Notes: Standard errors in parentheses.

* Significance at 10 percent level, ** Significance at 5 percent level, *** Significance at 1 percent level.

Second, with reference to the augmented neoclassical model, we may examine the restrictions that the coefficients of physical capital (saving rate) and population growth rate as well as the coefficients of human capital and population growth rate sum to zero. In this regards, Equation (14) may be rewritten as under:

$$\ln(y_{i,t}/y_{i,t-\tau}) = \gamma_1 \ln y_{i,t-\tau} + \gamma_2 [\ln s_{i,t} - \ln(n_{i,t} + g + \delta)] + \gamma_3 [\ln h_{i,t} - \ln(n_{i,t} + g + \delta)] + v_t + \mu_i + \varepsilon_{i,t} \quad \dots \quad (14 \text{ a})$$

The coefficients are: $\gamma_1 = -(1 - e^{-\lambda})$, $\gamma_2 = (1 - e^{-\lambda}) [\alpha/(1-\alpha-\omega)]$, $\gamma_3 = (1 - e^{-\lambda}) [\omega/(1-\alpha-\omega)]$, where 'α' is the share of physical capital and 'ω' is the share of human capital in per capita income. The estimated results from the restricted regression are reported in Table 7.

Table 7

*Panel Data Tests for Conditional Convergence
(Restricted Neoclassical Model-Augmented)*

Dependent Variable $\ln(Y_{i,t}) - \ln(Y_{i,t-\tau})$

Variables	Least Squares	Fixed Effect(WG)	DIF-GMM
$\ln(y_{i,t-\tau})$	-0.100 (0.093)	-1.302*** (0.174)	-0.353*** (0.045)
$\ln(s_{i,t}) - \ln(n_{i,t}+g+\delta)$	0.019 (0.020)	0.028* (0.013)	0.025** (0.013)
$\ln(h_{i,t}) - \ln(n_{i,t}+g+\delta)$	0.371 (0.363)	0.340 (0.248)	0.367* (0.242)
Implied λ	0.021	N/A	0.087
Implied α	0.039	0.017	0.033
Implied ω	0.758	0.204	0.493
Wald test: p-value	0.27	0.41	0.2545

Notes: Standard errors in parentheses.

* Significance at 10 percent level, ** Significance at 5 percent level, *** Significance at 1 percent level.

The restriction implied by the augmented neoclassical model cannot be rejected at the conventional levels of significance (i.e. with p-value 0.2545). The results from first differenced GMM show the share of physical capital to be 0.033, which is very low and unrealistic, and the share of human capital is 0.49, which is quite reasonable. So it can be concluded that the data support the predictions of augmented model to some extent but not in case of basic neoclassical model.

Moreover, we can observe that estimates of convergence coefficient are not affected by restricting both the models and remain almost same as those obtained from unrestricted models and reported in Tables 4 and 5. This behaviour indicates that the coefficients are consistent with the specifications shown above, and the results for the speed of convergence are robust.

5.3. The Sigma Convergence

The sigma (σ) convergence does not relate directly to the growth rates of economies but it focuses attention on the dispersion of per capita income over a cross section of economies at each point in time. If the cross-regional dispersion of income (measured as standard deviation of the logarithm of real income) tends to decrease over time, the regions are said to converge and vice-versa. We have also tested the available data for sigma-convergence. By comparing the findings, the regional disparities in terms of per capita incomes appear to be more severe than that of per worker incomes. The finding implies that the number of dependent or inactive members of the population is responsible for higher dispersion of per capita income. This is in line with the conventional wisdom, since a higher dependency ratio means higher consumption or lower saving rates and thereby lower growth rates.

Fig. 1. Dispersion of Real Per Capita/Worker Income (All Regions) (Sigma Convergence) 1979–2005

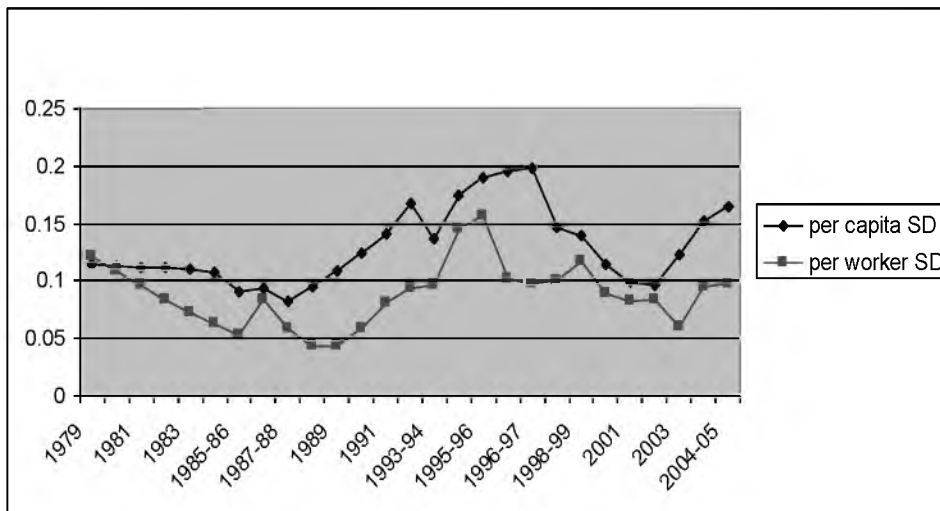


Figure (1) shows the dispersion of both per capita and per worker incomes across all regions of Pakistan over the period from 1979 to 2005. The trend in dispersion in the per capita income during the whole period (1979-2005) shows that there is no evidence of σ -convergence, rather the disparities in regional incomes seem to rise. The standard deviation rose from (0.114) in 1979 to (0.165) in 2005, with a significant increase of 44 percent, keeping aside the slight decrease for the years 1988 and 2001-02. However, much of the sharp increase in dispersion has taken place during the 1990s, where the highest value can be observed for 1996-97. So far as the case of per worker income is concerned, the figure shows a slight decrease in dispersion from 0.12 in 1979 to 0.10 in 2005. However, there is a sign of σ -convergence in 1980s as evident from declining tendency in dispersion, however with some temporary increase in year 1986-87. During 1990s, the standard deviation rose sharply indicating an increase in regional disparities. Thereafter no uniform trend prevails; rather there are fluctuations.

An application of the model separately to rural and urban areas revealed that the intra-regional differences in the socio-economic conditions are as serious as the inter-regional differences. To sum up, the findings indicate that incomes per capita across the provinces are moving farther away from one another overtime and there is little tendency for reducing of disparities.²⁰

Some important results can be derived from σ -convergence analysis across regions of Pakistan. The comparison between per capita and per worker income turns out to be quite useful and important. When we observe the data in per capita terms, regional income disparities appear to be more stringent as compared to the small decline of dispersion in per worker terms. The result might be rational keeping in view the fact that a large fraction of Pakistani population is not economically active. In general, the families depend on active members (workers) as shown by high dependency ratios.²¹ It can also be noted that all values of standard deviation in per worker income are lying below the estimates for per capita income, showing lesser dispersion in terms of per worker data. It seems that the number of dependent and inactive members of the society is responsible for increase in income disparities. Put differently, the income of earning hands seems to be eaten up by the dependent and inactive members. These results are also consistent with the findings arrived at under absolute convergence of per worker income during period 1979-2005.

6. CONCLUSIONS AND POLICY IMPLICATIONS

The evidence on conditional convergence indicates that each regional economy converges to its specific steady state, rather than to a common equilibrium. However, it does not tell about prevalence of regional disparities; as to how they appeared or gravitated overtime and how they could be addressed. Hence, conditional convergence neither implies necessarily a reduction in regional disparities nor does it contradict with trends of increasing disparities.

The present study has examined the phenomenon of convergence of per capita income to steady states across the four provinces of Pakistan with rural-urban splits over the period from 1979 to 2005. We could not find any evidence of absolute convergence for the entire time span of 26 years from 1979 to 2005 except for the period 1979-88, when the signs of regional convergence could be observed. However the trend could not continue thereafter, rather the symptoms of divergence were observable for the period 1998-2005. Put differently, the absence of absolute convergence predicts an increase in disparities over time across regions. On the other hand, a strong evidence of conditional convergence could be observed. The findings imply that differences in the socio-economic conditions prevailing across the political entities are crucial and responsible for economic disparities to persist. Pakistan has been undergoing substantial structural changes in recent years, so the steady state determinants also changing constantly.²²

²⁰ We do not report the detailed results for space constraints, which may be provided on request.

²¹ According to Population Census Report (1998), Economically Active Population is 29.4 millions out of total population 132.4 millions. The report also indicates that only one third of the population 10 years and above in Pakistan is economically active which is very low.

²² These changes might be in response to the aftermaths of 9/11 event that have drastically upset the geo-political environment in Afghanistan and Pakistan. The US intervention has resulted into massive

The differences in social, cultural and political behaviours across the four provinces of the federation are natural and can be easily understood. However, the prevalence of abject poverty and gross inequalities over the long run, both across the regions and within the regions in rural-urban bifurcation, is posing problems. This situation needs serious attention and calls for immediate remedial measures, failing which the dangerous sense of deprivation will continue to develop and lead to political instability. Economic theory predicting convergences across regions subject to fulfilment of certain assumption can help in this regard. The growth rate of a region is affected by both the distance from the steady state and the shift in the steady state itself. There are sufficient evidences that the important part of growth process is not convergence to steady state level per se, rather the factors responsible for determination of steady state equilibrium are more important. If any public policy can shift the steady state level of income per capita, then the growth rate of that region should also accelerate. Alternatively, all the regions can converge to some common steady state equilibrium (and thereby economic disparities removed) if and only if the differences in the factors responsible for the steady state level of income across the respective regions could be minimised somehow via appropriate public policies.

Special efforts are therefore needed to enhance investment, not only in physical infrastructure but also in the social sector and human capital, to improve the conditions of living in targeted parts of the country, which were either ignored in the past or remained lagging on the path to prosperity for one reason or the other. In particular, special attention is needed to improve the efficiency of labour and to generate more employment opportunities in the relatively poorer rural regions. "Regional prosperity implies strengthening of the federation" can be considered as a simple rule of thumb. High GDP growth is meaningless if does not reduce the sufferings of masses. Further research is needed to identify the peculiar determinants of growth, keeping in view the socio-political circumstances prevailing in different regions of the country.

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