Testing Club Convergence across Pakistan's Districts by Using a Household Welfare Index

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Abstract: *The study of club convergence has taken center stage in the literature on economic growth and development over the last three decades. GDP per capita has usually been employed as a proxy for the measurement of national welfare in studies of convergence in living standards across regions. The analysis is based on an augmented household welfare index for measuring household living standards through convergence and the clustering technique proposed by Phillips and Sul (2007). The index is composed of five indicators of household welfare. Using principal component analysis, the indicators are aggregated to get a final household welfare index. Overall, the findings of the study reject the hypothesis that all districts of Pakistan converge to a unique equilibrium state regarding the household welfare index. When club convergence was tested, five convergence clubs and one group of divergent districts were discovered. The findings show that there is not a uniform living standard across all districts, and thus, policies need to be designed to lessen these spatial disparities.*

**Key Words:** Household Welfare Index, Club Convergence, PCA

Background

The convergence or divergence problem across regions in the developing world has been paid less attention in the literature on development. This is most likely a result of our propensity to view developing nations as a single, homogeneous economic, social, and political entity. Convergence identification is a key issue for developing countries like Pakistan. One of the key objectives of Pakistan's planning has been shrinking regional inequalities across the country. In all the plans, more attention has been given, and the fears for territorial imbalances in development have been described in the country's programs and policies. The primary focus of the Vision 2025 objectives is more rapid and inclusive growth, which acknowledges the need to design more inclusive growth in the form of outcomes of growth running to those groups of people who have recently been marginalized by high rates of economic development reached.

Despite a variety of social, economic, and political obstacles that the nation and the world have faced during the past 20 years, Pakistan has experienced extraordinary economic development following reforms and free trade. Pakistan's GDP went up from $82.69 Billion in 2000 to $346 Billion in 2021, representing more than four times the rise in two decades (see Figure 1).

Figure 1

Annual GDP (billion US dollars) 2000-2019
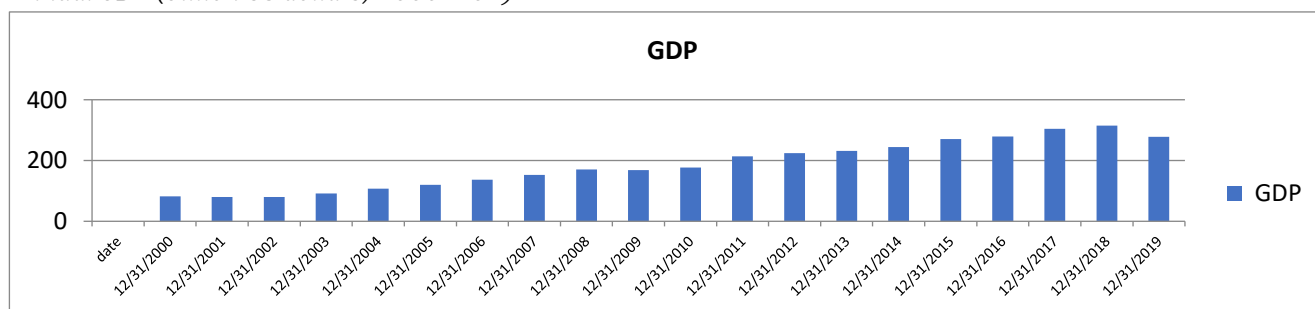
Data Source: Pakistan Economic Survey

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Moreover, the per capita income of the country showsa times increase in the income level (see Figure2). As the per capita income of Pakistan was just around 570 US$ in 2000, that is now around $1,538 US$ in 2021. In the last two decades, the economic growth of Pakistan rates revealed significant variations: both remarkable and poor growth rates were experienced by the economy. Over the previous two decades, the country has been able to sustain a generally respectable average GDP growth rate of roughly 4.6% (See Figure 3).
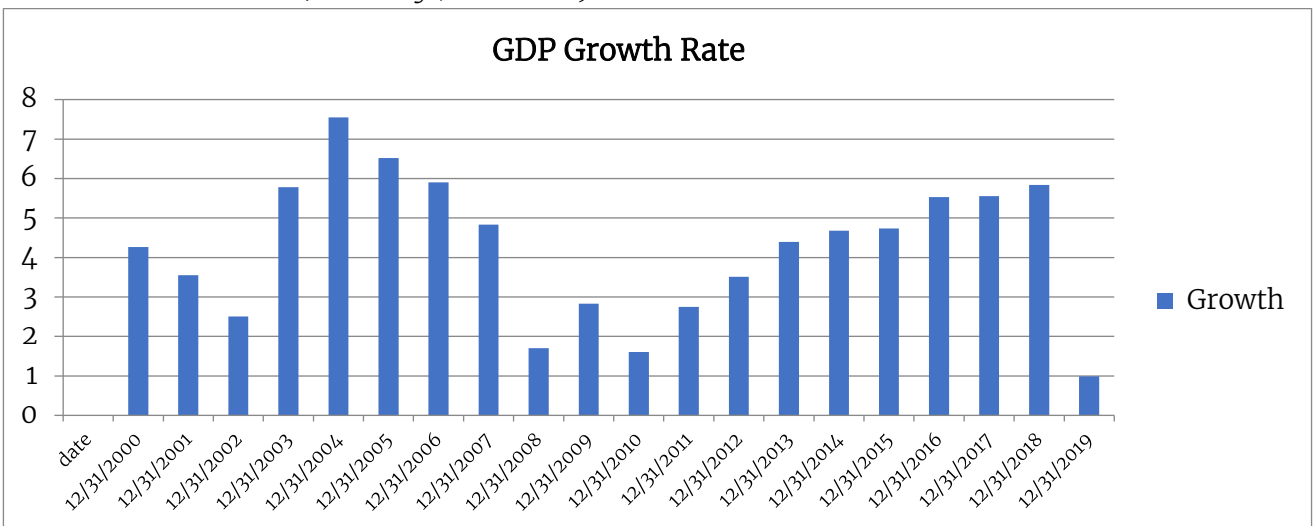
Figure 2

Annual GDP per Capita (billion US dollars) 2000-2019
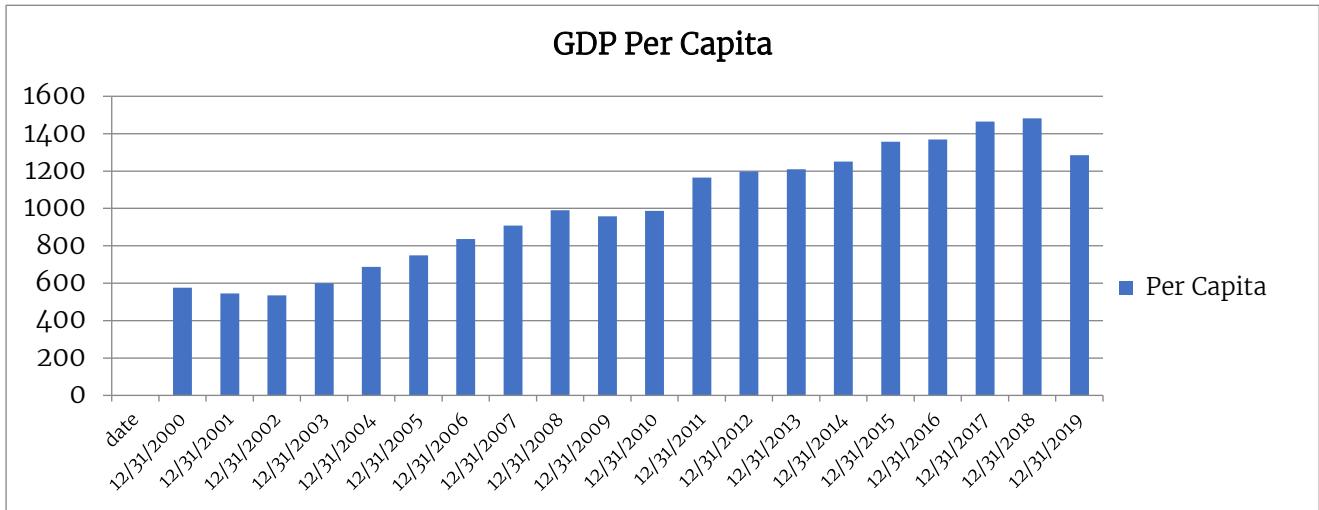
Source: Pakistan Economic Survey

Figure 3

Annual GDP Growth Rate (Percentage) 2000-2019

Data Source: Pakistan Economic Survey

From the above figures, it is clear that Pakistan has experienced economic development in the last two decades. However, Pakistan is still facing the upsetting test of overcoming its uneven regional development. Pakistan's growth path has resulted in uneven social and economic development, particularly in terms of public service delivery Easterly (2003).Therefore, in order to achieve more inclusive regional growth, it is essential that the advantages of growth be distributed fairly throughout all regions of the country.

The following sections make up the remainder of the study. After the introduction in Section 1, Sections 2 and 3 present the literature and discuss the technique and data, respectively. Section 4 explains the findings and discussion, and Section 5 discusses the conclusion and its implications for policy.

Literature Review

The second section talks about the theoretical literature and empirical evidence relating to the issue of spatial inequality. The section is further divided into two sub-sections. Sub-sections further comprise theoretical literature and empirical evidence of the study.

Theoretical Literature

The neoclassical model of growth developed by Solow (1956) has attracted the attention of the majority of researchers on the subject of economic growth and development. Solow modified the Harrod-Domar model in 1956 by including labor as a factor of production, thus completing the equation for growth. He contends that, over time, as each economy achieves its balanced growth path, there will be less disparity in real per capita income between developed nations as a result of technical progress. In other words, it indicates that as long as the structural characteristics of countries remain the same, the income levels of these economies will converge to the same steady state regardless of the initial level of income Barro and Sala-i-Martin (1992). This situation is referred to as absolute convergence. Since the Solow model believed that growth was exogenous, it was unable to explain how these economies would be able to maintain a steady state.

The failure of the neo-classical model in the explanation of steady-state growth leads to various types of new models.Contrary to the neoclassical model, the theories of endogenous growth Romer (1986), Lucas Jr (1988), Aghion et al. (1998), institutional theory Zetterström et al. (1992) and Nelson (1993), the new economic geography Krugman (1991) and Venables (1999) have a tendency to agree with the essential statement of Myrdal and Sitohang (1957)that growth is a growing spatial practice that results in higher disparities. One type of growth theory Azariadis and Drazen (1990), Chatterji (1992), Barro and Sala-i-Martin (1992), David (1994), Durlauf and Johnson (1995), Quah (1996), Azariadis (1996) and Galor (1996) believe that while having roughly equivalent structural characteristics (such as production technology, preferences, governmental regulations, etc.), It is still possible for economies with various initial conditions to converge to various steady-state equilibria. A common, balanced growth path can only be predicted among a group of comparable economies if their initial conditions are also comparable. As a result, it is asserted that countries with economies that are nearly at the same steady-state equilibrium are members of the same convergence club Galor (1996).

Baumol and Wolff were the first to define the idea of club convergence at the end of the 1980s. According to Chatterji (1992), the existence of a convergence club suggests that different regions have transitioned to a long-term stable state with the same per capita income. In 1996, Quah developed the club convergence hypothesis at the national level. He established a method (not based on a theoretical model) designed for modeling the dynamics of cross-sectional distributions of economies. According to Quah, there is no trend of economic convergence among economies because the per capita income has developed into a twin peak distribution at the global level.

Empirical Literature

Empirical studies on the convergence club hypothesis have reached various outcomes concerning the quantity and features of groups, particularly influenced deeply by the methods employed. By using a simple non-linear model, a high-income convergence club and a low-income divergence club were identified by Wolff and Baumol in 1988. In 1992, Chatterji announced the existence of two mutually exclusive convergence clubs. One is made up of wealthy nations and the other of poorer ones. Using per capita income as a development indicator, Quah (1993) employed regression tree analysis to investigate the club convergence hypothesis for 105 nations between 1960 and 1990. He noticed a twin peak that was expanding and dividing the country into two distinct socioeconomic categories.

Durlauf and Johnson (1995) employed regression tree analysis to determine club convergence for 121 countries. According to their research, the expansion and variability of the available human capital have an impact on how clubs are formed. By creating models for club convergence, Galor (1996) extends the notion that there might be numerous steady-state equilibria. Despite his claim that various sets of equilibria do not converge, he agreed that, over the long run, countries with similar characteristics tend to move towards a single steady-state equilibrium.

Individual heterogeneity, economic transition, economic structure, and convergence path were all problems that could not be solved with the approaches taken in the aforementioned research on the club convergence phenomena. Phillips and Sul (2007)examined the significance of variation across time and economies in the transitional dynamic of economic growth. They also introduced a novel method for grouping panels into club convergence groups. Numerous researches on economic convergence have been conducted since Phillips and Sul (2007), a few of these studies are discussed below.

According to a study done in Turkey by Aksoy and colleagues, from 1987 to 2017, convergence clubs existed in every NUTS-III area. They discovered five clubs between 1987 and 2001 and six clubs between 2004 and 2017 for the second era. Tian et al. (2016) looked at 31 Chinese provinces' regional income convergence between 1978 and 2013. They made a distinction between the two convergence clubs and claimed that human capital, openness, and investment increase the likelihood that a region will be a member of the high-income club.

Li et al. (2018)carried out a comparable study using data from 2286 regions in China between 1992 and 2010. They concluded from their investigation, which revealed six convergence clubs, that population density, industrialization, and per capita fixed assets had all contributed to the emergence of new convergence clubs. Mendoza-Velázquez et al. (2020) used a time-series approach while taking into account temporal and transitional variability to analyze the convergence trends in income per capita throughout the Mexican states from 1940 to 2015. According to the findings, the hypothesis regarding convergence among Mexican states was rejected. For both regional inequality and income per capita, club convergence was observed as opposed to overall convergence.

Between 1990 and 2005, Bartkowska and Riedl (2012) examined the per capita income construction of convergence clubs among 206 European regions. They discovered the presence of these clubs, which indicated that European regions constitute five distinct clubs that all follow their own steady states. Using provincial data for China from 1985 to 2000, Hao (2008) assessed the convergence club. According to his research, the Chinese regions are divided into two categories, each of which has convergence clubs that show distinct growth patterns.

The above-mentioned empirical research showed that per capita GDP is the only measure commonly used in studies on convergence clubs. Recently, the notion of club convergence has been extended to include the analysis of convergence among economies by using development indices. The studies that follow are a few of them.

Basel et al. (2021) analyzed the convergence club based on an augmented index to measuredevelopment in 102 countries. Seven important development indicators are included in the index, including ones related to energy use, living standards, access to water and sanitation, the environment, education, health, and good governance. The study examined the emergence of clubs in 102 countries between 1996 and 2015 and confirmed the existence of four final convergence clubs.

Montan et al. (2018) examined the convergence proposition for Spain for the time periods 1980-2007 and 1980-2014 using the income and human development index. The analysis came to the conclusion that there were fewer clubs between 1980 and 2014, demonstrating how the Great Recession lessened regional differences. Szendi (2014) investigated the HDI in the countries of the world from 1990 to 2010 to analyze the development from economic and social aspectsusing beta convergence of HDI and its clubconvergence. The results analyzed small economic and social convergence. The convergence clubs also support the prevailing tendencies of the world in the aspect of regional differences and the global center-periphery theory.

Despite the abundance of literature in the world, economists and development researchers have not focused on club convergence at the district level in Pakistan. This research empirically investigates the issue of distinct districts converging to diverse stable states throughout Pakistan and the emergence of "convergence clubs," as some experts in the growth literature hypothesized (Baumol, 1986; Durlauf, 1995; and Galor, 1996).

Data and Methodology

Data and Variables Description

District-level data for the indicators of household welfare is collected from six PSLM Surveys. The detail of indicators used to compute the household welfare index is given in Appendix 1. Although these surveys covered data for 116 districts across four provinces of Pakistan, 19 districts were dropped from the data due to missing observations. The list of the dropped districts is given in Appendix2.

The dissimilarity between geographical units is conceptually characterized in terms of living standards. On the other hand, from an empirical and practical perspective, GDP per capita has been the main proxy variable for determining living standards in the majority of the literature. Economists are increasingly aware that it is a flawed indicator of welfare since it does not take into account the full range of human well-being, which is much more than what income growth rates can captureSen (1983), Goossens,(2007) Todaro (2011) Schepelmann et al.(2010) Fleurbaey and Blanchet (2013), Stiglitz et al (2019). In this context, numerous alternatives have been put forth in this situation by both economists and non-economists Becker et al. (2005), Cordoba and Verdier (2008) and Fleurbaey and Gaulier (2009). In recent growth literature, renowned economist Xavier Sala-I-Martin has proposed that convergence can be applied in the case of human development Roy (2009). We, therefore, attempt to estimate the household welfare index for 97 districts in Pakistan between 2004 and 2015 by analyzing the convergence club based on the augmented home welfare index. The household welfare index consists of five variables. Weights from Principal Component Analysis (PCA) are used to combine these indicators Basel et al. (2021) (Basel et al., 2020).

Econometric Methodology

In this section, we examine the approach outlined by Roy (2009), Phillips and Sul (2007) (hence referred to as PS) for identifying any convergence clubs and assessing convergence in a panel of districts. The log t-test suggested by PS is used in this study to examine the convergence of the household welfare index among districts of Pakistan. As it endogenously groups regions with comparable characteristics into exclusive clubs, the method is empirically sound.The logt test is important because it does not make any assumption about the trend or stochastic non-stationarity of the relevant variable or the common components in the panel across individuals Aksoy et al. (2019).

The methodology is dependent on a pioneering disintegration of the variable of concern. Panel data are generally decomposed in the following manner:

$$log y_{it} = \emptyset_i u_t + \varepsilon_{it} \quad (1)$$

Whereu_t signifies the common factor, φ_i symbolizes the component of unit characteristic, and ε_{it} represents the error term. On the other side, in the pattern applied here, the log of income per capita, log y_{it} has a time-varying factor depiction that might result from the representation of typical panel data:

$$log y_{it} = (\emptyset_i + \frac{\varepsilon_{it}}{u_t})u_t = \delta_{it} u_t \quad (2)$$

Where δ_{it}absorbs the error term and hence the unit-specific factor signifying the distinctive fraction that differs over time. Whereas the first model tried to reveal the manners of the individual *log y_{it}*by the common factor μ_t and two unit characteristic components, φ_i, and ε_{it}, the second method looksto explain per capita income by calculating the share (δ_{it}) of the common growth path (u_t) that country *i* undertakes. So as to model the transition coefficients δ_{it}, a relative transition coefficient, h_{it}, is built:

$$hit = \frac{log y_{it}}{N^{-1}} \sum_i^N = log y_{it} = \frac{\sigma_{it}}{N^{-1}} \sum_{i=}^N \sigma_{it} \quad (3)$$

So, h_{it} stands for the transition path of economy *i* relative to the cross-section average and has a dual understanding: first, it determinesthe behavior of individual regions in relation to other regions, and second, it portrays the relative disappearance of region *i*from the common growth path μ_t. In the case of convergence, that is, when all regions move in the direction of the identical transition path, $h_{it} \rightarrow 1$ for all *i* as $t \rightarrow \infty$. Afterward, the cross-sectional variance of h$_{it}$, indicated by $V^2_t = N^{-1} \sum_i (h_{it}-1)^2$, converges to zero. There are various possible conclusions in the case of no convergence. For example, V_t might converge to a

positive number, which is an attribute of the convergence club, or remain restricted above zero and not converge or diverge.

In order to discover the null hypothesis, Phillips and Sul (2007)model δ_{it} in a semi-parametric form:

$$\delta i = \delta i + \frac{\sigma i\, \xi it}{L(t)t^\alpha} \quad (4)$$

Where δ_i is fixed, σ_i is an idiosyncratic scale parameter, ξ_{it} is iid(0,1), L(t) is a function varying slowly (such that L(t) →∞ as t →∞), and α is the decay rate.

The following is an explanation of the convergence null hypothesis:

$$H0 : \delta i = \delta \text{ and } \alpha \geq 0 \quad (5)$$

It is tested against the alternative $H_A{:}\delta_i{\neq}\delta$ for all *i or α< 0*. Keep in mind that under the null hypothesis of convergence, other transitional models of regions i and j are visible, including momentary divergence, which refers to times when i and j diverge. Because stationarity tests (see Hobijn and Franses (2000) fail in the case of transitory divergence, the method proposed by Phillips and Sul (2007) succeeds in identifying convergence even in this situation. The convergence proposition is incorrectly denied because stationary time series techniques are unable to identify the asymptotic co-movement of two-time series.

Taking into account Eq. (4), Phillips and Sul (2007) explain that the cross-sectional variance of hit has the limiting form under convergence.

$$Vt^2 \sim \frac{A}{L(t)^2 t^{2\alpha}} \text{ as } t \to \infty \text{ for some } A > 0 \quad (6)$$

The following convergence test based on regression can be deduced:

$$\log\left(\frac{v1^2}{vt^2}\right)- 2 \log L(t) = \alpha + b\log t + u_t$$

$$For\ t = [rT], [rT] + 1, \dots, T \quad (7)$$

Where generally rϵ(0, 1) and *L(t)* are function varying slowly. Phillips and Sul (2007), based on Monte Carlo simulations, suggest utilizing *L(t)=log t* and *r=0.,* for sample sizes below *T=50*. At last, by means of $\hat{b}$ = 2α, a one-sided t-test robust to autocorrelation and heteroskedasticity is applied to test the disparity of the null hypothesis $\alpha \geq 0$.

If $t\hat{b} < -1.65$ (1% significance level)

The null hypothesis is negated in that case.

The four steps of the test can be summed up as follows. Units are first organized in descending order with respect to the most recent period in the group's time series dimension. The log t-test is then used to create a club convergence. Additionally, this is accomplished by adding each district one at a time to the set of the two regions with the highest income at the beginning and running the t-log test until the $t\hat{b}$ value for this set is greater than –1.65. The log t-test is then performed once more for this set on each of the units still in the sample to determine whether they have converged. If not, the first three stages are applied to the remaining units. If no clubs are formed, it can be concluded that those economic units diverge.

Empirical Findings and Conclusion

This section discusses the outcomes for club convergence of household welfare index across districts of Pakistan. To investigate the convergence hypothesis and identify the convergence club, we applied the method suggested by Phillips and Sul. We first test the household welfare index's convergence across the entire sample. In the beginning, we performed the log t regression across 97 districts from 2004 to 2015. Table 1 presents the results obtained from the test. Because the value of the t-statistic is less than –1.65 and is statistically significant at 1%, the convergence hypothesis is rejected for the whole sample. As a result, we move on with club identification.

Table 1

Full Convergence Test

Variable	Coefficient	T-stat
log(t),	–1.2673	–26.3889

Note: Null hypothesis of convergence is rejected at the 1% level

Given the rejection of whole sample convergence, we move on to find out the formation of convergence clubs. For a given set of data, we use "Phillips-Sul methods of club Clustering" to identify clubs. The results of the club identification are shown in Table 2. Given that t-statistics is bigger than -1.65, the results demonstrate the household welfare index across 97 districts first converged to nine clubs. Attock and Khuzdar join the non-converging category.

According to Phillips and Sul, the convergence process may overestimate the real number of clubs. To deal with this issue, we evaluate merging adjacent clubs into larger clubs by applying club merging tests. All club pairs are subjected to a *log t*-test, and if the convergence hypothesis is jointly satisfied, the clubs may be combined to form a new club. The results of club merging are shown in Table 2.

Table 2

Convergence Club Classification

Initial Classification	No of districts	*log t*	Test of club merging	*logt*	Final Classification	No of districts	*logt*
1st Club	5	0.111 (0.527)	Club 1 + Club 2	0.1068 (0.5152)	1st Club	15	0.029 (0.150)
2nd Club	6	0.107 (0.498)	Club 2 + Club 3	0.0653 (0.3237)	2nd Club	37	-0.236 (1.643)
3rd Club	4	0.398 (1.529)	Club 3 + Club 4	0.0358 (0.1898)	3rd Club	25	0.041 (0.229)
4th Club	18	0.304 (1.264)	Club 4 + Club 5	0.2558 (1.1344)	4th Club	15	0.093 (0.49)
5th Club	4	0.395 (1.510)	Club 5+ Club 6	0.0464 (0.2388)	5th Club	2	0.381 (1.801)
6th Club	15	0.214 (0.963)	Club 6 + Club 7	-0.3150 (-2.9777)	6th Group	3	-1.315 (-20.95)
7th Club	25	0.041 (0.229)	Club 7 + Club 8	-0.5017 (-4.8462)			
8th Club	15	0.093 (0.497)	Club 8+ Club 9	-0.9798 (-17.36)			
9th Club	3	0.381 (1.801)	Club 9 + G~ 10	-1.2671 (-21.965)			
10th Group	2	-1.315 (-20.953)					

Note: The t-statistics are in parenthesis.The tilde symbol represents the non-converging group.

The above club merging outcome confirmed that there is a convergence between the four groups. The first, 2nd, and 3rd clubs merged to form a club of 15 districts, while 4th, 5th, and 6th clubs merged to form a club of 37 districts. The 7th and 8th merged to form a club of 11 districts. After convergence between four groups, the final club classification shows seven convergence clubs and one divergent group. The final club classification result is presented in Table 3.

Table 3

FinalConvergence Clubs

Clubs	No of Districts	Districts
Club 1	15	Islamabad, Rawalpindi, Gujranwala, Gujrat, Sialkot, Hafizabad, Lahore, Sheikhupura, Hyderabad, Karachi, Malakand, Peshawar, Charsada, Nowshera, Swabi

Club 2	37	Sargodha, Khushab, Jehlum, Chakwal, Faisalabad, Kasur, Okara, T.T.Singh, MandiBahuddin, Narowal, Sahiwal, Multan, Khanewal, Sukkur, Ghotki, Larkana, Lower Dir, Shangla, Chitral, Kohat, Bonair, Karak, Hangu, Mansehra, Dadu, Swat, Upper Dir, Abbottabad, Batagram, Haripur, Mardan, Quetta, Pashin, Sibbi, Ziarat, Zhob, Musa Khel
Club 3	25	Mianwali, MuzaffarGarh, Jhang, Lodhran, Vehari , Pakpatten, Bahawalpur, Bahawalnager, Rahim Yar Khan, Layyah, Khairpur, ShaheedBenazirabad, NowsheroFeroze, Jaccobabad, Shikarpur, Sanghar, Mir PurKhas, D.I.Khan, Tank, Bannu, LakkiMarwat, Kalat, Kharan, Lasbilla, Nasirabad
Club 4	15	Bhakhar, D.G.khan, Rajanpur, Badin, Thatta, Kohistan, Qilla Abdullah, Mastung, Gwadar, Loralai, Barkhan, QillaSaifullah, Jafarabad, JhalMagsi, Bolan
Club 5	2	Tharparkar, Chaghi, Awaran
Group 6	3	Attock, Khuzdar

The final club classification revealed five convergence clubs and one divergent group. The first club is represented by Islamabad, Rawalpindi, Gujranwala, Gujrat, Sialkot, Hafizabad, Lahore, Sheikhupura, Hyderabad, Karachi, Malakand, Peshawar, Charsada, Nowshera, and Swabi. The second is the integration of Sargodha, Khushab, Jehlum, Chakwal, Faisalabad, Kasur, Okara, T.T.Singh, MandiBahuddin, Narowal, Sahiwal, Multan, Khanewal, Sukkur, Ghotki, Larkana, Lower Dir, Karak, Shangla, Bonair, Kohat, Chitral, Hangu, Mansehra, Dadu, Swat, Upper Dir, Abbottabad, Batagram, Haripur, Mardan, Quetta, Pashin, Sibbi, Ziarat, Zhob and Musa Khel.

The third club comprises Mianwali, Jhang, Vehari, Pakpatten, Lodhran, Layyah, MuzaffarGarh, Bahawalpur, Bahawalnager, Rahim Yar Khan, Khairpur, ShaheedBenazirabad, NowsheroFeroze, Jaccobabad, Shikarpur, Sanghar, Mir PurKhas, D.I.Khan, Tank, Bannu, LakkiMarwat, Kalat, Kharan, Lasbilla, and Nasirabad. The fourth club encompasses Bhakhar, D.G.khan, Rajanpur, Badin, Thatta, Kohistan, Qilla Abdullah, Mastung, Gwadar, Loralai, Barkhan, QillaSaifullah, Jafarabad, JhalMagsi, and Bolan. The fifth club consists of Tharparkar, Chaghi, and Awaran. The last group comprising non-converging districts encompasses Attock and Khuzdar.

Figure 4
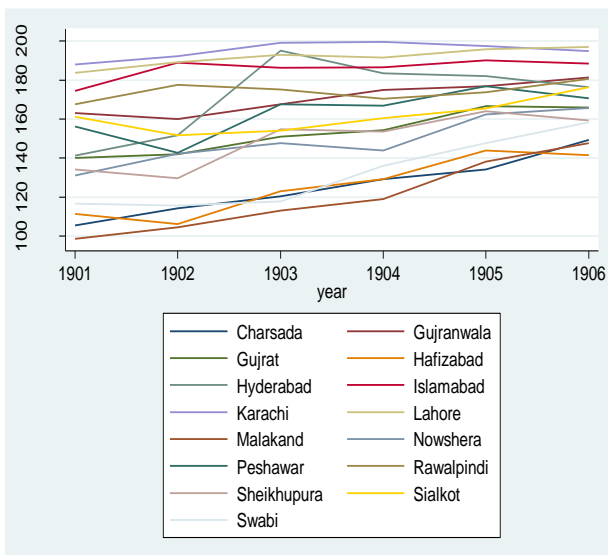Relative convergence within Club 1

Figure 5
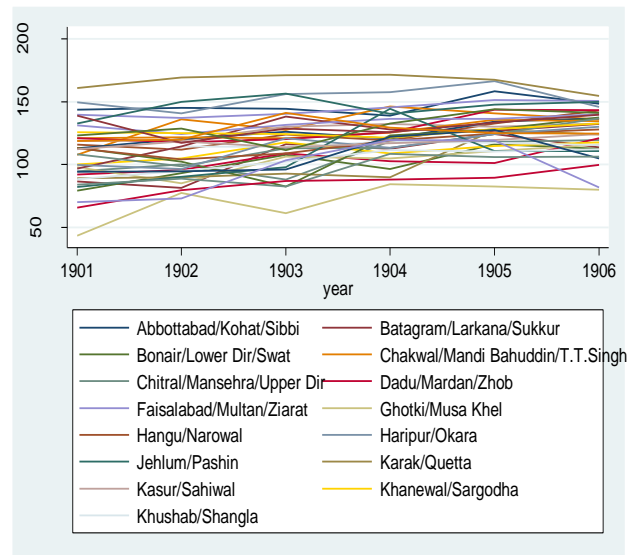Relative convergence within Club 2

Figure 6
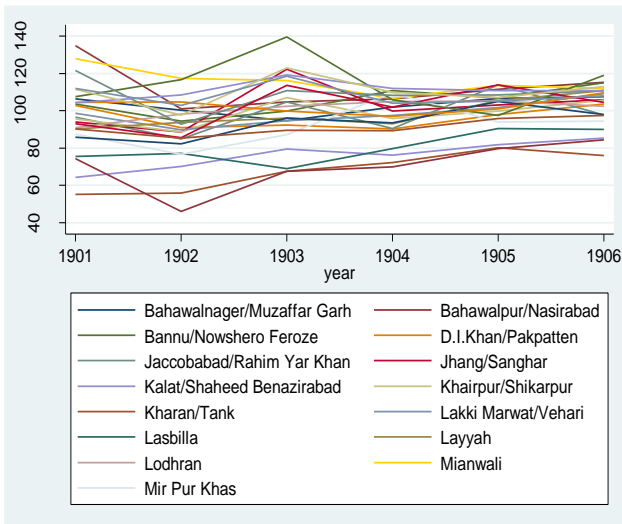*Relative convergence within Club 3*

Figure 7
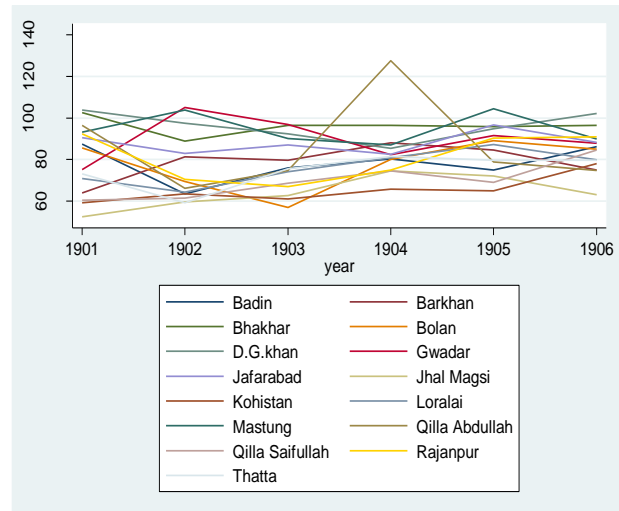*Relative convergence within Club 4*

Figure 8
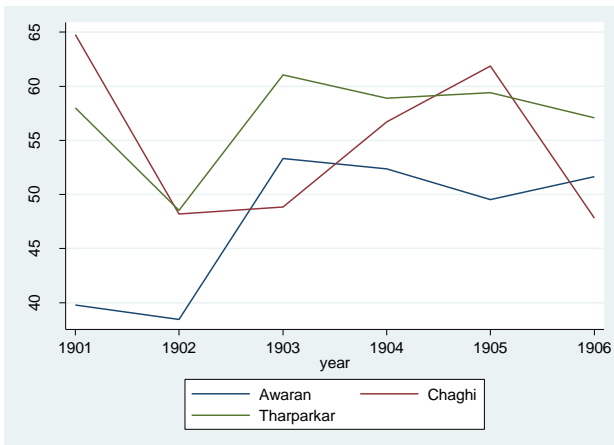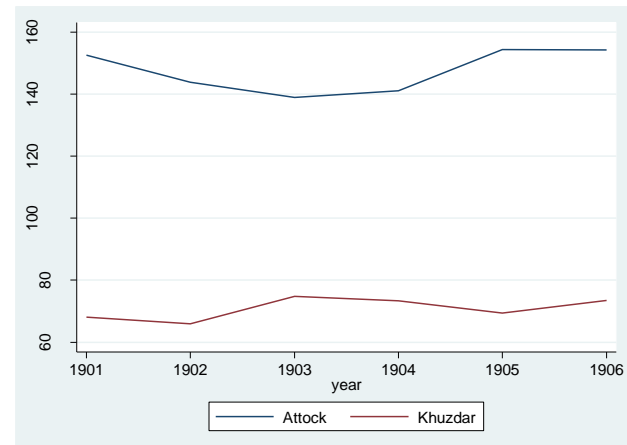*Relative convergences within Club 5*

Figure 9
Non-Converging Group

The aforementioned six figures depict the respective transition pathways for each of the five convergence clubs and one diverging group. Districts in Club 1 as a whole have greater household welfare levels than those in other clubs. However, as shown by the greater estimate of the coefficient and demonstrated by Fig. 5 in comparison to other figures, Club 5's members are achieving convergence at a faster rate than those of the other clubs.

The above-mentioned club results and figures clearly indicate that there is no convergence among districts of Pakistan, as the districts are classified into five different convergence clubs and one diverging group. The districts with the same household welfare index levels are classified within the same group, while the districts with the highest and lowest household welfare Index don't merge with any club and are classified as a non-converging group.

Conclusions

The convergence club idea has been the center of economic growth and development for the last three decades. A new class of models, including theories of endogenous growth Romer (1986), Lucas Jr (1988), Aghion et al. (1998), institutional theory Zetterström et al. (1992) and Nelson (1993), and the new economic geography, were developed as a result of Solow (1956) model's failure to explain steady-state growth Krugman (1991) and Venables (1999). These ideas agreed with Myrdal and Sitohang (1957) fundamental claim that growth is a developing spatial practice that increases inequities.One type of growth theory Azariadis and Drazen (1990), Barro and Sala-i-Martin (1992), Chatterji (1992), David (1994), Durlauf and

Johnson (1995), Quah ([1996](#)), Azariadis ([1996](#)) and Galor (1996)describe how differing initial conditions can lead to different steady-state equilibria in economies that share the same structural characteristics (such as production technology, preferences, government policies, etc.). As a result, only if the initial conditions of a set of comparable economies are also comparable, then a common balanced growth path is predicted. As a result, it is asserted that countries with economies that are nearly at the same steady-state equilibrium are members of the convergence club Galor ([1996](#)).

The study investigated the formation of a convergence club in Pakistan's districts over the period 2004-2015 for the human welfare index. Instead of using conventional measurements like per capita GDP, the research bases its analysis of the convergence club hypothesis on broader characteristics of household welfare and living standards. This is accomplished by using the augmented household welfare index, which consists of five indicators. The weights from Principal Component Analysis (PCA) are used to aggregate the indicators. Convergence clubs are studied using the methodology developed by Phillips and Sul. The results showedthat as opposed to overall convergence, club convergence is identified for household welfare across districts of Pakistan. One divergent group and five convergence clubs were found, according to the findings. The existence of fiveconvergence clubs supports the view that human development is not uniformly distributed across districts of Pakistan, and thus,there is a need to design policies that could reduce regional inequalities in household living stands across districts of Pakistan.

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