CONVERGENCE ANALYSIS OF REGIONAL DEVELOPMENT

Hurriyat Khudaykulova

Chief expert, the State Committee of the Republic of Uzbekistan on statistics Freelance researcher (PhD) at TSUE

Abstract. In these studies, attention is paid to convergence in the socio-economic development of regions and in the analysis of their change, economic aspects come to the fore. The evolution of regional disparities is studied using convergence methods; σ-convergence and β-convergence.

Keywords: regional disparities, GDP per capita, β-convergence, σ-convergence
JEL classification: C0, C5, R15

Introduction

The evolution regional disparities in Uzbekistan is studied using convergence methods on the GDP dynamics in the years 2010-2018.

The present investigation is exclusively based on secondary data sources. The data is extracted from the database of the State committee of Uzbekistan on statistics.

In regional development analysis, there arises the question of whether economic development was accompanied by any significant changes in regional disparities. To determine the tendency of change in this respect, use is made of methods of convergence analysis.

Methodology

Regional convergence means a tendency of the level of gross regional product per capita to equalise over time. An opposite phenomenon is termed divergence (Czyż and Hauke, 2011).

In the present article use is made of the classic methods of convergence analysis: σ-convergence and β-convergence.

σ-convergence is measured as the variance of regional per capita income given by the formula (Rahul Srivatsa & Stephen, 2010):

$$\sigma_t = \sqrt{(\frac{1}{N-1}) \sum_{t=1}^{N} [\log(y_{it}) - \log(\overline{y}_t)]^2} \quad [1]$$

where: y_{it} - gross regional product per capita in region i in the year t; y_t - GDP per capita in the year t; N - number of regions.

There is σ-convergence in the regional system when the time sequence of the σ_t^2 values is decreasing.

β-convergence is interpreted as a process of narrowing of inter-regional differences in which regions lagging behind in development display a faster growth rate than advanced ones. β-convergence is determined on the basis of the formula(Andrew et.al.,2008):

$$\ln(y_{i,t}/y_{i,t-T}) = \alpha + \beta \ln(y_{i,t-T}) - u_{i,t}) \quad [2]$$

where: $y_{i,t}$ – regional per capita GDP in region i in the year t; $u_{i,t}$ - random error;
T - number of years from the initial to the final one.

β-convergence occurs when, in a regression equation of the mean annual increase in gross regional product per capita from its initial level, the coefficient of regression β is statistically significant and negative (Czyż and Hauke,2011).

Results and discussions

Using equation of σ-convergence in the analysis, regional differences in the successive years of the period 2010-2018 are measured by the variance of per capita GDP. The variance figures form decreasing sequence, with some fluctuations, and display a downward tendency in regional disparities. The curve of variance describes the evolution of regional differences between 2010 and 2018 (fig.1). On the basis of its shape, one can discern fluctuations and their corresponding subperiods in the pattern of change in regional disparities: a steep decrease in disparities in the years 2010-2011, another slow decrease in 2011–2016, their slight increase in 2016–2017, and fast increase in 2017–2018. It is worth noting that the curve of variance of GDP per capita plotted for 13 regions without capital city-Tashkent also shows evidence of an increase in regional disparities in recent years.

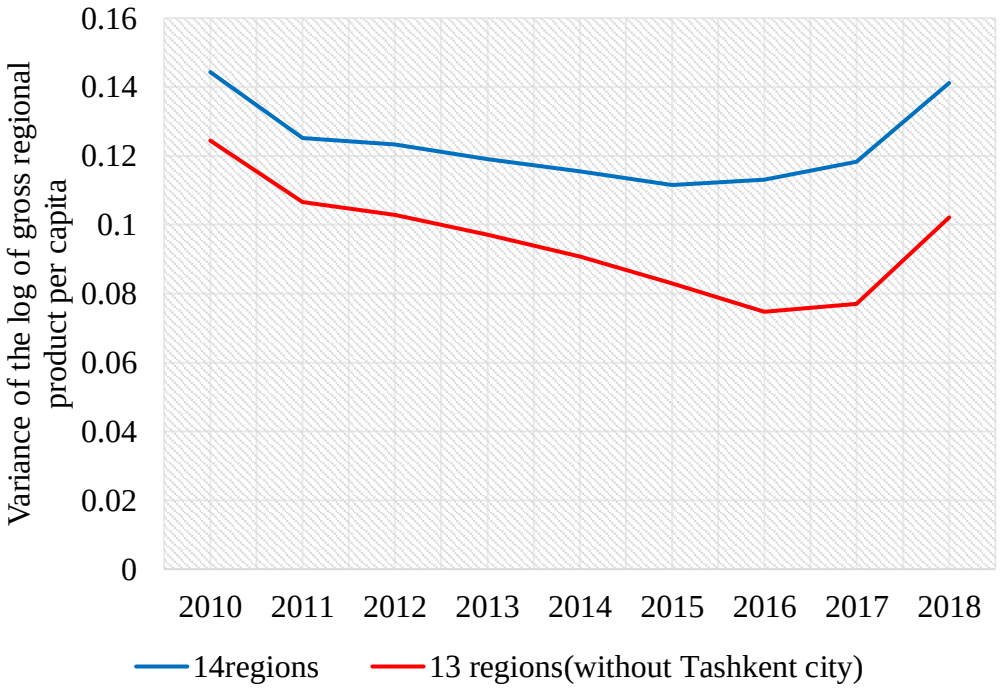

Fig.1. σ-convergence (2010-2018)

Using equation of β-convergence in the analysis, a study is made of the dependence between the dynamics of change in GDP per capita figures over the years 2010-2018 and this index at the start of the period, i.e. in 2010. The estimation of the model of β-convergence leads to an equation of the form:

$$y=8{,}71-5.56*x\ ,\ R^2=0.52,\ \text{significant at } \alpha = 0.43$$

where: y – log of the mean annual increase in gross regional product per capita, and x – log of gross regional product per capita, in 2010.

The goodness of fit of the model is poor. The regression coefficient β = -5.56 is high enough and negative, which shows a presence of β-convergence.

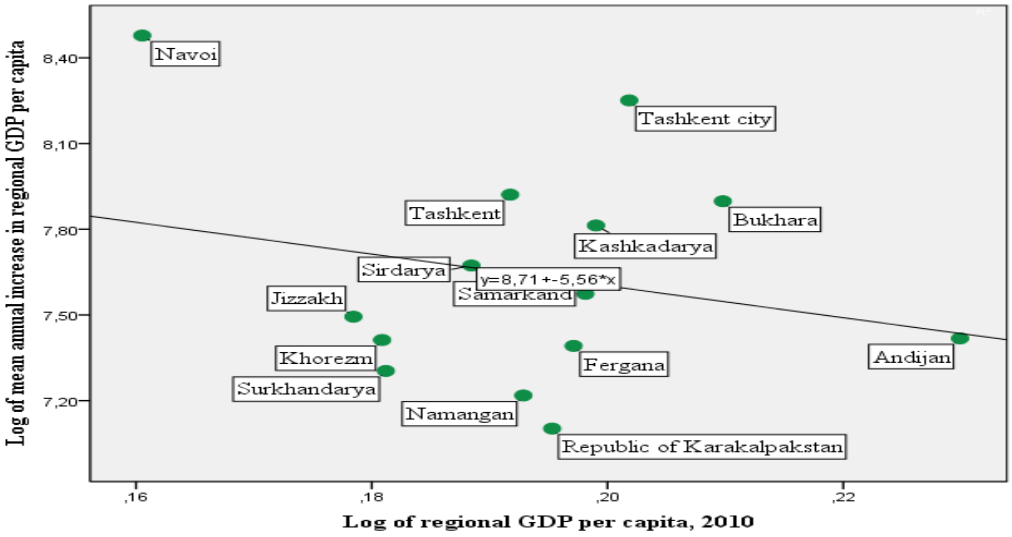

Fig.8. β-convergence (2010-2018)

The diagram of the regression equation is a downward curve, which even means the convergence, i.e. a stronger growth rate of GDP per capita in regions of low gross regional product per capita than in those with a relatively high initial gross regional product per capita.

Conclusion

The results obtained using the σ- convergence methods are found to indicate decrease in regional differences in the years in the years 2010-2016, a steady increase in 2016-2018 and according to the results of β-convergence analysis, the differences in the development of the regions of the Republic of Uzbekistan in GDP per capita in 2010-2018 are slightly eliminated.

While Beta-convergence focuses on detecting possible catching-up processes, Sigma-convergence simply refers to a reduction of disparities among regions in time. The two concepts are closely related.

REFERENCES:

1. Andrew, T., Young Matthew, J. and Higgins Daniel, L. (2008), "Sigma Convergence versus Beta Convergence: Evidence from U.S. County-Level Data", Journal of Money, Credit and Banking, Vol. 40, No. 5, pp. 1083-1093
2. Czyż, T., Hauke, J. (2011), "Evolution of regional disparities in Poland", Quaestiones Geographicae, Vol. 30 No.2, pp. 35–48
3. Henley, A., (2005). "On regional growth convergence in Great Britain", Regional Studies, Vol.39 No.9, pp.1245–1260
4. Rahul Srivatsa, Stephen L. Lee(2010), European real estate market conver-gence, Journal of Property Investment and Finance, Vol 30 No 5, pp1-14
5. Pratap Kumar M., Narayan Chandra N. (2019), "An investigation of intrastate income disparities and regional convergence in Odisha", Journal of Social and Economic Development, Vol 21 No.2, pp 288–308
6. The State committee of Uzbekistan on statistics, official website: https://www.stat.uz