Initial Statistical Analysis Of Regional Development:Case Study Uzbekistan

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Abstract- The article presents the state and changes in the pattern of regional disparities in Uzbekistan over the years 2010-2018. 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. The convergence in the level of economic development of regions is examined in a dynamic approach based ongross regional product per capita. The results obtained using the σ-convergence methods are found to indicate decrease in regional differences in the years 2010-2016, a steady increase in 2016-2018. According to the results of β-convergence analysis, the differences in the development of the regions of Uzbekistan based ongross regional product per capita are slightly eliminated in the years 2010-2018.

Index Terms-gross regional product per capita, poverty, real income per capita, regional disparities,β-convergence,σ-convergence.

1 INTRODUCTION

Geographical location, climatic conditions, demographic situation, development history and other factors have a significant impact on the economic development of the region. However, poverty in the economic development of the regions is likely to increase if there is high inequality and there is no change in income. This has a negative impact on the socio-economic development of the country.

 Therefore, each country strives to pursue a regional policy aimed at improving living standards in developing countries, that is, creating conditions and opportunities for their socio-economic development, thus contributing to improving the quality and level of human potential.

The fact that the subject of variations in regional development in recent years is considered a topical issue is of great interest to geographic and Economic Sciences, this situation can be seen in the rapid increase in the number of publications and literature on this topic.

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The chief present-day problem of socio-economic development,in geographical-economic terms, is growing spatial inequality when viewedin a regional approach. In the recent years, regional disparities have become of great interest to geographical and economic sciences, as manifested by a fast-growing number of publications on the subject. Worth special notice are empirical-methodological studies of regional differences in the World, e.g. Domański (2005), Henley (2005), Kosfeld et al. (2006), Rodriguez-Lopez et al. (2009), Czyż&Hauke (2011), Otsuka et.al (2016), Pratap Kumar (2019), the empirical-methodological research conducted by Agnieszka (2019) and others.

Realizing the seriousness and importance of the problem of regional socio-economic disparities, the study measures and compares the levels of socio-economic development of different regional administrative division of Uzbekistan (i.e., 12 regions (Andijan, Bukhara, Jizzakh, Kashkadarya, Navoi, Namangan, Samarkand, Surkhandarya, Syrdarya, Tashkent, Fergana, Khorezm), one autonomous republic (Republic of Karakalpakstan) and one independent city-the capital of Uzbekistan(Tashkent city)) based on socio-economic indicators. It is hoped that the results of the study would be useful for regional planning in Uzbekistan.

The data used in this analysis have been taken from the State Committee of the Republic of Uzbekistan on statistics. The analysis was carried out for the years 2010-2018, these being the years for which we had the latest regional statistical data.

2 RESEARCH METHODOLOGY, DATA, RESULTS AND DISCUSSIONS

2.1. Development of economic and social infrastructure of the regions

In the Strategy Uzbekistan's Five-Area Development Strategy for 2017-2021(defined by the Decree of the President of the Republic of Uzbekistan "On Uzbekistan's Development Strategy")focuses on Integrated and balanced socio-economic development of provinces, districts and cities, optimum and efficient use of their potential as one of the priorities. In addition, a decree "On priority measures to ensure the accelerated socio-economic development of the regions" (signed by President of the Republic of Uzbekistan Sh. M. Mirziyoyev on August 8, 2017). The document was adopted to analyzes the socio-economic development of the regions, radically improve the forms and methods of organizing work and the quality and living standards of the population, and other important tasks. A major objective of the development programmes lunched in Uzbekistan is to bring the balanced regional development. In order to achieve the goal, the economic planning in the country has traditionally been focused upon the need to provide special support to the disadvantaged areas.

Although the country remains on course to achieve its socio-economic development goals, related challenges such as inequality and regional disparities persist (Hurriyat, 2019).

There were several causes leading to distortion of balance in all regions specifically, rate of development in initial years of market economy, attractiveness of the place to investors, economic-geographic location of the area, conditionof infrastructure, features of innovation.

In general, each sector has its own significant share in the formation of GDP in Uzbekistan. We can observe this in the figures of 2018 year data, that is, agriculture, forestry and fisheries accounted for

32.4 percent, industry (including construction) 32 percent, services 41.7 percent (Fig.1). Also, net product taxes are 11.2 percent.
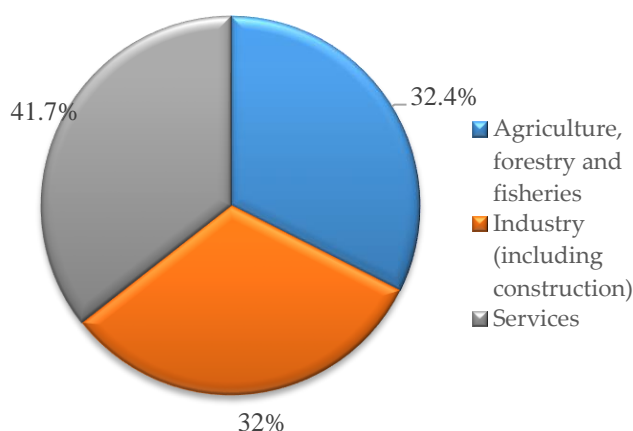

Fig. 1. Structure of gross domestic product of the Republic of Uzbekistan by types of economic activities, in 2018, as a percentage of the total

As a result of economic reforms in the country and various economic and social programs, the GDP growth rate is 6.7 percent on average in 2010-2018.During these years, the highest GDP growth rate was 7.8 percent in 2011, this was compared to 2010. The value added index was higher this year in construction - 8.1 percent and other services -9.2 percent.

The data analysis of the gross regional product per capita confirms the uneven regional development in the Uzbekistan (Fig. 2).
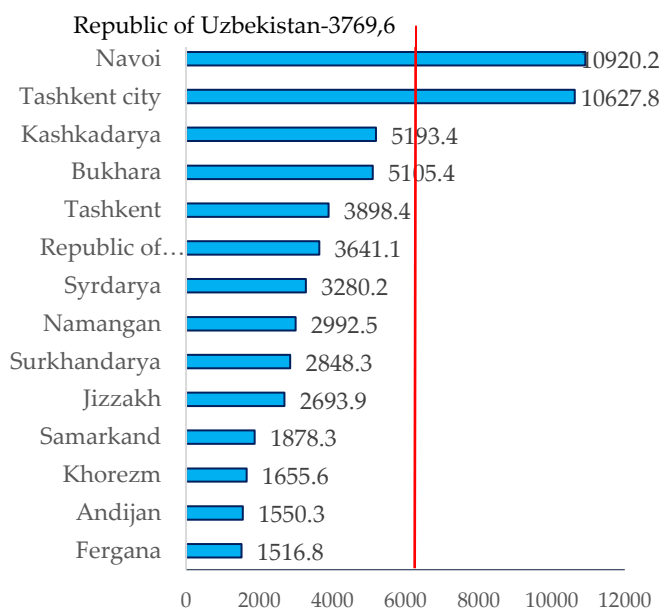
An analysis of the gross regional product data per capita examines the tendency for its increase with different rates of growth in the regions. Its value makes up 22489.1 thousand soums in Navoi, and it equals 6712.5 thousand soums in Surkhandarya. That is 3.5 times lower than in Navoi in 2018. Regional disparities demonstrate the existence of different economic factor endowment in the regions of Uzbekistan. The factors of production are unequally and unevenly distributed among regions. That explains the paradox, why 11 regions have a lower than the average value of gross regional product per capita.
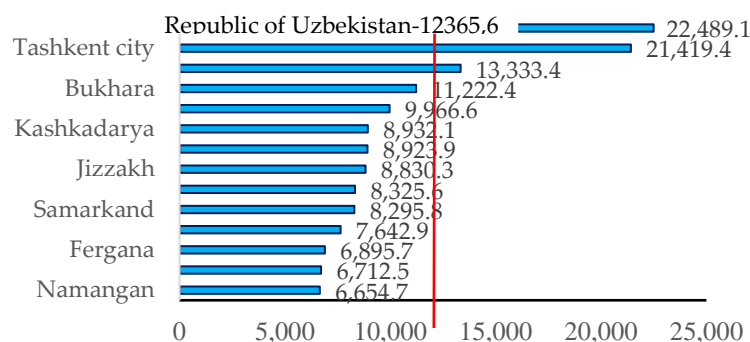
Fig. 2. Gross Regional Product per capita in Uzbekistan (thousand soums), in 2018
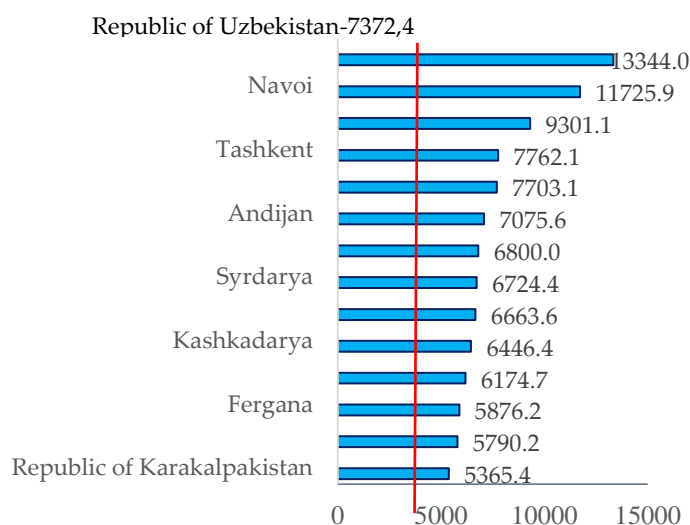
The comparison of fixed capital investment per capita depicts the asymmetric distribution among regions (figure 3). 9 regions have the lowest fixed capital investment per capita in 2018. The existence of enormous regional disparities in the fixed capital investment distribution could be seen from the comparison of the data for Navoi and Tashkent city, where they equal 10920.2 and 10627.8 thousand soums in 2018. In Ferghana fixed capital investment per capita makes up 1516.8 thousand soums for the same year, that is almost 7 times less than in Navoi and Tashkent city.

The study of the State Committee of the Republic of Uzbekistan on statistics data for Uzbekistan demonstrates the asymmetry in incomes' distribution among regions (Fig.3).

Republic of Uzbekistan-3769,6

Region	Value
Navoi	10920.2
Tashkent city	10627.8
Kashkadarya	5193.4
Bukhara	5105.4
Tashkent	3898.4
Republic of…	3641.1
Syrdarya	3280.2
Namangan	2992.5
Surkhandarya	2848.3
Jizzakh	2693.9
Samarkand	1878.3
Khorezm	1655.6
Andijan	1550.3
Fergana	1516.8

Fig. 3. Fixed Capital Investment per capita in Uzbekistan (thousand soums), in 2018

The real income per capita is 13344.0 thousand sums in Tashkent and 5365.4 thousand soums in the Republic of Karakalpakstan in 2018. That is 2.5 times lower than the capital- Tashkent city. 9 regions have the lowest income per capita in 2018.

Republic of Uzbekistan-7372,4

Region	Value
	13344.0
Navoi	11725.9
	9301.1
Tashkent	7762.1
	7703.1
Andijan	7075.6
	6800.0
Syrdarya	6724.4
	6663.6
Kashkadarya	6446.4
	6174.7
Fergana	5876.2
	5790.2
Republic of Karakalpakistan	5365.4

Fig.4. Real Income per capita in Uzbekistan (thousand soums), in 2018

It is known that, economic growth is one of the most important indicators of a healthy economy. One of the biggest impacts of long-term growth of a country is that it has a positive impact on national income and the level of employment, which increases the standard of living. As the country's GDP is increasing, it is more productive which leads to more people being employed. This increases the wealth of the country and its population.
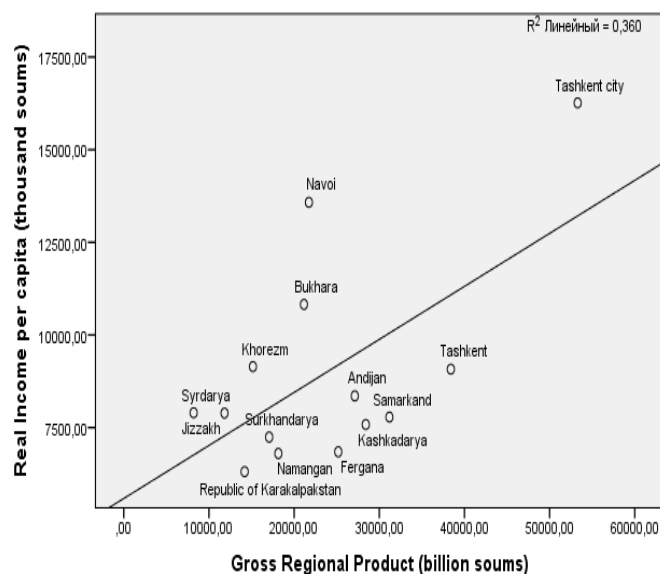
Fig.5. Association between gross regional product and real income per capita, in 2018

An analysis of association between gross regional product and per capita real income shows that, in Tashkent, Kashkadarya and Samarkand regions, gross regional product is high (11.6 percent, 9.4 percentand 8.6 percent of the total GDP, (respectively).Butin these regions real gross income per capita is lower than in other regions such as Navoi, Bukhara and Khorezm (Fig.5). This may be explained by the fact that GDP in these regions is insufficient for a large population base and / or GDP is not growing fast enough.

And it also shows that, it has to be deeply analysedSurkhandarya, Namangan regions and the republic of Karakalpakstan as problematic regions.

According to Redistribution Effect, if there is a rise in inequality and mean income remains constant, then poverty will rise.

An analysis of association between real income per capita and poverty rate shows that there is an inequality in income both between regions and within the regions (Fig.6).

It is expresed by the fact that, by region, the large difference between the real per capita income and the high poverty rate are consistent. The conclusion is that there are significant disparities in the distribution of income of the population in the Republic, and it affects poverty rate.

The fact that Navoi region is characterised by high real income per capita and relatively high poverty rates suggests that there is a high disparity in income among the population.

The conclusion from the fact that the Navoi region is characterized by a high level of poverty and a large value of Real per capita total income relatevely, is that there there is a high disparity in income among the population in this region.
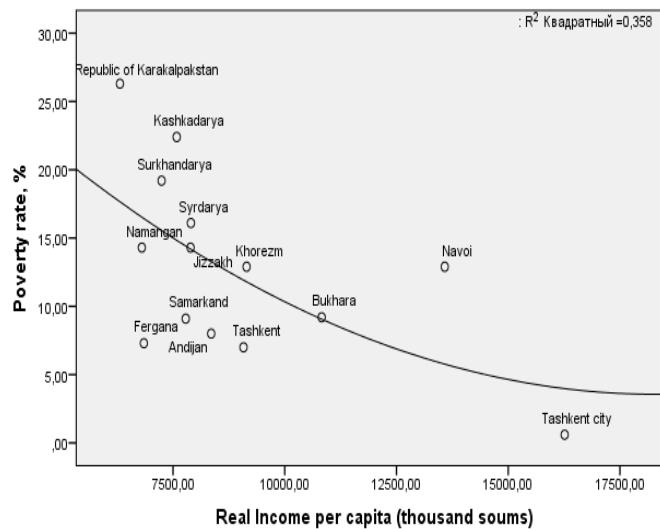
Fig.6. Association between real income per capita and poverty rate, in 2018

2.2. Convergence in per capita income acrossregions

Over the years 2010-2018, a period of Uzbekistan's dynamic economic development, all the regions recorded a marked increase in per capita GDP. Hence, there arises the question of whether economic development was accompanied by any significant changes in regional disparites. To determine the tendency of change in this respect, use is made of methods of convergence analysis.

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 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.

Regional disparities demonstrate the existence of different economic factor endowment in Uzbekistan's regions. The factors of production are unequally and unevenly distributed among regions. That explains the paradox,why 11 regions have a lower than the average value of gross regional product per capita. One could distinguish the group of the industrially developed and backward agrarian regions in the Uzbekistan.

The evolution of regional disparities in Uzbekistan is studied using convergence methods. In a broad sense, regional convergence means a tendency of the level of gross regional product per capitato equalise over time. In a narrower sense, convergence is a relatively faster developmentof economically weak regions than that of strong ones, leading to a reductionof differences between them. 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-convergenceσ-convergence is measured as the variance of regional per capita income given by the formula(Rahul Srivatsa& Stephen, 2010):

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

Where:

yit- gross regional product per capita in region i in the year t;

yt- 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 σt2 values is decreasing.

In σ-convergence, the approach applied to an analysis of changes relies on models of comparative statics, that is a comparison is made of how the pattern of regional differences changes with time (Czyż and Hauke, 2011).

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):

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

where:

yi,t–regional per capita GDP in region i in the year t;

ui,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).

Using equation-1 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 displayadownward tendency in regional disparities. The curve of variance describesthe evolution of regional differences between 2010 and 2018 (figure 7).
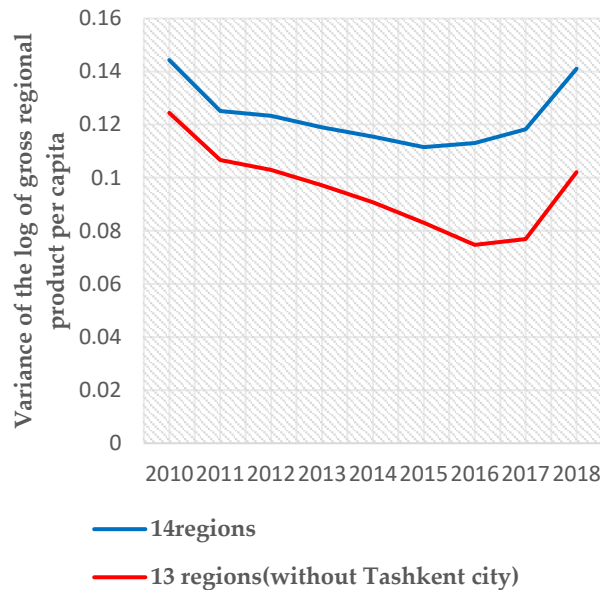
Fig.7. σ-convergence (2010-2018)

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.

Using equation-2 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. This is intended to answer the question of whether regions lagging behind in development (occupying a low position on the scale of the 2010 value of GDP per capita) display a tendency towards a faster increase in this GDP per capita than economically advanced ones (occupying a relatively high initial position on the income scale). 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, significant at α = 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 apresence of β-convergence.The diagram of the regression equation is adownward curve, which even meansthe convergence, i.e. a stronger growth rate of GDP per capita in regions of low gross regional product per capitathan in those with a relatively high initial gross regional product per capita (figure 8).
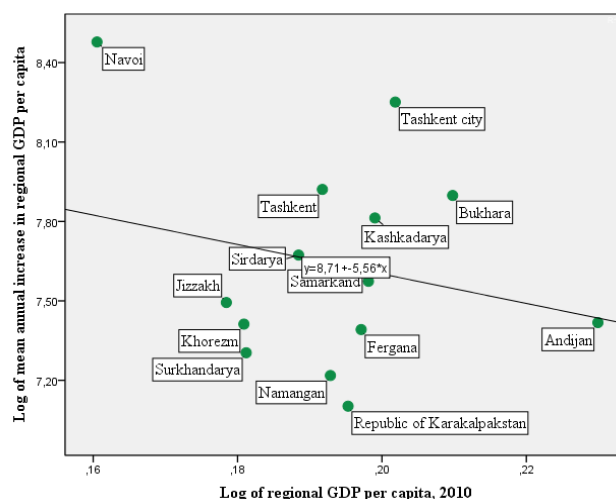
Fig.8. β-convergence (2010-2018)

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.

3CONCLUSION

Starting from independence diminishing regional differences and harmonizing the economics has become focus of the policy. In addition, there were several improvements in purpose of increasing competitiveness among regions and role of regions had fundamental changes, which also can be seen in several aspects of life.

The assessment of the main economic indicators like gross regional product per capita, fixed capital investment per capita, real income per capita demonstrates the existence of essential disparities.They include the differences in productionendowments, asymmetry in fixed capital investment, and disproportional income distribution in the regions.

At the same time, the analysis of the association between the gross regional product and real per capita income, real income per capita and poverty rate can be summarized as follows:

GDP in Tashkent, Kashkadarya and Samarkand regions is insufficient for a large population base and / or GDP is not growing fast enough;

High income inequality in Navoi region; Throughout the country, Tashkent and Bukhara regions have relatively sound economic management systems.

As a precondition for formulating the goals and measures of the regional policy, it is necessary to conduct an analysis of social and economic characteristics of the regions.

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 regionsin time. The two concepts are of course closely related. Formally, Beta-convergence is necessary but not sufficient for Sigma-convergence. Intuitively, this is either because economies can converge towards one another but random shocks push them apart or because, in the case of conditional Beta-convergence, economies can converge towards different steady-states. This and a number of limitationsof the Beta-convergence approach (see for instance Quah, 1993) have led some economists to suggest that the concept of Sigma-convergence is more revealing of the reality as it directly describes the distribution of income across economies without relying on the estimation of a particular model.

The convergence loses credibility if one makes thefollowing qualifications: (i) the model is not able to explain why leaders change with the passage of time or why some followers before can become leaders later (as is the caseof Uzbekistan); (ii) the model fails to explain why some poor regions stay poor and rich regions stay rich, without any tendency to converge; (iii) the model does not explain why some Regions fell from a fast-growing club into a slower one in Uzbekistan); (iv) the model does not explain further why convergence holds for some periods and not for others.

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