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Do Kazakh Regions Converge?

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Even though Kazakhstan is one of the most successful transition countries in Central Asia it has been neglected in the literature on regional convergence. This paper fills this gap with an empirical analysis of the growth process on the regional level using annual gross regional product (GRP) data for the period 1998–2008 for the 16 Kazakh regions. In particular, we look at the σ- and absolute β-convergence. Given the growing variation in GRP over time, σ-convergence cannot be found for Kazakhstan. The data show that there is also no evidence for absolute β-convergence. In contrast, the Kazakh regions even seem to diverge.

1 Introduction

Studies on regional convergence within or across countries have already been completed for a broad range of regions (Barro and Sala-i-Martin, 1995). However, none of them deals with the former Soviet Union countries in Central Asia. The reason might be the insufficient or even missing data on these countries, especially on the regional level. Although we are facing this problem as well, we want to provide some first insights into the regional convergence process with the present note.

Among the former Soviet Union states in Central Asia Kazakhstan is the most successful economy. During the early 1990s, it has essentially completed its transitional phase. A new constitution and legal framework were created and a market economy as well as a privatized banking system was established (Agrawal, 2008). In addition, social problems were tackled. The poverty level was reduced significantly, the unemployment rate decreased and the educational level was raised (Ursulenko, 2010).

When looking at the growth process in Kazakhstan, especially in the period after 1998 one should take into account the country's natural resources, namely oil and gas,[1] which mainly drove this process (see Figure 1).

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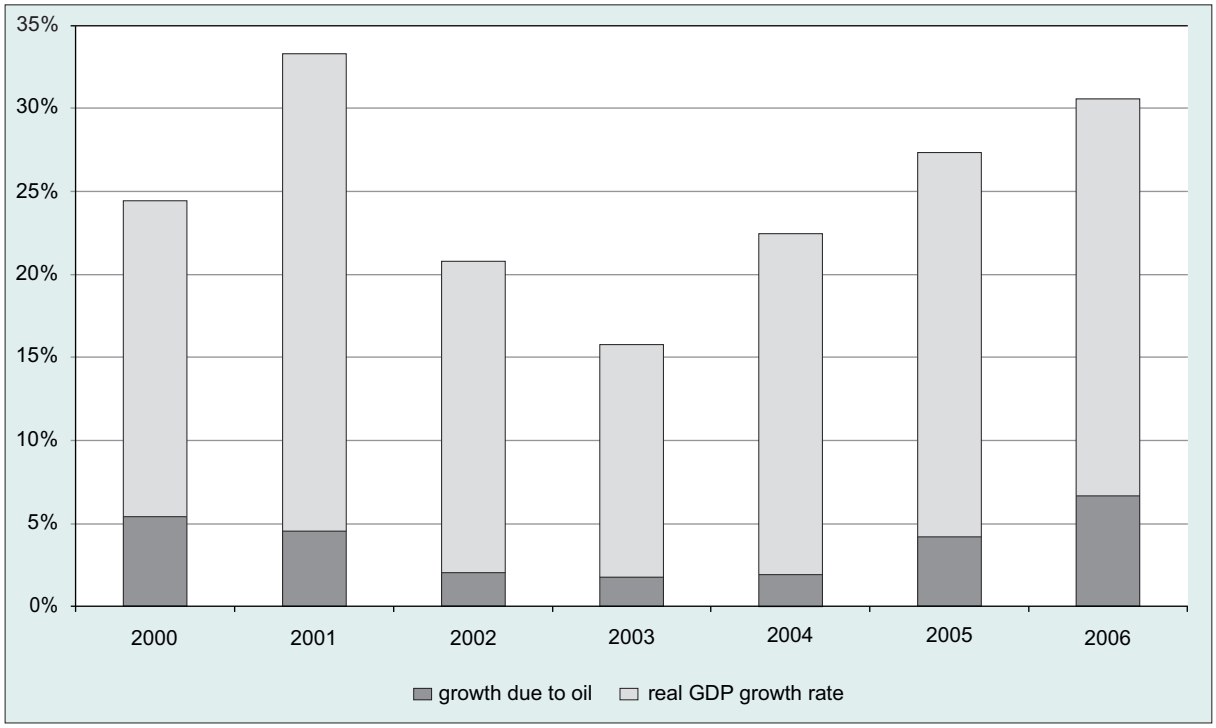
[1] Note that gas is neglected in the following as it contributes only an inconsiderable part to the total oil and gas extraction.

Figure 1: Growth of real GDP due to oil extraction (in percent), 2000–2006



Source: own calculation based on the Statistical Yearbook of Kazakhstan

In 2000, the extraction of oil rose by approximately 78.7%, which accounted for 22.3% of the total growth of real GDP.[2]

2 Regional Growth Dynamics

To analyze the regional growth dynamics in Kazakhstan, data on GRP per capita in US-Dollar (PPP) is drawn from the National Human Development Report 2009. It includes data for the 16[3] Kazakh regions (*oblasti*) for the period 1990–2008. For structural reasons we start our analysis with the year 1998.

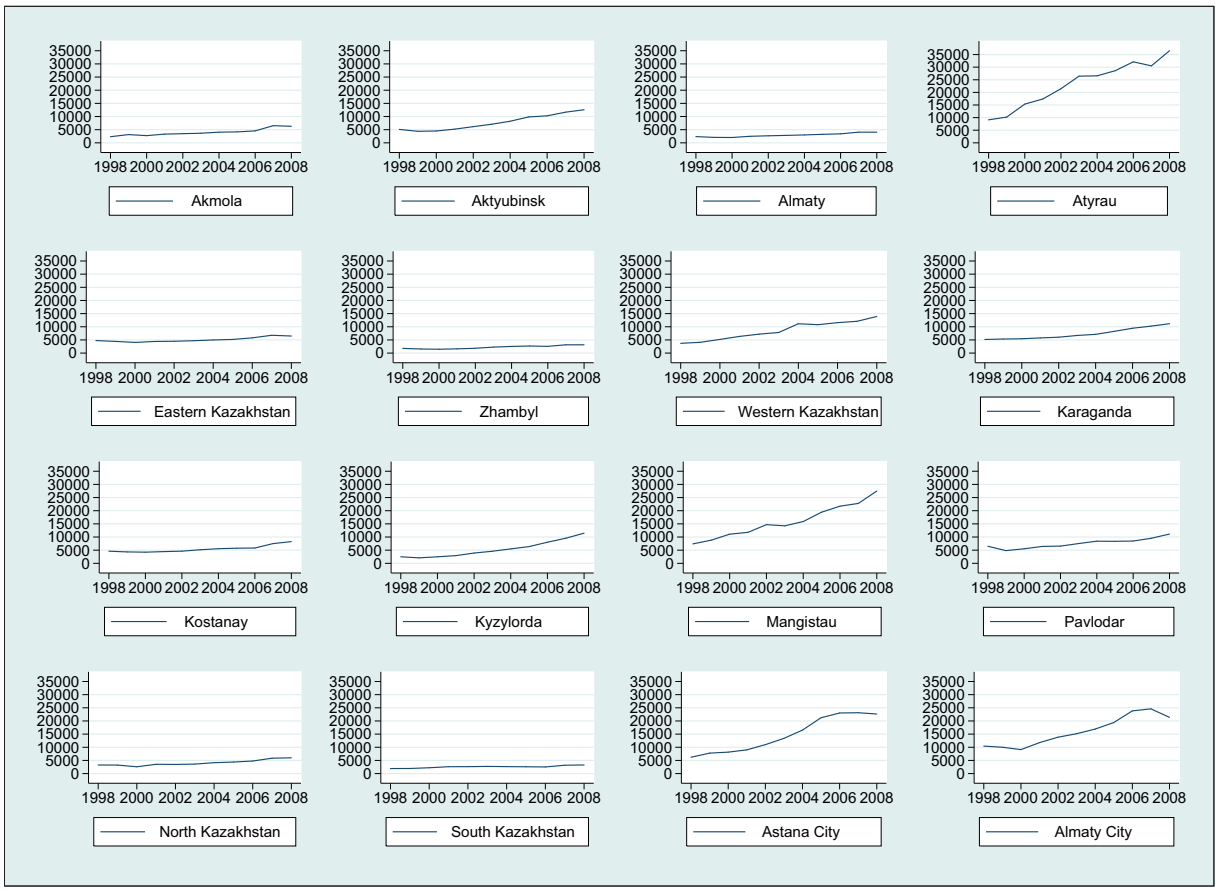
Figure 2 shows the data for each of the 16 Kazakh regions from 1998–2008. At first glance they seem not to converge to a single GRP per capita level. Even though all regions started at approximately the same level in 1998, within only 10 years they reached levels of per capita GRP which differ by a factor of almost 12.

Table 1 includes a number of descriptive statistics for the full sample. The mean of per capita GRP is always higher than the median. This is not unexpected because it means that only very few regions are extremely rich while most of the *oblasti* are quite poor. The positive values of skewness indicate that the distribution is not symmetric, but skewed to the right. The long tailed side is the one with the few high GRPs while the distribution on the other side is steep. The differences compared to the standard Gaussian distribution can also be seen in the kurtosis, which implies a long thin tail on the right side of the distribution.

[2] The real GDP grew by 24.4%.

[3] Kazakhstan can be devided in 14 administrative provinces and two major cities (Almaty and Astana).

Figure 2: Per capita GRP for the 16 Kazakh regions in USD (PPP), 1998–2008



Source: own illustration based on UNDP 2009

Table 1: Summary statistics of the GRP per capita in USD (PPP)

	N	Median	Mean	SD	Skewness	Kurtosis
1998	16	4688	4825.1875	2590.2118	0.7147	2.6278
1999	16	4370	4893.5625	2844.9505	0.7498	2.3221
2000	16	4376	5387.625	3803.0906	1.3096	4.0082
2001	16	4834	6193.6875	4296.2157	1.2990	3.9281
2002	16	5334.5	7133.5	5433.6918	1.3878	4.0515
2003	16	5933	7996.875	6419.6702	1.6431	5.215
2004	16	6345	8955.1875	6787.1121	1.2434	3.756
2005	16	7308.5	10020.5	7876.555	1.092	2.9952
2006	16	8252	11124.3125	9037.425	1.0825	2.9157
2007	16	9539	11946.75	8532.4518	0.9556	2.5943
2008	16	11148	12863.375	9543.4767	1.1446	3.4488
1998–2008	176	5817	8303.6688	6935.8042	1.7264	5.6513

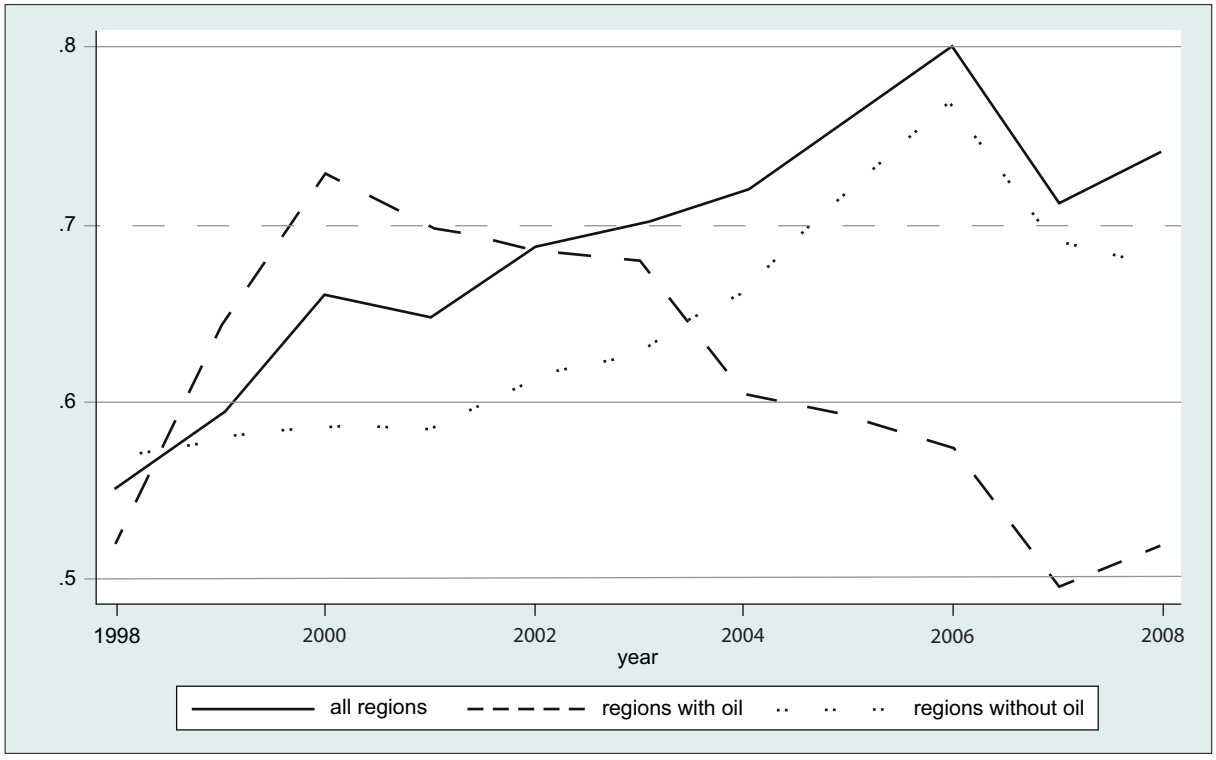
Source: own calculations based on UNDP 2009

3 σ-convergence

Following Barro and Sala-i-Martin (2004), σ-convergence occurs if the cross sectional dispersion of GDP (GRP) decreases over time. It is measured as the standard deviation of the annual log growth rate of GRP.

Figure 3 shows the cross-sectional standard deviation (i.e. σ-convergence) of the log of per capita GRP for the period 1998 to 2008. The solid line graphs the movement of σ-convergence, including all Kazakh regions. The dashed line describes the σ-convergence within the subset of regions, which are well endowed with oil.[4] Regions without oil are represented by the third line.

Figure 3: Dispersion of the log of per capita GRP across Kazakh regions, 1998–2008



Source: own illustration based on UNDP 2009

This gives some interesting results. As the variation in GRP is growing over time (except in 2001 and 2007), no σ-convergence across all Kazakh regions seems to be present. As the trend for all regions coincides with the one for the regions without oil, σ-convergence could also not be established for these regions.

In contrast, there is high evidence for σ-convergence across the oil regions. The variation in per capita GRP in these regions grows steeply during the first two years, but declines steadily in the following years. In 2007, it even falls below the starting level. The reason for this might be that Atyrau and Mangistau have traditionally been the main oil producers whereas Aktyubinsk, Kyzylorda and Western Kazakhstan are three relatively new oil-producing regions, which were only explored during the last decade (Najman et al, 2005). That is why the latter caught up with Atyrau and Mangistau between 2000 and 2007 while expanding the oil production gradually.

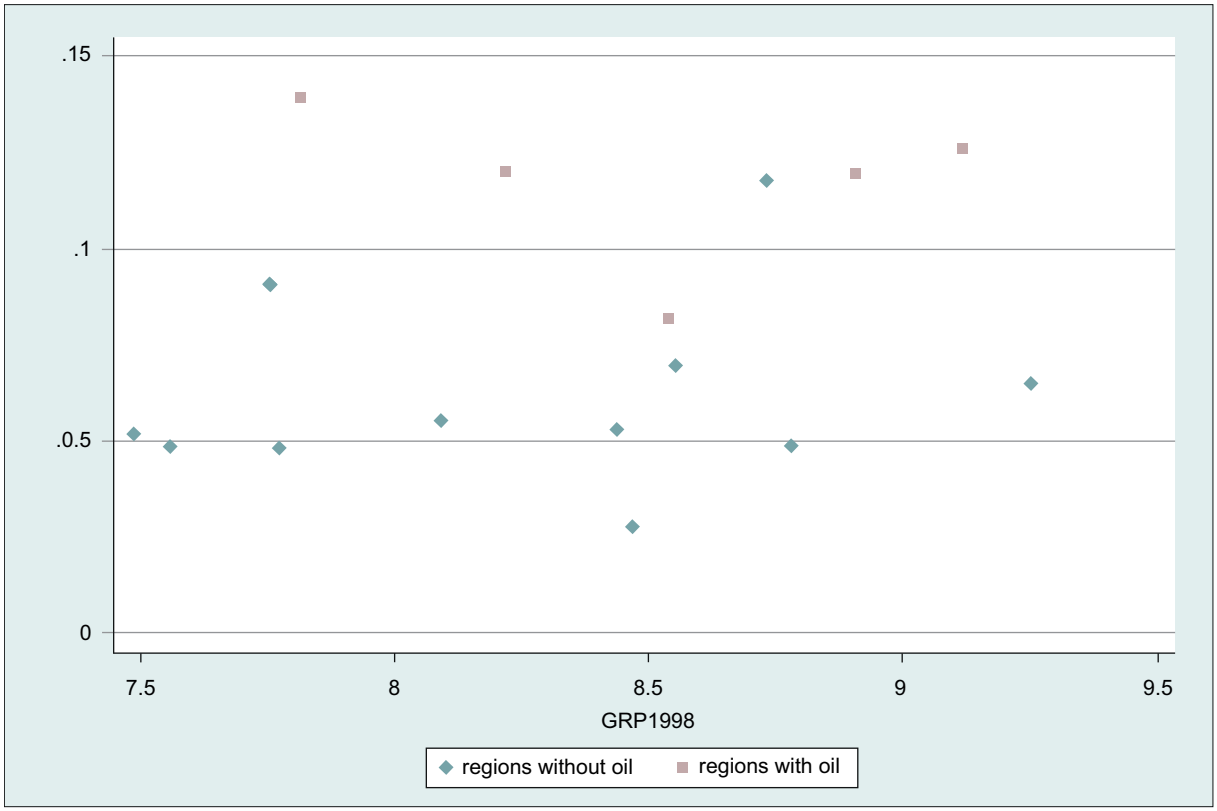
[4] These are Aktyubinsk, Atyrau, Kyzylorda, Mangistau, and Western Kazakhstan.

4 β-convergence

Generally speaking, the idea of convergence is an outcome of the neoclassical growth theory which is widely known from the Solow-Model (1956). Two different concepts of β-convergence have to be distinguished, the absolute and the conditional β-convergence.[5] Absolute or unconditional β-convergence is based on the idea that poor regions tend to grow faster than rich ones and per capita income of the former would catch up with the latter. The main assumption here is that the steady state levels of GDP (GRP) are almost equal across the analyzed countries (regions). This is most likely within a country, as Barro and Sala-i-Martin (2004) stated.

Figure 4 shows the plot of the initial log GRP per capita and its average log growth rate between 1998 and 2008 for the regions with and without oil. Looking at this, no clear relationship can be identified for both groups of regions.

Figure 4: GRP growth rate of regions with and without oil, 1998–2008



Source: own illustration based on UNDP 2009

The classical cross-sectional approach is used to analyze absolute β-convergence. Therefore the following non-linear equation based on Barro and Sala-i-Martin (2004) is estimated using NLS.[6]

$$\frac{1}{T} ln\left(\frac{y_{i,T}}{y_{i,0}}\right) = a - \left[(1 - e^{-\beta T})/T\right] \cdot ln(y_{i,0}) + u_{i,0,T}$$

On the left hand side of the above equation the average annual log growth rate of the per

[5] As the analysis of conditional convergence requires an even broader database, we only focus on absolute convergence.

[6] To use OLS, a modified version of the equation should be used, where b ($b = -\frac{1}{T}\left(1 - e^{-\beta T}\right)$) instead of β is estimated.

capita GRP is displayed. Subscript t denotes the year and subscript i the region. T stands for the length of the observed time period. On the right hand side y describes the level of the initial GRP per capita. The error term $u_{i,t}$ is distributed independently with mean 0 and variance $\sigma^2_{i,t}$.

Roughly spoken, if the log of the initial GRP per capita influences the average annual growth rate negatively, convergence occurs. Therefore β, which can be interpreted as the speed of convergence,[7] should be positive.

The results of our estimation are shown in table 2. The β coefficient has a negative sign but is not statistically significant. A negative β would indicate diverging instead of converging regions. Nevertheless, the main result of this analysis it that the unconditional convergence approach is not the appropriate one in case of the Kazakh regions.

Table 2: Results of non-linear estimation

	(1)
VARIABLE	Kazakhstan
β	-0.013308
	(0.0142531)
Observations	16
R^2	0.051

standard error in parentheses

Source: own calculations based on UNDP 2009

5 Conclusion

In this paper we have shown that there is no evidence for regional convergence in Kazakhstan, however, this is a preliminary result. One reason for this might be that the assumption of similar steady states does not hold for the Kazakh regions. Another reason might be the very limited number of observations. To overcome this problem, data on a more disaggregated level is necessary. Additionally, data on other explanatory variables which are proxies for the different steady states could be included to look at the conditional convergence across the Kazakh regions.

References

[1] Agency of Statistics of the Rupublic of Kazakhstan, 2003. Statistical Yearbook of Kazakhstan. Almaty, 2003.

[2] Agency of Statistics of the Rupublic of Kazakhstan, 2007. Statistical Yearbook of Kazakhstan. Astana, 2007.

[3] Agrawal, Pradeep, 2008. “Economic Growth and Poverty Reduction: Evidence from Kazakhstan”, Asian Development Review, vol. 24, no. 2, 90–115.

[7] According to the relevant convergence literature, the empirically estimated β is expected to be 2%.

[4] Barro, Robert J., and Sala-i-Martin, Xavier, 1992. “Convergence”, Journal of Political Economy, 100(2):223–251.

[5] Barro, Robert J., and Sala-i-Martin, Xavier, 1995. Economic Growth. McGraw-Hill, New York.

[6] Barro, Robert J., and Sala-i-Martin, Xavier, 2004. Economic Growth. The MIT Press, Cambridge (Massachusetts).

[7] Najman, Boris et al, 2005. “How are Oil Revenues redistributed in an Oil Economy?”, The University of Adelaide, School of Economics, Working Paper 2005–18.

[8] National Human Development Report, 2009. From exclusion to equality: realising the rights of persons with disabilities in Kazakhstan. United Nations Development Programme, Kazakhstan 2009.

[9] Solow, Robert M., 1956. “A Contribution to the Theory of Economic Growth”, Quarterly Journal of Economics, Vol. 70, 65–94.

[10] Ursulenko, Kseniia, 2010. “Regional Development in Kazakhstan”, OEI Kurzanalysen und Informationen, Nr. 47.