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THE UNBALANCED DYNAMICS OF RUSSIAN REGIONS
Towards a real divergence process

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Abstract

This article examines the uneven evolution of Russian regional per capita income and productivities during the late 1980s and 90s. Following the studies by Baumol and Barro and Sala-i-Martin, we examine the convergence process of the Russian economy under two aspects. First we point out the sources of growth stressed by the new growth theories (accumulation of physical capital, education effort, and public expenditures). Secondly, we examine the economic-geography perspective, by analysing the impact of the distance to Moscow and the North-East diagonal on growth. This first application to Russian regional data confirms the regional

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divergence which results from the paradox of a beta-divergence (except in the case of gross regional product), a fifteen years sigma-divergence and a weak conditional convergence in the late 1990s, from both the macroeconomic and geographical perspectives.

KEYWORDS: Russian regions, unbalanced dynamics, real divergence

JEL classification: L00; O41; R1

Introduction

This study of the convergence of Russian regions is especially interesting, in regards to Russia's secular feature of a center, the Moscow region, which is clearly defined by its size, its location and above all its widely accepted leadership in technologies and industry. Considering this, there is every incentive to analyse polarization phenomena and, more generally, spatial-economic asymmetries, more so when taking into account that Russia outstretches across eleven time zones.

For such a country, a regional analysis is useful from both the empirical and theoretical points of view. Empirically, it is easier to compare data derived from the same sources than to undertake international comparisons. Theoretically, the assumptions made, such as those regarding the unicity of structures and infrastructures as well as the institutional framework, preferences and available technologies are directly relevant, since exchanges impediments do not exist (except for natural barriers).

In the light of the difficulties encountered in ensuring harmonious development within the European Union (Dunford, 1994 ; Armstrong and Vickerman, 1995; Tumpel and Mooslechner, 2003; Carluer and Gaulier, 2002), despite the use of structural funds and a decade of continuous growth (Artobolevskiy, 1997; Bachtler and Turok, 1997; Jovanovic, 1997; European Commission, 1999), it is not surprising that Russian regional disparities have been accentuated by the opening of markets (Sapir, 1999; Babeski and Maurel, 2002; Kocenda and Evzen, 2001; Carluer, Mercier and Samson, 2004). Indeed, only a small number of the Russian regions have benefited from "cumulative growth", on the contrary, the majority is threatened rather, by the "poverty trap" (Azariadis and Drazen, 1990; Pritchett, 1997; Carleur, 2004).

Our approach is a three-stage one. First of all, a descriptive analysis of Russian regional disparities is undertaken from the standard convergence perspective (beta-

and sigma-convergence are tested; section 1). We then use the equation of conditional convergence to analyse the main sources of regional growth from a macroeconomic (section II) and geographical perspective (section III). Thus we try to measure the impact of investment, education and public expenditures on regional growth and to shed light on the importance of geographical position.

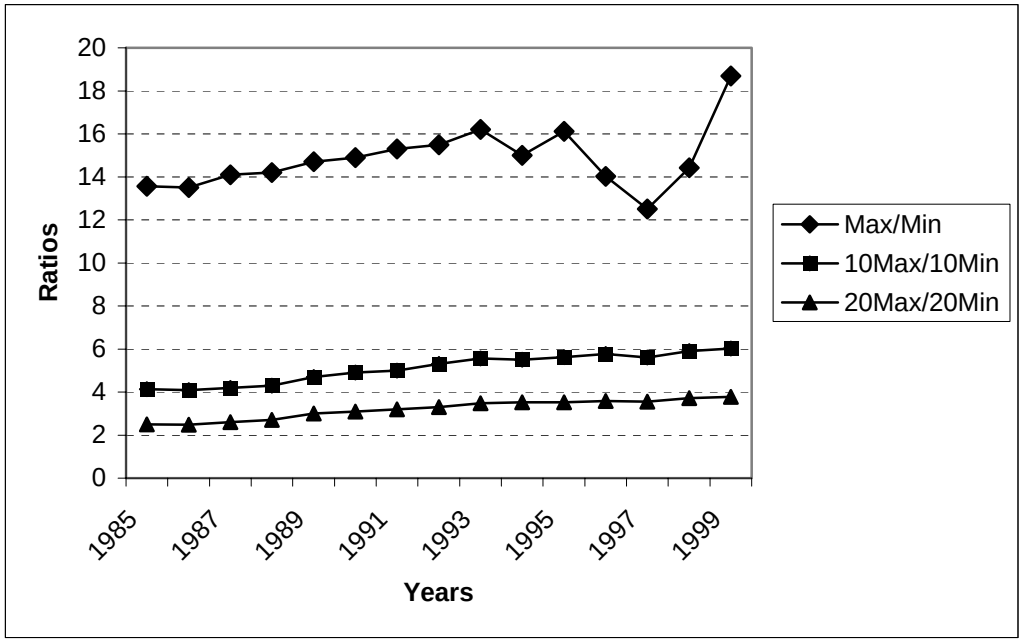
Descriptive analysis

This study draws on data on per capita income (in nominal terms) for the 88 Russian regions (Annex 1), available to the Ministry of Economic and Finance and obtained by the Russian European Center for Economic Policy (RECEP) in Moscow since 1985. In order to avoid certain problems related to changes in measurements or even in particular definitions, especially given the substantial political and economic changes in the country during the transition, the data are smoothed using the moving average method for three years, using weightings of 0.25, 0.5 and 0.25 respectively for the dates *t-1*, *t* and *t+1*. The initial (1985) and final (1999) levels are not modified, so the procedure does not change the regressions and calculus carried out in cross section. However, in the light of the immense size of the country (see the map in Annex 2) and the cultural diversity of its regions, as well as the differences in the degree of monetization of the economy and the absence of regional price deflators, the results should be interpreted with caution.

Relative performances

An initial analysis of Russian regional disparities reveals that the gap between the groups of regions remains substantial. The ten richest regions have, on average, a *per capita* income four times higher than the ten poorest regions in 1985 and the trend is upward (more than six times higher in 1999). This is confirmed for the twenty richest and poorest regions - but the gap increased less during the same period, from 2.5 to 3.8. Nevertheless, the difference between the richest (Moscow) and the poorest region (Ingushetia) reached an incredible level in 1999 (the downward direction of the trend at the end of the period is due to slower growth and the emergence of a contest for the national leadership between Yamalia, a central northern region, and Moscow).

Figure 1. Gaps between richest and poorest regions: per capita income



From a geographical perspective, the ten worst performing regions**,** in terms of per capita income**,** are mainly located in the Caucasus (South-West) and near the Mongolian frontier (South). Moreover, their position and performance remained stable from 1985 to 1999, with six of the ten poorly performing regions always in the bottom ten (Figure 2). Only one region, Khakasiya, really soared up the table, leaping nearly 50 places. Except for this one spectacular case of leapfrogging, no process of convergence is revealed.

The performance of the top ten regions is also characterized by considerable stability: eight of the ten richest regions maintained their superiority and five increased their lead. It was mainly the Eastern and the Northern regions that out-performed the rest, and particularly regions in the east of the Urals "frontier" (i.e. Siberia ; Show, 1987 or Portnov, 1994): Tyumenskaya, Khanty-Mansiiky and Yamalo-Nenetsky. Thus we notice that the richest regions are located close to the poorest ones, such as Komi-Permyatsky. Lastly, the spectacular progress of the Moscow region should be noted, since it occupies no fewer than ten of the top eleven places (and therefore does not feature in Figure 3). Clearly, there is now a genuine capital effect in Russia.

Figure 2. Per capita income deviations for the ten laggard regions

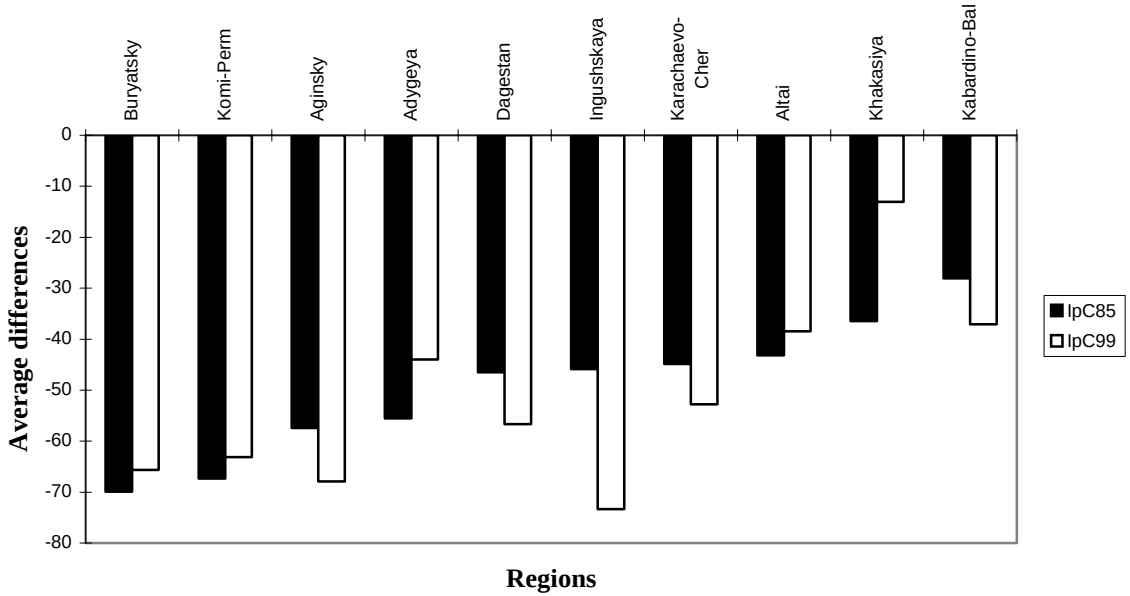
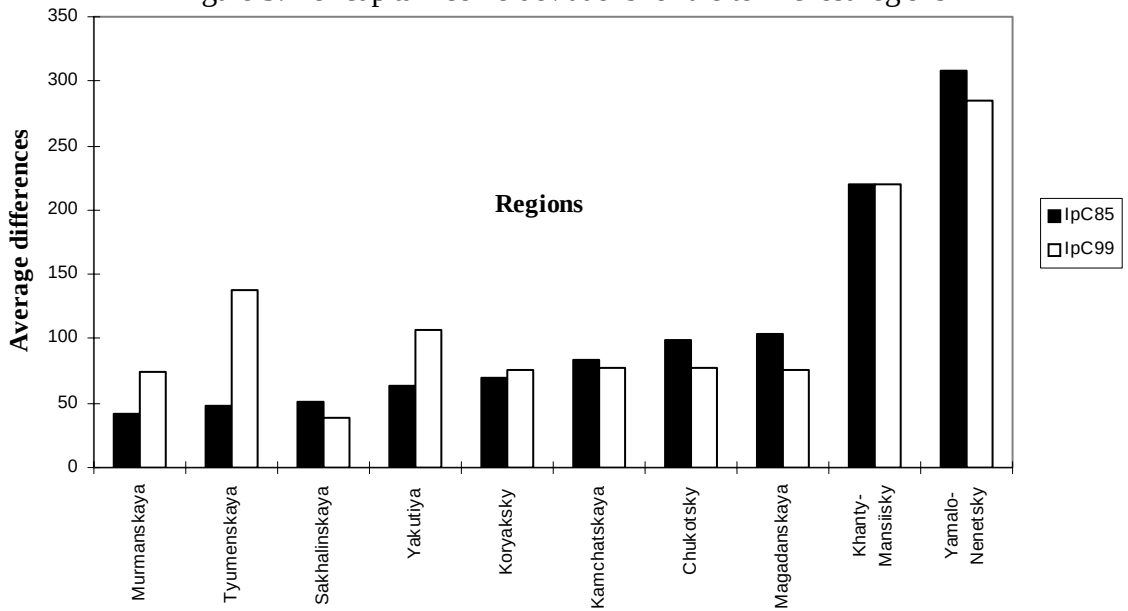


Figure 3. Per capita income deviations for the ten richest regions



Beta-convergence

In order to evaluate more precisely the convergence of per capita income we could apply the two concepts of beta and sigma-convergence. The former refers to the existence of a negative relationship between the initial level of income and the growth following growth. It is a necessary but not sufficient condition for the sigma-convergence to be verified. This second concept merely shows the variance reduction of productivities in cross section between two dates. It should be noted that, in the case of strong asymmetrical regional shocks, the per capita income dispersion does not diminish even in the presence of the beta-convergence. The results of a standard empirical analysis of regional disparities using the hypothesis of sigma-convergence and beta-convergence corroborate this trend.

The estimate will be performed in cross section (88 regions) as it is customary to do so (these results are confirmed by a time series estimation). Given that the sigma-convergence is the strongest and the most intuitive[3] definition of convergence, we will refer to this concept in order to decide on the presence or absence of convergence.

Clearly, there is no absolute convergence for the regional incomes per capita in the 1985-99 period (Table 1). A divergence process is nearly highlighted. This is obvious for the industrial output for the last years of the century. On the contrary, on a similar period, a strong beta-convergence could be noted for the gross regional product.

[3] *However a sole statistics cannot sum up the evolutions of the regional productivities spread. An extended study, stressing on the emergence of convergence clubs for example, will require the use of tools developed by Quah [1996 a,b] or Durlauf and Quah [1999].*

Table 1. Beta-convergence of income, gross regional product and industrial output per capita

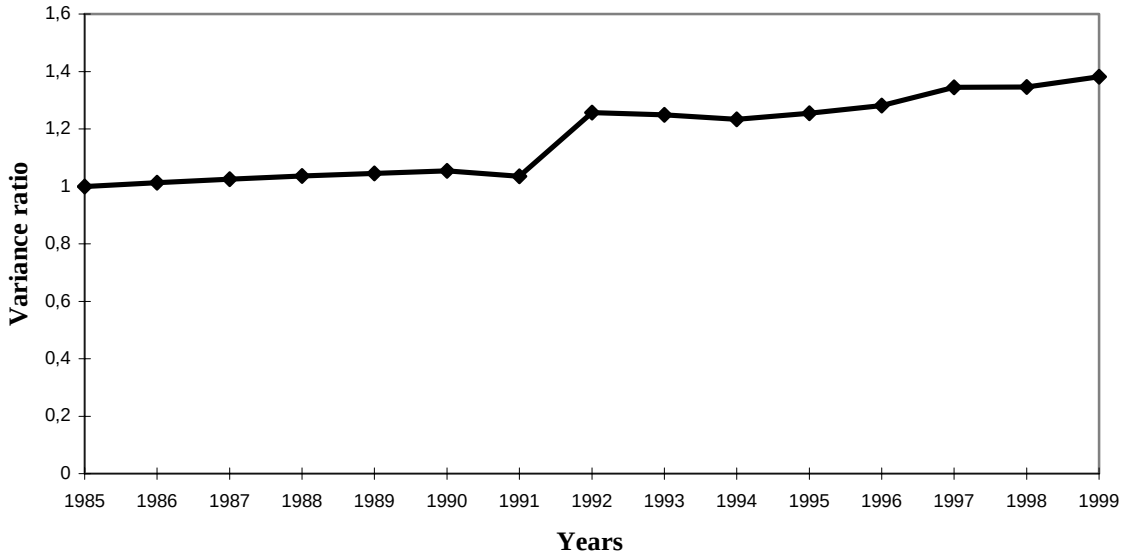
	Period	Beta	Constant	DW	R^2
Income	1985-99	+0.78 % (1.41) [0.161]	+0.66 (59.64) [0.000]	2.083	0.151
Gross regional product	1994-99	-13.6 % (-7.94) [0.000]	0.52 (23.85) [0.000]	1.793	0.651
Industrial output	1995-2000	+0.92 % (2.64) [0.010]	-0.013 (-2.21) [0.030]	1.882	0.274

(.) = Student; [.] = p-value.

Sigma-convergence

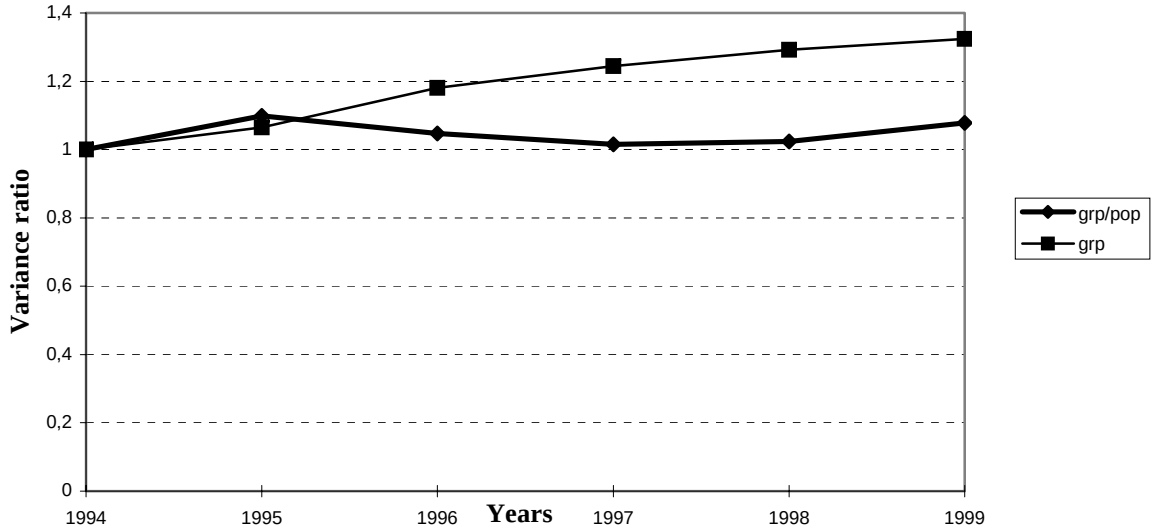
The further study of sigma-convergence confirms this preliminary diagnosis: the variance ratio increases by nearly 40% during the nineties (Figure 4), and there is no reversal of the trend. It shoud be noted that, on the contrary, when we consider prices series, a significant convergence clearly appears at the end of the 1990s (Babeski and Maurel, 2002). Otherwise, the intensity of the uneven process is reinforced by the fact that the ten leading regions (in particular the last ones) and the ten lagging regions (especially the middle ones) swap positions (as shown by Figures 2 and 3) inside these two specific groups.

Figure 4. Sigma-convergence of per capita regional income



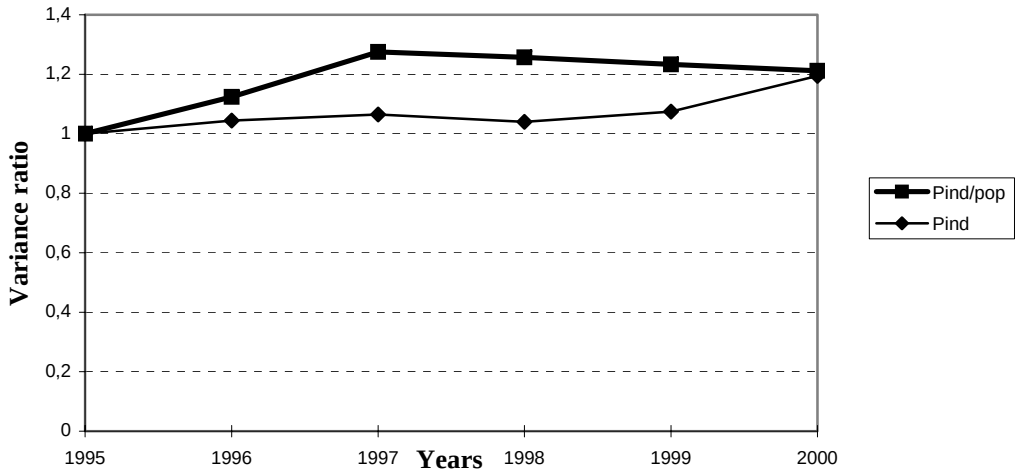
The tendency is lower, but still obvious, for the gross regional product, even if the per capita gross regional product seems to show a relative stability (for six years only!).

Figure 5. Sigma-convergence of gross regional product



Lastly, and adversely to the previous indicators, divergence process was of about 20 percent during the last six years of the century, and nearly equal for both indicators: industrial output and per capita industrial output.

Figure 6. Sigma-convergence of industrial output



Macroeconomic analysis

Conditional convergence

When initial conditions are "controlled" (i.e. regional structures are assumed to be similar), especially the role of physical and human capital (i.e. the determinants of economic growth; Barro, 1997; De La Fuente, 2002), the divergence process disappears, even on a long period of time. We shed light on a conditional convergence for industrial output, the convergence speed of per capita gross regional product (grp) being over 15% per year! Investment and education efforts, as well as public expenditures, have a strong impact on growth, whereas the judgement is more complex for financial aid. Moreover, the negative influence of health levels and of social policy on growth must be interpreted in a two fold way: a better quality of life in the richest regions and a genuine aid to the unfavored regions.

When attention is focused on the convergence of both main determinants of regional growth, no sign of a possible catching-up appears. The sigma-divergence remains obvious, especially for investment which evolved spectacularly during the 1990s.

If, at a first glance, the human capital evolution seems to have a positive impact, it is only because the lagging regions invest in it more than the average.

Table 2. Determinants of regional growth and convergence

	Period	Beta	INV	EDUC	PUBEXP	FINAID	SOCPOL	HEALTH	Cst	DW	R^2
Income	1985-99	-0.45 (-0.74) [0.46]		0.0094 (4.03) [0.000]	0.0092 (3.52) [0.001]	-0.0043 (-2.24) [0.028]			0.56 (14.6) [0.00]	2.00	0.398
Gross regional product	1994-99	-17.8 (-16.1) [0.00]	0.324 (8.77) [0.00]	0.086 (2.51) [0.014]		-0.019 (2.65) [0.010]		-0.078 (-2.58) [0.012]	0.658 (4.77) [0.00]	1.57	0.899
Industrial output	1995-2000	-4.89 (-4.69) [0.00]	0.249 (6.36) [0.00]			0.0062 (2.22) [0.029]	-0.0063 (-1.8) [0.075]		0.037 (0.8) [0.43]	1.78	0.631

INV = Investment, EDUC = Education, PUBEXP = Public expenditures, FINAID = Financial aid, SOCPOL = Social policy, HEALTH = Health, Cst = Constant, DW = Durbin-Watson.

2.2 - The role of physical and human capital

Figure 7. Sigma-convergence of investment

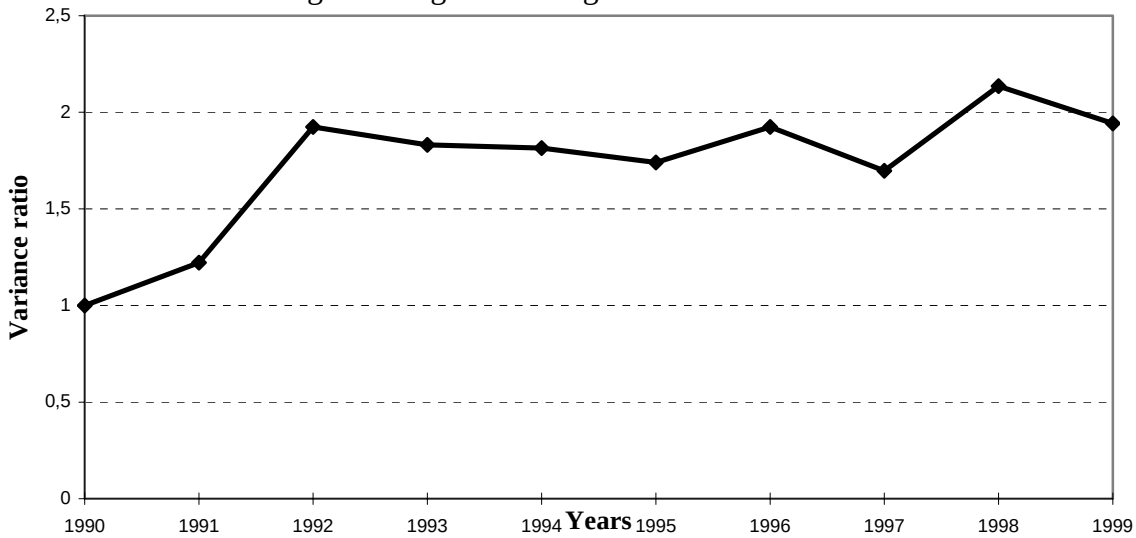
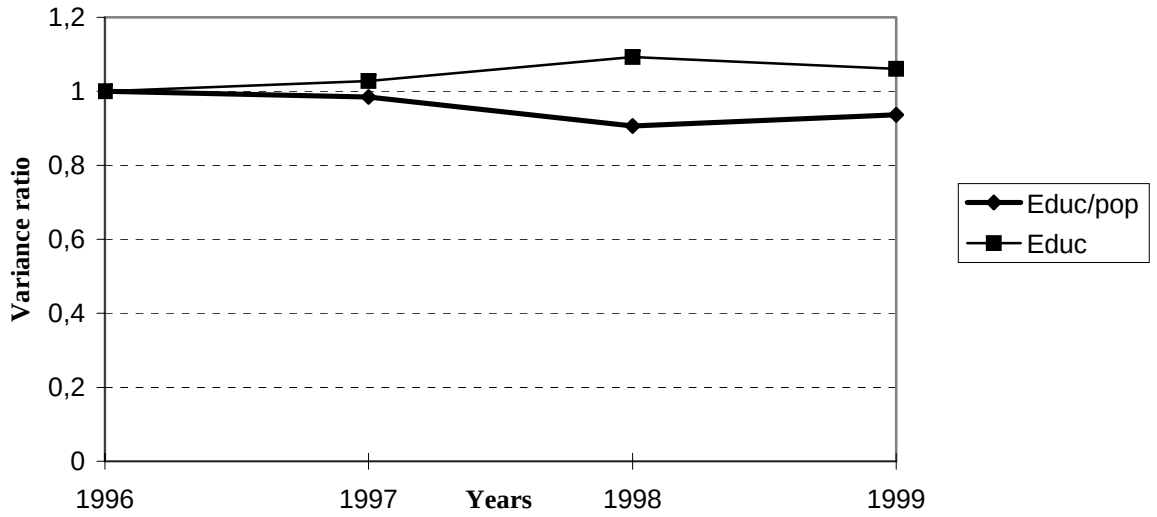


Figure 8. Sigma-convergence of education



An economic geography perspective

From a geographical point of view, the trends and conclusions are relatively similar. Although in this case we find no strong convergence process for per capita gross regional product, the result is stronger for industrial output.The localization of the Russian industrial apparatus reflects a national strategic plan that favours convergence. This is probably linked to a less polarized and reduced industrial production. Otherwise, the regions located far from Moscow have experienced higher growth (does this equate to a "vampire effect" exerted by the Russian capital or to greater growth opportunities for frontier regions?). The northern and eastern regions are the great winners of the decade (Portnov, 1998), whereas the South as well as the West experienced some problems in maintaining balanced growth.

It should be noted that, for the second equation, only the North and West variables (which have a positive and negative impact on growth) are robust. For the third equation, the distance from Moscow and the investment variable (today the leadership of Moscow's region in technologies tend to be stronger) have a clear influence on convergence (Fagerberg, 1995 ; Stehrer and Worz, 2003).

Conclusion

Regional divergence is a real phenomenon in Russia (Babetski and Maurel, 2002 ; Svelnar, 2002). The study of various indicators confirms the difficulty of lagging regions in catching up with the leading ones, namely Moscow and the northern and eastern regions. For a long period (1985-99), no convergence appears even when macroeconomic and geographical variables are added. The conditional convergence perspective corroborates the strategic roles of investment and human capital (whose influence gives rise to a small convergence process), but their trends point in the direction of a multiple equilibrium: there are several Russias (Carluer, 2004) and the global tendency seems to be gathering strength.

Table 3. Geography and growth

	Period	Beta	DIST	FRONTIER	NORTH	EAST	SOUTH	WEST	Cste	DW	R^2
Income	1985-99	-0.44 (-0.95) [0.38]	0.0006 (1.59) [0.11]						0.55 (13.5) [0.00]	2.08	0.411
Gross regional product	1994-99	-0.46 (1.34) [0.18]		0.034 (1.73) [0.088]	0.034 (2.72) [0.008]	0.035 (1.63) [0.106]	-0.025 (-1.35) [0.18]	-0.041 (-1.98) [0.051]	-0.008 (-1.04) [0.30]	1.76	0.534
Industrial output	1995-2000	-14.0 (-9.45) [0.00]			0.162 (4.26) [0.00]		-0.077 (-3.14) [0.002]	-0.055 (-1.83) [0.07]	0.55 (23.6) [0.00]	1.79	0.772

Dist = Distance to Moscow (kilometers), Frontier, North, East, South, West = dummies.

Annex 1.

List of regions

	REGIONS	East	West	Border	South	North	Distance
1	Aginsky-Buryatsky avtonomny okrug	0	0	0	0	0	15,1
2	Altaisky krai	0	0	1	1	0	9,4
3	Amurskaya oblast	0	0	1	1	0	17,4
4	Arkhangelskaya oblast	0	0	0	0	1	3,2
5	Astrakhanskaya oblast	0	0	1	1	0	4,1
6	Belgorodskaya oblast	0	1	1	0	0	1,7
7	Bryansk oblast	0	1	1	0	0	1,2
8	Vladimirskaya oblast	0	0	0	0	0	0,6
9	Volgogradskaya oblast	0	0	1	1	0	2,9
10	Vologodskaya oblast	0	0	0	0	0	1,4
11	Voronezhskaya oblast	0	1	1	0	0	1,6
12	Evreiskaya avtonomnaya oblast	0	0	1	1	0	18,5
13	Ivanovskaya oblast	0	0	0	0	0	0,9
14	Republic of Ingushetiya	0	0	1	1	0	4,9
15	Irkutskaya oblast	0	0	0	0	0	13
16	Kabardino-Balkarskaya Republic	0	0	1	1	0	4,7

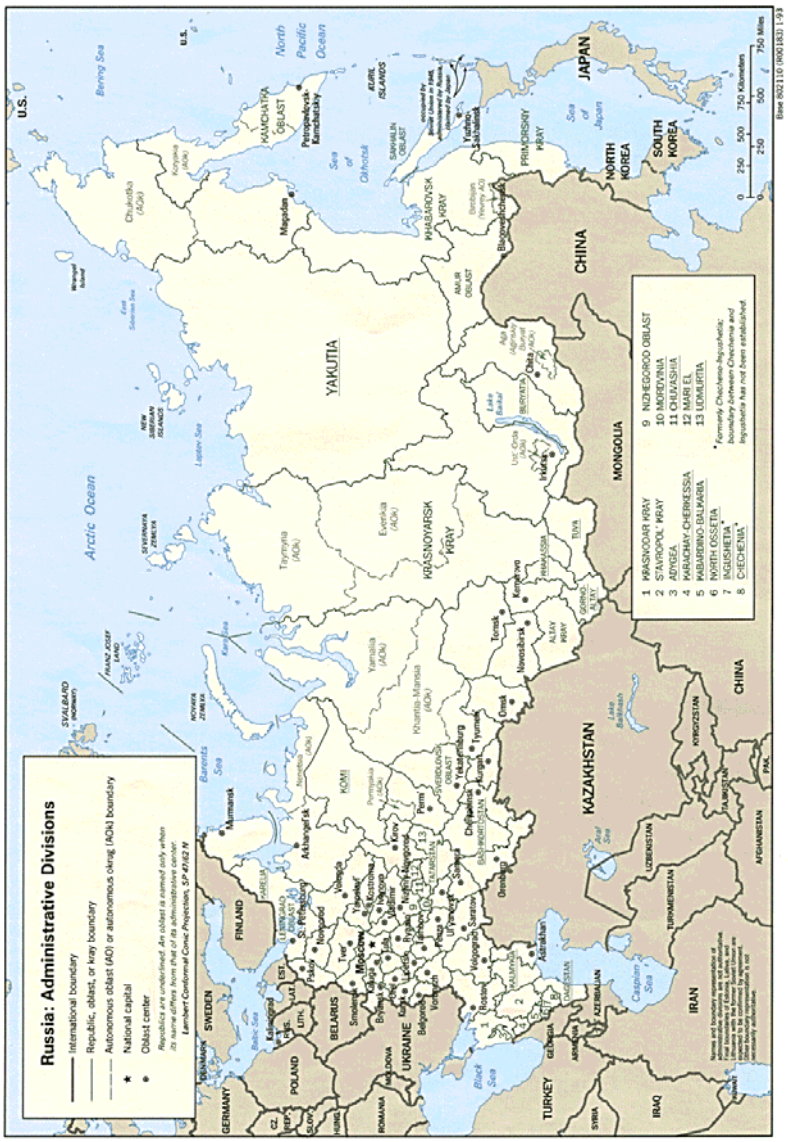
17	Kaliningrad economic region	0	1	1	0	0	3,4
18	Kaluzhskaya oblast	0	0	0	0	0	0,4
19	Kamchatskaya oblast	1	0	1	0	0	21,4
20	Karachaevo-Cherkesskaya Republic	0	0	1	1	0	4,4
21	Kemerovskaya oblast	0	0	0	0	0	9,4
22	Kirovskaya oblast	0	0	0	0	0	2,5
23	Komi-Permyatsky avtonomny okrug	0	0	0	0	0	3,5
24	Koryaksky avtonomny okrug	1	0	1	0	0	20
25	Kostromskaya oblast	0	0	0	0	0	1
26	Krasnodarsky krai	0	1	1	0	0	3,6
27	Krasnoyarsky krai	0	0	0	0	0	10,8
28	Kurganskaya oblast	0	0	1	1	0	5,4
29	Kurskaya oblast	0	1	1	0	0	1,4
30	Leningradskaya oblast	0	1	1	0	0	2,5
31	Lipetskaya oblast	0	0	0	0	0	1,2
32	Magadanskaya oblast	1	0	1	0	0	18,8
33	Moskva	0	0	0	0	0	0,01
34	Moskovskaya oblast	0	0	0	0	0	0,1
35	Murmanskaya oblast	0	1	1	0	1	4,8
36	Nenetsky avtonomny okrug	0	0	0	0	1	5
37	Nizhegorodskaya oblast	0	0	0	0	0	1,2

38	Novgorodskaya oblast	0	0	0	0	0	1,4
39	Novosibirskaya oblast	0	0	1	1	0	9
40	Omskaya oblast	0	0	1	1	0	7
41	Orenburgskaya oblast	0	0	1	1	0	3,8
42	Orlovskaya oblast	0	0	0	0	0	1,1
43	Penzenskaya oblast	0	0	0	0	0	1,9
44	Permskaya oblast	0	0	0	0	0	3,6
	REGIONS	East	West	Border	South	North	Distance
45	Primorsky krai	1	0	1	1	0	20
46	Pskovskaya oblast	0	1	1	0	0	1,8
47	Republic of Adygeya	0	1	1	1	0	4,2
48	Republic Altai	0	0	1	1	0	10,3
49	Republic of Bashkortastan	0	0	1	1	0	4,6
50	Republic Buryatiya	0	0	1	1	0	13,9
51	Republic of Dagestan	0	0	0	1	0	5
52	Republic of Kalmykiya	0	0	1	1	0	3,8
53	Republic of Kareliya	0	1	1	0	1	3,1
54	Republic of Komi	0	0	0	0	0	3,5
55	Republic of Mariy-El	0	0	0	0	0	2,2
56	Republic of Mordoviya	0	0	0	0	0	1,7

57	Republic of Sakha (Yakutiya)	0	0	0	0	1	15,2
58	Republic of Severnaya Osetiya-Alaniya	0	0	1	1	0	4,8
59	Republic of Tatarstan	0	0	0	0	0	2,7
60	Republic Tyva	0	0	1	1	0	11,2
61	Republic Khakasiya	0	0	0	0	0	10,5
62	Rostovskaya oblast	0	1	1	0	0	3
63	Ryazanskaya oblast	0	0	0	0	0	0,7
64	Samarskaya oblast	0	0	1	1	0	2,7
65	Saint-Petersburg	0	1	1	0	0	2,1
66	Saratovskaya oblast	0	0	1	1	0	2,4
67	Sakhalinskaya oblast	1	0	1	0	0	20,8
68	Sverdlovskaya oblast	0	0	0	0	0	4,5
69	Smolenskaya oblast	0	1	1	0	0	1,1
70	Stavropolsky krai	0	0	0	0	0	4,1
71	Taimyrsky avtonomny okrug	0	0	0	0	1	8,7
72	Tambobskaya oblast	0	0	0	0	0	1,4
73	Tverskaya oblast	0	0	0	0	0	0,6
74	Tomskaya oblast	0	0	0	0	0	8,9
75	Tulskaya oblast	0	0	0	0	0	0,6

76	Tyumenskaya oblast	0	0	1	1	0	5,5
77	Udmurtskaya Republic	0	0	0	0	0	3
78	Ulyanovskaya oblast	0	0	0	0	0	2,2
79	Ust-Ordynsky Buryatsky avtonomny okrug	0	0	0	0	0	13
80	Khabarovsky krai	1	0	1	1	0	18,9
81	Khanty-Mansiisky avtonomny okrug	0	0	0	0	0	6,9
82	Chelyabinkskaya oblast	0	0	0	0	0	3,6
83	Chitinskaya oblast	0	0	1	1	0	14,9
84	Chuvashskaya Republic	0	0	0	0	0	1,8
85	Chukotsky avtonomny okrug	1	0	1	0	1	18,1
86	Evenkiisky avtonomny okrug	0	0	0	0	0	10,6
87	Yamalo-Nenetsky avtonomny okrug	0	0	0	0	1	7,4
88	Yaroslavskaya oblast	0	0	0	0	0	0,8

Annex 2. Map


Russia: Administrative Divisions
International boundary
Republic, oblast, or kray boundary
Autonomous oblast (AO) or autonomous okrug (AOk) boundary
National capital
Oblast center
Arctic Ocean
Bering Sea
North Pacific Ocean
Sea of Okhotsk
Sea of Japan
Barents Sea
Baltic Sea
Black Sea
Caspian Sea
Aral Sea
Lake Baikal
YAKUTIA
KRASNOYARSK KRAY
KAMCHATKA OBLAST
KHABAROVSK KRAY
PRIMORSKIY KRAY
AMUR OBLAST
SAKHALIN OBLAST
KOMI
PERM OBLAST
SVERDLOVSK OBLAST
ALTAY KRAY
TYUMEN OBLAST
TUVA
KHAKASSIA
CHINA
MONGOLIA
KAZAKHSTAN
JAPAN
NORTH KOREA
SOUTH KOREA
FINLAND
SWEDEN
NORWAY
BELARUS
UKRAINE
POLAND
GERMANY
TURKEY
IRAN
IRAQ
1 KRASNODAR KRAY
2 STAVROPOL' KRAY
3 ADYGEA
4 KARACHAY-CHERKESSIA
5 KABARDINO-BALKARIA
6 NORTH OSSETIA
7 INGUSHETIA*
8 CHECHENIA*
9 NIZHEGOROD OBLAST
10 MORDOVIA
11 CHUVASHIA
12 MARI EL
13 UDMURTIA
* formerly Chechen-Ingushetia; boundary between Chechnya and Ingushetia has not been established

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