Regional Convergence and Institutional Development in Russia[1]

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Abstract

This paper is an attempt for shedding light on the relatively poor economic performances of Russian regions, as compared to Central and Eastern European Countries (CEECs hereafter). It looks at the determinants of economic convergence across Russian regions and *oblasts*, then at the role played by institutions on the speed of convergence. The methodology rests on a convergence equation, where the regional GDP per capita is regressed on its own lagged value; unit-root tests make use of the time series information; depending upon the closeness of the estimated coefficient to one, we conclude that a convergence process is at work or not. The innovation of the paper consists in writing the coefficient of convergence as a function of market institutions, and to show that initial differences from a common trend are absorbed more quickly if market institutions - such as macro-economic stabilisation, price liberalisation, small-scale privatisation, break-up of state-owned enterprises – are implemented.

Keywords: economic integration, regional convergence, panel unit root test

JEL classification: C23, E30, F15

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Introduction

This paper is an attempt for shedding light on the relatively poor economic performances of certain Russian regions, as compared to CEECs, by looking at the degree of economic convergence across Russian regions and *oblasts*, then at the role played by institutions on the speed of convergence. The main explanation for the low record of Russia as compared to other transition countries is, as argued by Shleifer (1997), the government's failure to provide institutions that promote business growth. Zhuravskaia (2000) recently demonstrates that one key institution for promoting such a business growth is the fiscal scheme, providing or not the local governments with the right incentives of favouring private business and supplying a sufficient level of public goods provision. More generally, the *Journal of Economic Perspectives* publishes in 2002 a symposium on the role of institutional reforms for explaining the diverging adjustment trajectories: institutions in the labour market[2], banking sector[3], the ability of developing a functioning legal framework and corporate governance scheme [4].

That paper starts from several stylised facts: labour mobility is remarkably low; Russian federalism, highly centralised, turns out to be inefficient[5], as shown by Lavrov, Litwack, and Sutherland (2000); although highly flexible, the labour market is not guarantying the factor reallocation towards the most productive sectors of the economy. Those features imply that Russia is far from constituting an OCA (Optimal Currency Area). Furthermore, one can ask whether the high level of centralisation is compatible with the observed degree of convergence within regions, and between regions. This question is addressed by looking at the speed of regional convergence. In this process, institutions such as the degree of price regulation, subsidies, and the extent of privatisation, play a key role.

Section 1 summarises the main motivations of the paper, while section 2 estimates the speed at which Russian regions converge towards each other[6]. The analysis is based upon a very rich panel of 11 aggregate macro regions, called regions[7], and 88 sub-regions, thereafter *oblasts*[8]. One interesting result is that the degree of convergence is higher within macro regions than between them. This finding supports the view defended in Kocenda (2001) for transition countries that more homogenous institutional framework favours convergence. Section 3 examines the evidence for conditional convergence, by writing that the coefficients of the convergence equation depend upon the institutional setting-up. Conclusion draws the main policy implications.

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[2] See Tito Boeri and Katherine Terrell (2002).
[3] See Jan Svejnar (2002).
[4] See Jan Svejnar (2002).
[5] The high number of contradictory laws and regulations make their fulfilment unfeasible in practice.
[6] Besides the question of convergence, running the analysis prior to/ and including August, 1998, allows to analyse the impact of the financial crisis on convergence.
[7] Until 2001. Later on, the administrative structure has been changed.

Background and Related Literature

A set of alternative conditions must be fulfilled for a Currency Union (CU hereafter) to be sustainable: labor mobility must be high, wage and prices flexible, or budgetary transfers must be able to re-distribute wealth in case of asymmetric shocks. In the case of the Russian regions, labor mobility is as low (maybe lower) as within CEECs (Central European Eastern Countries)[9], fiscal transfers tend to worsen regional inequality[10] instead of contributing to fill in the gap between rich and poor regions. The only favourable indicator is the flexibility of prices and wages, including arrears, but Friebel and Guriev (2000) argue convincingly that the generalisation of in-kind payments and various arrears contribute to explain the low degree of workers mobility towards more prosperous regions away from regions with high unemployment rates. Nevertheless there would be less need for international factor mobility or for fiscal instruments to offset differentials in GDP per head if we were observing a natural tendency for poorer regions to catch up richer regions, in other words if poorer regions were converging towards richer ones. We first review the empirical evidence in terms of fiscal transfers, labour mobility and wage flexibility, then we will assess the extent to which a convergence process occurred over the nineties.

- *Fiscal transfers*

In Russia interregional fiscal inequality increases with fiscal decentralisation: richer regions get richer; more vulnerable regions get poorer. As shown in the following table, the coefficient of variation of regional revenues (set equal to the standard deviation divided by the mean) increased markedly from 1991 to 1994 and then remained stable. A similar picture emerges if one considers the ratio between revenues of the highest-revenue region and those of the lowest-revenue region in each year. From 1992 to 1995, this ratio increases and reaches a pick equal to 619, which means that the fiscally richest region received more than 600 times the revenues of the poorest.

Table 1 : Fiscal Inequality in the Russian Economy, 1991-97

	1991	1992	1993	1994	1995	1996	1997
Coefficient of Variation of Regional Revenues	1.0	1.08	1.18	1.50	1.50	1.40	1.49
Maximum Reg. Revs. / Minimum Reg. Revs.	258	107	200	339	619	472	556
Memo: Regional Tax Share	35.3	40.1	54.9	52.7	49.8	52.0	55.5

Sources: Table 5 page 30 in Treisman (1999)

[8] Those *oblasts* are sub-parts of regions. Also, by the term *"olbast"* we denote both an *oblast* itself, e.g. *Moscow oblast* and a city, e.g. the city of Moscow.

[9] Kapelyushnikov (1999) argues that labor mobility is not lower than in other transition countries; but Fidrmuc (2002) shows that mobility across Czech and Slovak Republics, Polish and Czech regions turns out to be strikingly low.

[10] See Treisman (1999), who argues that under the assumption of revenue-maximizing governments in a federal state with revenue-sharing and imperfect hw enforcement, many problems, including growing interregional fiscal inequality, can emerge. He takes Russia as an example.

According to this picture of increasing regional inequalities, Zhuravskaya (2000) argues that the rules of revenue sharing provide with no incentive to increase tax base and favour the formation of private business; hence the growing inequalities between Russian regions may be explained by the government's failure to provide fiscal institutions that would promote business growth.

- *Labor mobility*

In a recent report published in *Industrial and Labor Relations Review*, Simon Clarke (2002) reviews all the factors which may explain the dramatic increase in wage inequality across and within regions, occupations, and branches. The main conclusion is based upon the fact that Russian wages exhibit a very high degree of flexibility and that there is no evidence that the low labour mobility should be responsible for persisting inequalities between low and high wages. Contrary to what most labour economists would believe, "wages may be flexible, but this does not necessarily mean that they are performing their appropriate economic function of re-deploying labour from less to more productive uses" (Clarke, page 8). For Commander *et alii* (1993) the pattern of wage differentiation reflects the control structure and decision-making rules characterising the bulk of Russian firms, the latter aiming at paying competitive wages, above their market clearing, for maintaining attachment. It is worth noticing that wage inequality within region is substantially higher than between regions, which means that the change for a worker of getting an higher wage would be higher by moving within his region than towards another region. Nevertheless the latter mobility is very likely to be seriously impeded by administrative barriers (such as *propiska*, which is an internal visa required to obtain the right of moving).

Taking into account wage arrears and in-kind payments is very likely to change significantly the pattern of wage inequalities depicted above. Friebel and Guriev (2000) show in a very comprehensive and convincing framework that non cash components of wage inequality explain both why workers mobility is very low - workers are not able to raise the cash needed to cover fixed costs associated with such a mobility - and why firms benefit from providing more skilled workers with higher compensation non-cash payment - proceeding that way, they are indeed able to attach those workers who pay off only if they stay. One consequence of the negative correlation between regional mobility and in kind payments, which in turns is correlated with the lack of restructuring, is to enforce a diverging process between from one hand regions where more restructuring implies less in kind payments and less migration flows (workers benefit from staying in more prosperous regions), and from the other hand poor regions which accumulate in-kind payments and where workers are locked in. Empirical evidence supports the view that in kind payment decreases the probability of moving by 19%.

- *Wage flexibility*

Wage flexibility is very high in Russia, but as for worker mobility, it is not used in a way which would promote the allocation of workers towards sectors corresponding to their marginal productivity. Brana and Maurel (2001) argue that wage flexibility induced by the generalisation of arrears and in kind payment allow firms to avoid massive layoffs and maintain employment at a level, which is above what would imply market clearing. In a recent symposium published in the *Journal of Economic Perspectives*, Boeri and Terrell (2002) explain the poor performance of Russia in terms of restructuring by the government's failure to adopt social policies and institutions that would have uphold wages at the bottom of the distribution and forced the old sector and backward regions to restructure.

Given the poor functioning of the market instruments that would compensate for significant regional disparities, it is worth asking whether the interregional arbitrage allows those disparities to be absorbed by convergence over time; in other words, whether convergence in prices, revenues per head, or in whatever macro-economic indicator, occurs.

Convergence in Russia: the framework

Convergence in Russian prices has been extensively analysed[11]; The principal result is that after a period of prices divergence induced by the sudden freeing or prices from regulation in 1992, market institutions were developing and the process of interregional arbitrage started to function.

Literature

For what regards revenue per head, according to the initial definition derived from growth models (Solow, 1956; Cass, 1965; Koopmans, 1965), absolute convergence means that per capita incomes of poor countries tend to converge to per capita incomes of rich countries irrespective of the initial endowments and all other conditions. This prediction however is not validated by empirical observation, what is observed is rather an increasing gap between rich and poor countries. Nevertheless, by looking at convergence across countries which belong to a cluster with similar institutions, environment, capital stock, one retrieves a weaker version of the notion of convergence, called conditional convergence. According to this latter notion, per capita incomes of poor countries

[11] See Gardner and Brooks (1993) find substantial prices differences due to resistance to reforms; Goodwin et al. (1996) use cointegration and causality tests for showing that local markets are economically linked, Berkowitz et al. (1998) show that price gap are decreasing over time; they obtain evidence of cointegration between state and market prices across regions, Zarova and Prozhivina (1997) establish significant relationships between regional prices and the level of economic development, and Gluschenko (2001) uses a non-linear threshold model for analysing the speed of price convergence towards the national level across 7 regions of West Siberia.

tend to converge to those of rich countries irrespective of the initial endowments if all other conditions are equal (in particular institutions).

Carluer and Sharipova (2001) computed for Russia two traditional measures of convergence (beta and sigma convergence); they found the striking result of a beta-divergence and sigma-divergence over 15 years. The concept of beta convergence comes from the following equation:

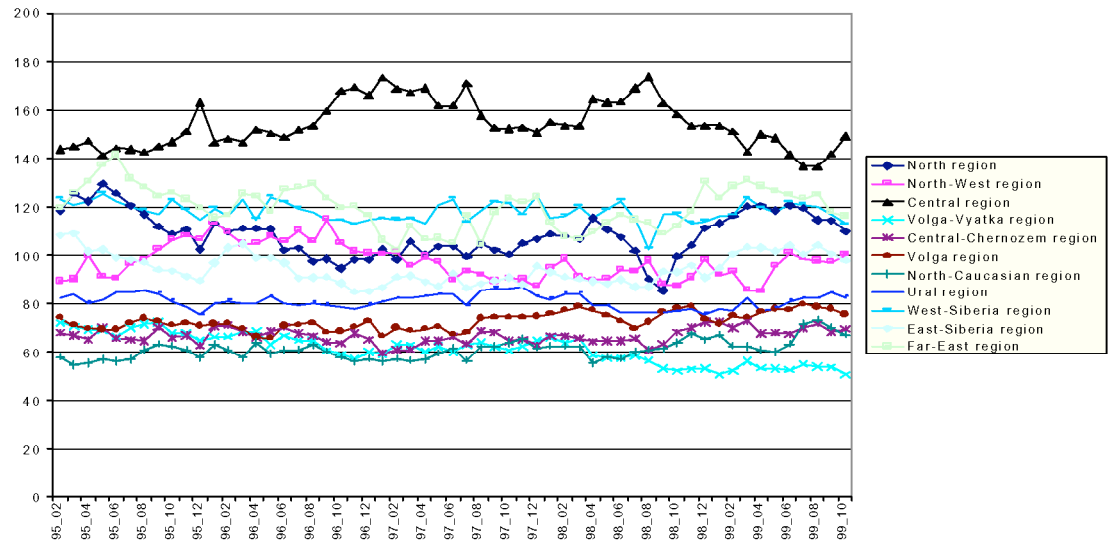
$$\ln(y_T / y_0) = b \ln(y_0) + g'x + \varepsilon \qquad (1)$$

where y_0 and y_T denote the first and last period, x a vector of explanatory variables, and ε the error term.

Using a panel data of 88 regions over 1985-99, and testing without x, authors do not find any significant (negative) relationships between current and initial income, gross regional product, and industrial output. However, controlling for differences in physical and human capital, investment in education and capital, and public expenditures, b becomes significant and negative, and allows to compute a speed of convergence of gdp per head of 15% per year.

We report below the revenue per capita in percentage of national average across eleven regions from 1995 up to 1999; the same pattern of no absolute convergence comes out:

Figure 1 : Regional money incomes per capita as % of the national average

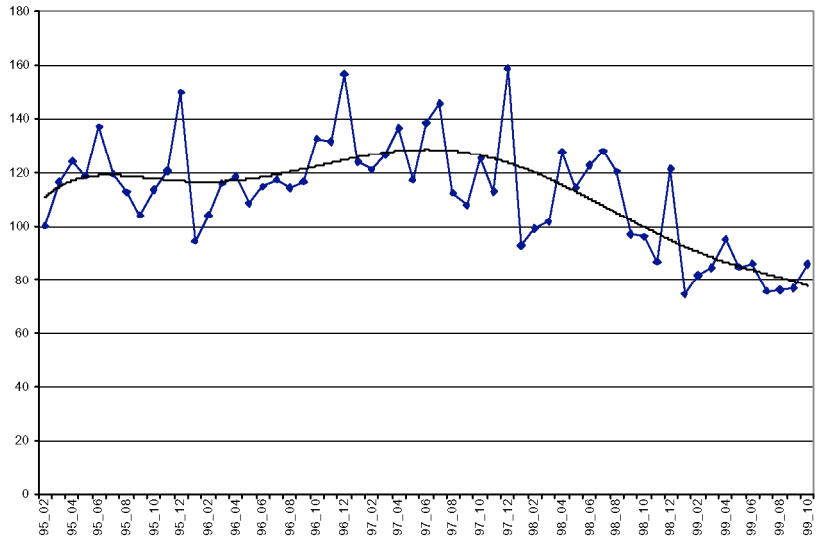


Source: Goskomstat, authors computations

Sigma-convergence complements the previous analysis in terms of beta-convergence. It refers simply to the notion of sample's variance, as indicated in the following expression: $\sigma_t^2 = \sum_t (y_{it} - \bar{y})^2$, where $\bar{y}$ relates to the sample mean.

In Carluer and Sharipova (2001), the dispersion of regional income per capita, gross regional product and industrial output again increases over the last decade, highlighting the increasing difficulties, if any, of conducting a common monetary policy across the whole territory. Contrary to this last results and focusing on the last years (from 1996, February, to 1999, October), we find that the variance of monthly incomes per capita across 11 regions tends to decrease (see Figure 2).

Figure 2 : sigma-convergence
(Variance of incomes per capita across 11 regions)



Source: Goskomstat, authors computations

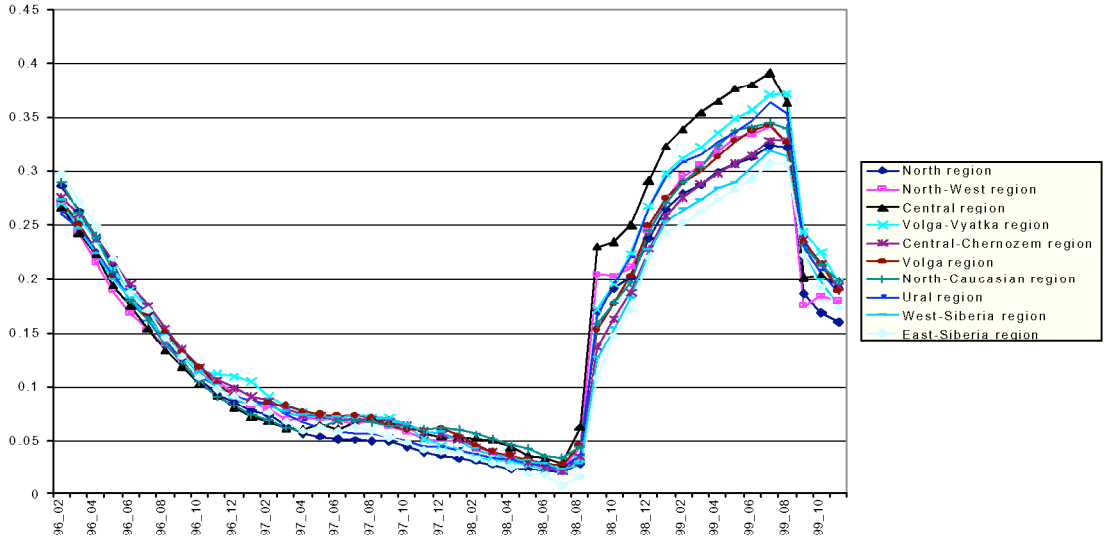
Data

The data used in this paper come from the Goskomstat[12]; they constitute a balanced panel of selected monthly macro-economic indicators, which include consumer prices and income per capita over 1995:02-1999:11 and across approximately one hundred Russian regions.

We combine those macro-economic indicators with the following Lavrov's institutional indicators built up at the regional level and reported for 1996: the share of goods and services whose prices are regulated, the degree of prices regulation, the extent of privatisation of trade, catering and household services, budget subsidies for agriculture, and production subsidies in budget spending.

[12] Goskomstat is the official Russian statistical agency.

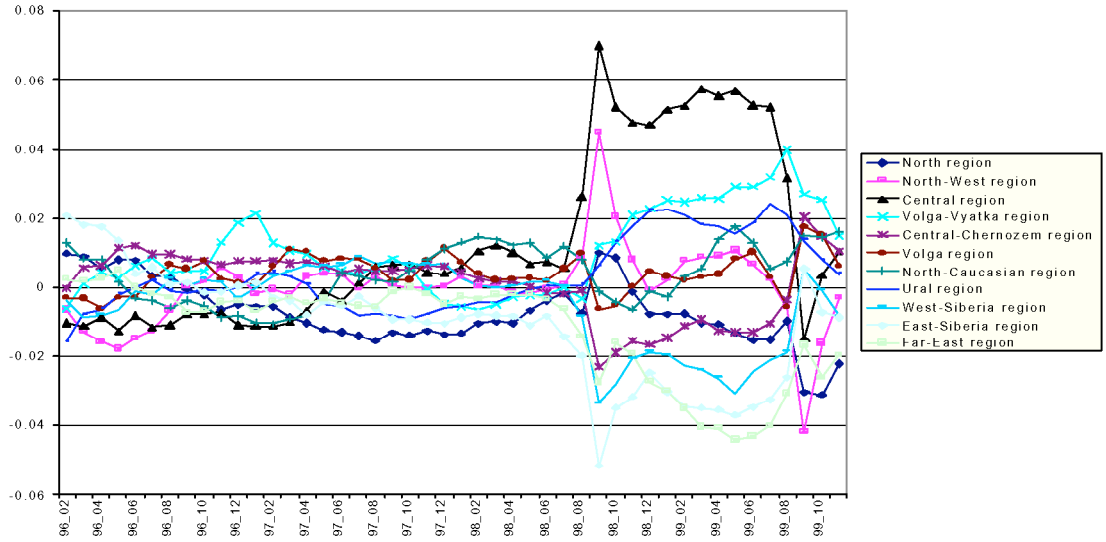
Figure 3 : Consumer prices (11 aggregate regions, log 12th differences)



Source: Goskomstat, authors computations

Figure 3 above reports the logarithm of consumer prices in 11 aggregate regions; prices are clearly exhibiting a decreasing trend up to 1998, august, when the financial crisis occurs.

Figure 4 : Consumer prices (11 aggregate regions, differences from the average)

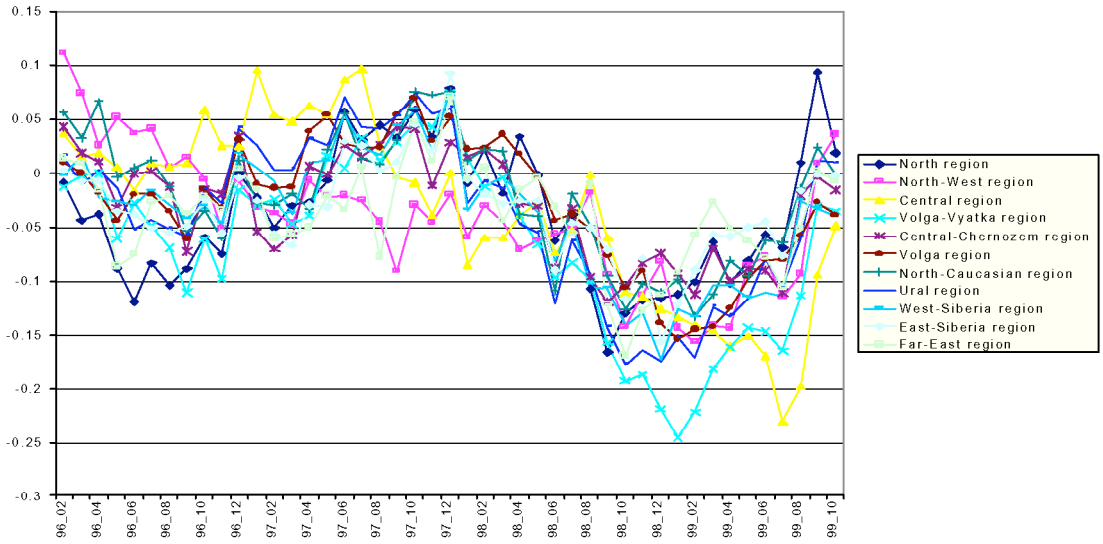


Source: Goskomstat, authors computations

By taking the difference from the average (Figure 4) we see that the sharp increase in inflation in 1998 translates into an increase in the volatility of inflation. Once the shock occurred, volatility decreases alongside with stabilisation, which could contribute to increase the estimated degree of convergence. More generally, it is very likely that any event, affecting equally all Russian regions, has

an impact on the estimated convergence equation. In the present case, we expect the degree of convergence to be lower over the period before the crisis and higher over the period including the crisis.

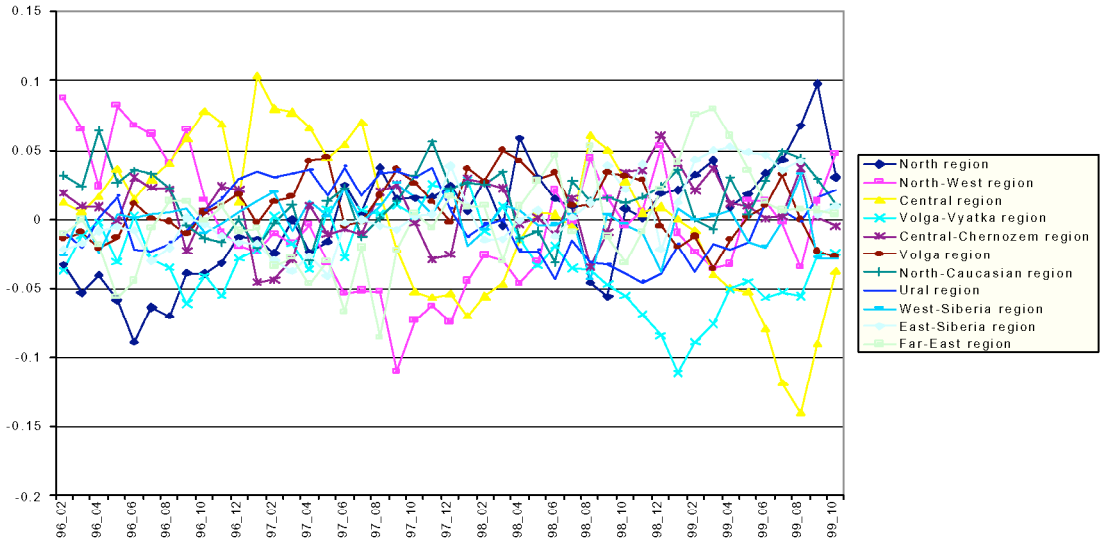
Figure 5 : Real money incomes per capita (11 aggregate regions, log 12th differences) over 1996:01 – 1999:10



Source: Goskomstat, authors computations

Figure 5 reports the pattern of rates of growth of regional income per capita from 1996 up to 1999. Overall, the average rate of growth is decreasing until the crisis, then it exhibits a slight tendency of recovering. Expressed in terms of differences from the average (see Figure 6), we do not observe, as was the case for prices, any increase in the volatility of income per capita.

Figure 6 : Real money incomes per capita (11 aggregate regions, differences from the average)



Source: Goskomstat, authors computations

Methodology

The methodology used in this paper rests on panel unit root tests, as operationalized by Levin and Lin (1992), Ben-David (1995, 1996), Kocenda and Papell (1997) and Kocenda (2001). The first step consists in removing the seasonal component of monthly consumer prices (CPI) and real money incomes per capita (IPC), by computing for each region yearly growth rates X_t:

$$X_t = \log P_t - \log P_{t-12} \tag{2}$$

where P_t is Consumer Price Index or Industrial Price C at period t.

Let define an autoregressive process for each region i:

$$X_{i,t} = c + dX_{i,t-1} + \varepsilon_{i,t} \tag{3}$$

where $X_{i,t}$ is the growth rate of consumer prices or money incomes as defined in (2).

Rearranging the terms, we obtain:

$$X_{i,t} - \overline{X}_t = d(X_{i,t-1} - \overline{X}_{t-1}) + u_{i,t} \tag{4}$$

where $\overline{X}_t$ is a simple average over the regions. The error terms $\varepsilon_{i,t}$ and $u_{i,t}$ are assumed to be i.i.d. We define D which is the difference between X and the average across regions:

$$D_{i,t} = X_{i,t} - \overline{X}_t \tag{5}$$

Equation (4) can be re-written as follows:

$$D_{i,t} = dD_{i,t-1} + u_{i,t} \tag{6}$$

For removing residual auto-correlation, equation (6) is expressed in the form of the augmented Dickey and Fuller specification:

$$D_{i,t} = dD_{i,t-1} - \sum_{j=1}^{k} \gamma_j \Delta D_{i,t-j} + z_{i,t} \tag{7}$$[13]

where $\Delta D_{i,t} = D_{i,t} - D_{i,t-1}$ - the first difference of $D_{i,t}$.

The optimal number of lags k in (7) is determined empirically. We start from k=7; if the 7th lag is significant, we keep all the lags. Otherwise, we reduce the number of lags by one, and consider k=6. The procedure is iterated until the last lag is significant.

To take into account for small sample size, we compute critical values for d using Monte-Carlo simulations with 5000 replications.

[13] Note that multicollinearity can be a serious problem in (7). We perform diagnostic checking by calculating the variance inflation factors (VIF).

The coefficient d is a measure of convergence. If it tends to one, i.e. if d has an unit-root, the variable differential remains constant. Values smaller than one are thus an indication for convergence, values higher than one for divergence.

Using d, we can compute a coefficient (labelled *H-L or* half-life thereafter), which is the number of periods needed for $D_{i,t}$ to decrease by one half.

$$H\text{-}L = log(0.5)/log(d) \tag{8}$$

So far we supposed that the coefficient d was constant. Now we relax this assumption. Let specify d as a function of institutions:

$$d = d_0 + \vec{b} \cdot \vec{I}_i = d_0 + \sum_{j=1}^{J} b_j inst_{j,i} \tag{9}$$

where *inst* is a vector of J institutional variables. By writing (9) we assume that institutions $inst_{j,i}$ vary across regions i but are constant over time. Substituting d into (3) we obtain:

$$X_{i,t} = c + (d_0 + b \cdot inst_i) X_{i,t-1} + \varepsilon_{i,t} \tag{3'}$$

$$\overline{X}_t = c + d_0 \overline{X}_{t-1} + b \cdot \overline{inst \cdot X_{t-1}} + \varepsilon_t \tag{3''}$$

$$X_{i,t} - \overline{X}_t = d_0 (X_{i,t-1} - \overline{X}_{t-1}) + b(inst_i X_{i,t-1} - \overline{inst \cdot X_{t-1}}) + u_{i,t} \tag{4'}$$

Or, equivalently:

$$D_{i,t} = d_0 D_{i,t-1} + b(inst_i X_{i,t-1} - \overline{inst \cdot X_{t-1}}) + u_{i,t} \tag{6'}$$

$$D_{i,t} = d_0 D_{i,t-1} + b(inst_i X_{i,t-1} - \overline{inst \cdot X_{t-1}}) - \sum_{j=1}^{k} \gamma_j \Delta D_{i,t-j} + z_{i,t} \tag{7'}$$

Convergence and Institutions: Results

For checking the reliability of the above methodology, we apply it to monthly CPI in the three Baltic States and retrieve the same results, as in Kocenda (2001). They are reported in Table 2 below.

Table 2 : Consumer prices growth rates, Baltic states, Jan. 1992 – Dec. 1998

	Unit root coefficient	t-stat	Number of lags	Half-life	Critical values		
					1%	5%	10%
Kocenda (2001)	0.877***	-10.48	6	5.28	-2.64	-1.96	-1.59
Our estimates	0.878***	-10.17	6	5.33	-2.64	-1.98	-1.60

Note: *** Significant at 1% level

Let now estimate the degree of convergence of consumer prices and real money incomes growth rates in the Russian Federation. Results are reported in

Table 3 and Table 4. They are significant at 1% level, except two estimates, which are significant at only 5% level[14]. All regressions pass successfully multicollinearity diagnostics (not reported here): the maximum variance inflation factor (VIF) scores do not exceed 6.

We observe that, on average, convergence within regions is higher than convergence between regions. One striking result is that convergence of consumer prices within or between Russian regions turns out to be lower than across other transition countries: it takes on average 7.5 months for an initial price difference to be halved in Russia, but only 5.3 in the Baltic States.

Taking into account the financial crisis in 1998 does not qualitatively change the results. As expected for prices, convergence is slightly higher if we include the period of the crisis and its subsequent stabilisation. But for growth rates of real incomes per capita, the reverse occurs, that is, convergence is higher if we exclude the period of the crisis. In both cases, the difference is not huge however. We interpret those results as supporting the view that the bias induced by a common trend, a common monetary policy, or common shock like the financial crisis for 1998 Russia, is not systematically sized downwards or upwards[15]; Moreover, it affects only marginally the speed of convergence, by less than 10%[16].

The number of periods needed for the difference in prices (in real income per capita) to decrease by one half, between the eleven macro regions, is found to be ranged between 7.5 and 8.23 months (7.76 and 2.26). Within those regions, convergence is significantly higher, whatever the variable we are looking at. For prices, the number of months needed for dividing an initial difference, within a macro region, by one half is 5.22[17]; while the number of months requested for a difference in real income per capita to be halved fall to 1.65[18]. By assuming that the degree of institutional similarity is higher within macro regions than across them, those results support the view that a more homogeneous institutional framework favours the process of convergence.

[14] real money income growth rates in the North-West region and consumer prices growth rates in the North region both estimated prior to the crisis.
[15] Ideally we would like to take into account this bias, which is extensively discussed in Bessonov (1998). Notice that the estimates in Kocenda (2001) are affected as well by the common trend induced by the same restrictive monetary policy conducted by the countries, which aim at joining the EU.
[16] 10% is the increase in the number of months required for an initial difference to be halved when we run the equation over the whole period, including the financial crisis. In other words, it is set equal to (8.23 – 7.5) / 7.5.
[17] Respectively 5.59 if we consider the period before the crisis.
[18] Respectively 1.37 if we consider the period prior to the crisis.

Table 3 : Consumer prices growth rates

Total period (Feb. 1995 – Nov. 1999)

Region	Number of *oblasts* in a region	Number of lags k	Unit root coefficient d	t-stat (d)	Half-life[1]	Critical values 1%	5%	10%
Russia	11	2	0.912	-4.19	7.50	-2.54	-1.94	-1.60
North region	5	0	0.877	-3.75	5.26	-2.63	-1.91	-1.60
North-West region	4	3	0.879	-3.01	5.40	-2.68	-1.97	-1.63
Central region	13	7	0.869	-5.92	4.92	-2.53	-1.91	-1.60
Volga-Vyatka region	5	7	0.841	-4.13	4.02	-2.54	-1.90	-1.58
Central-Chernozem region	5	6	0.827	-5.42	3.65	-2.61	-1.92	-1.59
Volga region	8	6	0.835	-5.05	3.85	-2.53	-1.88	-1.58
North-Caucasian region	7	0	0.882	-5.01	5.52	-2.48	-1.94	-1.61
Ural region	7	6	0.820	-5.32	3.48	-2.50	-1.90	-1.59
West-Siberia region	7	1	0.906	-4.54	6.98	-2.51	-1.91	-1.59
East-Siberia region	6	6	0.927	-3.06	9.14	-2.49	-1.90	-1.58
Far-East region	8	5	0.876	-4.81	5.22	-2.58	-1.90	-1.58
Average over regions			0.867		5.22			

Note: [1]Number of months needed for the difference to be decreased by two

Prior to the crisis (Feb. 1995 – Aug. 1998)

Region	Number of *oblasts* in a region	Number of lags k	Unit root coefficient d	t-stat (d)	Half-life[1]	Critical values 1%	5%	10%
Russia	11	3	0.919	-3.08	8.23	-2.65	-2.00	-1.64
North region	5	0	0.941	-2.12	11.38	-2.62	-1.96	-1.62
North-West region	4	6	0.847	-2.88	4.18	-2.49	-1.91	-1.58
Central region	13	7	0.841	-5.04	3.99	-2.63	-1.98	-1.62
Volga-Vyatka region	5	7	0.804	-4.32	3.18	-2.62	-1.94	-1.62
Central-Chernozem region	5	5	0.824	-4.65	3.58	-2.53	-1.93	-1.60
Volga region	8	6	0.846	-4.06	4.14	-2.47	-1.88	-1.57
North-Caucasian region	7	7	0.827	-5.23	3.66	-2.49	-1.88	-1.58
Ural region	7	2	0.908	-4.51	7.22	-2.52	-1.93	-1.61
West-Siberia region	7	0	0.926	-3.37	9.06	-2.57	-1.95	-1.64
East-Siberia region	6	6	0.846	-4.30	4.14	-2.54	-1.94	-1.59
Far-East region	8	5	0.884	-4.33	5.60	-2.54	-1.91	-1.59
Average over regions			0.865		5.59			

Note: [1]Number of months needed for the difference to be decreased by two

Table 4 : Real money income per capita growth rates

Total period (Feb. 1995 – Nov. 1999)

Region	Number of *oblasts* in a region	Number of lags k	Unit root coefficient d	t-stat (d)	Half-life[1]	Critical values 1%	5%	10%
Russia	11	6	0.735	-6.27	2.26	-2.53	-1.92	-1.58
North region	5	7	0.643	-3.80	1.57	-2.63	-1.96	-1.63
North-West region	4	7	0.597	-4.57	1.34	-2.59	-1.93	-1.62
Central region	13	5	0.772	-6.21	2.68	-2.47	-1.93	-1.59
Volga-Vyatka region	5	7	0.558	-5.53	1.19	-2.63	-1.96	-1.63
Central-Chernozem region	5	7	0.552	-6.31	1.17	-2.63	-1.96	-1.63
Volga region	8	2	0.668	-5.98	1.71	-2.46	-1.92	-1.61
North-Caucasian region	7	2	0.678	-5.50	1.78	-2.62	-1.93	-1.60
Ural region	7	1	0.742	-5.60	2.32	-2.51	-1.91	-1.59
West-Siberia region	7	1	0.652	-6.05	1.62	-2.51	-1.91	-1.59
East-Siberia region	6	7	0.650	-3.85	1.61	-2.55	-1.87	-1.58
Far-East region	8	1	0.562	-7.85	1.20	-2.59	-1.96	-1.59
Average over regions			0.643		1.65			

Note: [1]Number of months needed for the difference to be decreased by two

Prior to the crisis (Feb. 1995 – Aug. 1998)

Region	Number of *oblasts* in a region	Number of lags k	Unit root coefficient d	t-stat (d)	Half-life[1]	Critical values 1%	5%	10%
Russia	11	6	0.674	-6.13	1.76	-2.63	-1.94	-1.63
North region	5	7	0.528	-2.98	1.09	-2.62	-1.94	-1.62
North-West region	4	7	0.750	-2.03	2.41	-2.46	-1.87	-1.57
Central region	13	4	0.781	-5.14	2.81	-2.58	-1.95	-1.60
Volga-Vyatka region	5	7	0.476	-5.01	0.94	-2.62	-1.94	-1.62
Central-Chernozem region	5	7	0.537	-5.30	1.12	-2.62	-1.94	-1.62
Volga region	8	1	0.672	-5.19	1.74	-2.60	-1.93	-1.61
North-Caucasian region	7	1	0.627	-5.53	1.48	-2.52	-1.98	-1.66
Ural region	7	1	0.641	-5.57	1.56	-2.52	-1.98	-1.66
West-Siberia region	7	1	0.530	-6.08	1.09	-2.52	-1.98	-1.66
East-Siberia region	6	0	0.488	-7.49	0.97	-2.59	-1.91	-1.60
Far-East region	8	4	0.463	-5.28	0.90	-2.52	-1.89	-1.59
Average over regions			0.574		1.37			

Note: [1]Number of months needed for the difference to be decreased by two

We take now into account explicitly the institutional differences by estimating equation (7') in the previous section. We get two coefficients, b_0, which is the coefficient of the lagged difference in price or in real income per capita, and b, which is the coefficient of the difference between a given institution and its average across Russian regions. The equation is estimated over two samples. In the first sample we pool the eleven aggregate regions, for being able to compute the variance (and mean) of regional institutions across small regions within each macro-region. The second sample consists in the 75 micro regions and allows to exploit the whole information about institutions.

Results are presented successively in

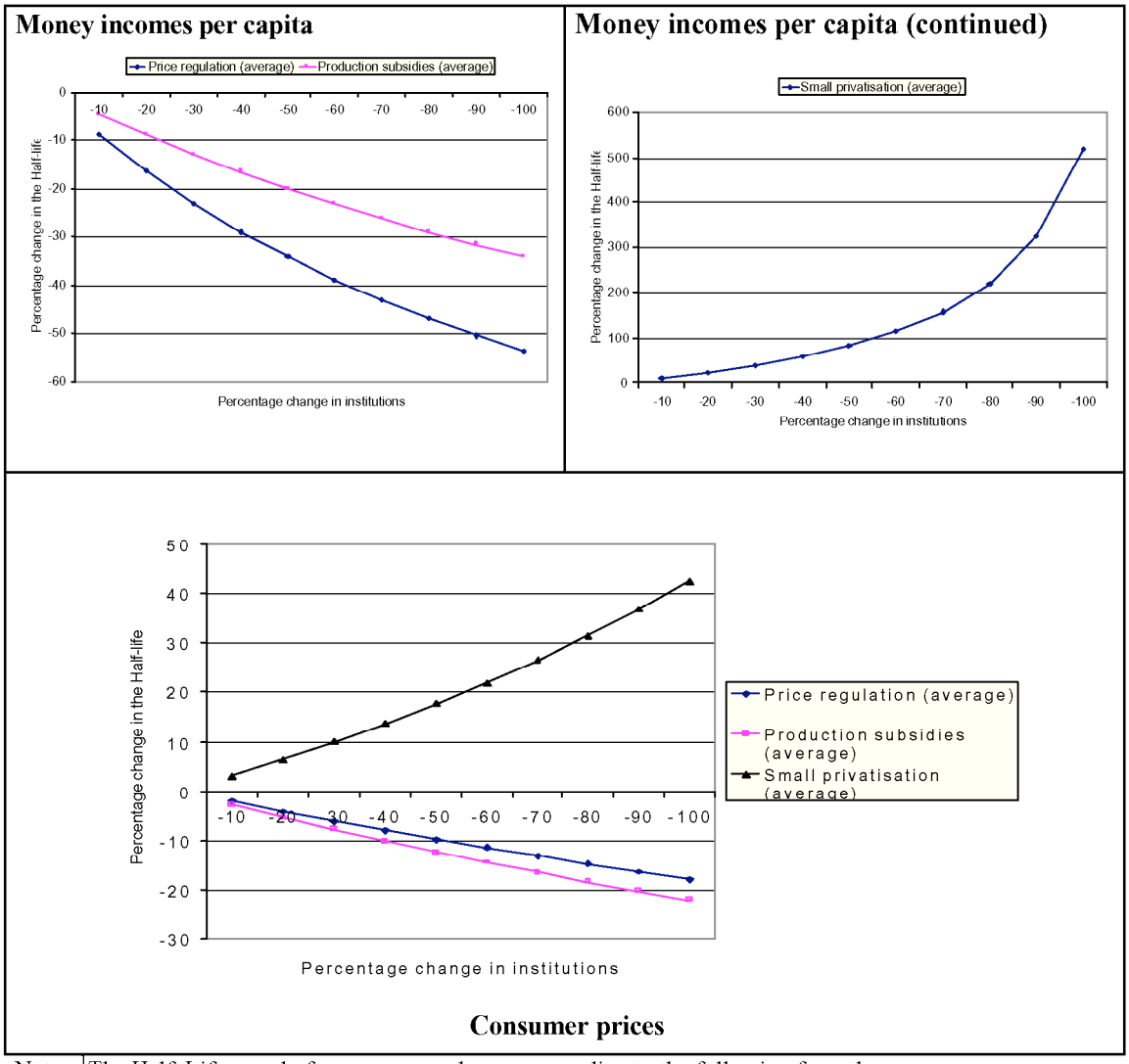
Table **5**, Table 6, and Table 7 in the Annex. The last column reports the calculated half-live time of convergence when we set equal to zero the institutional characteristics under consideration. In the absence of price regulation (*price regulation (average)* = 0), the time required for the convergence delay to decrease by one-half would represent 39% of the original time for money incomes and 63% for consumer prices. If subsidies to production were reduced to zero, the Half-life indicator would fall to 65% of its initial level for real money income and to 71% for consumer prices. Finally, in the absence of privatisation, the half-live period would last five times longer for money incomes and 1.23 times longer for consumer prices. We interpret those results as an evidence that market institutions favour economic convergence, while regulation and State intervention reduce it. The same judgement is reported in Gluschenko (2001)[19], who emphasises the role played by price controls, indirect price controls like subsidies, inter-regional trade protectionism ("According to Starikov (1999), decrees prohibiting or limiting removal of goods from a region were issued in 11 subjects of the Russian Federation", in Gluschenko, 2001, page 38), organised crime aiming at maintaining the rents, lack of nation-wide infrastructure for a consumer commodity market.

More institutional homogeneity – the latter being measured through the variance of institutions across regions which belong to a macro-region – influences the degree of convergence by increasing it. This result support the conventional wisdom that economic convergence is favoured when similar institutions are shared.

Using estimates in
Table **5**, we are able to compute the increase in the speed of convergence induced by a x% decrease in price regulation, x% percent decrease in subsidies to production, and x% increase in the extent of small privatisation. For example, a ten (fifty) decrease in regulated prices implies a ten (fifty) percent decrease in the number of months required for an initial price difference to be halved.

[19] "There are ground for believing that the institutional factor is of no small importance in poor market integration, namely, the fact that arbitrage activity as an institution is still in its infancy in Russia", in Gluschenko, 2001, page 38.

Figure 7 : The effect of a change in institutions on the Half-life speed of convergence [1]



Note: [1]The Half-Life speed of convergence changes according to the following formula:

$$\Delta HL = \log(0.5) / \log(d_0 + b \cdot \Delta inst)$$

Conclusion

In the literature about growth and transition from plan to market there is a wide consensus on the role played by institutions on the diverging trajectories. One emphasises the successful pattern followed by CEECs from one hand, enforced by the perspective of EU enlargement and by the political support behind the reforms, and the poor performance of CIS from the other hand. This paper rests on the estimation of convergence equations; the innovation consists in writing the convergence coefficient as a function of market institutions. The main result is that price regulation decreases the convergence of price levels, as well as subsidies to production, while privatisation increases it. We interpret those

findings as an evidence that market institutions favour economic convergence, while regulation and State intervention reduce it.

Differences of inflation rates and of incomes per capita have either a temporary or a permanent effect, they reflect either temporary deviations from a common trend (a common positive or negative rate of growth) or persistent divergence from it. In the case of Russia the effect of a shock occurring in one region does not propagate to other regions more quickly than if those regions were parts of different countries. This suggests that the speed of convergence across Russian regions is rather low, that the national market integration reached since the beginning of the transition process is quite weak. But this level of market integration is the rationale behind establishing the high centralisation of monetary and even fiscal policy.

One way for improving that situation is to implement market institutions, which favour market integration, in the absence of which any common policy (monetary and fiscal) is deemed to failure. This paper highlights the role played by what Jan Svejnar (2002) calls Type I reforms, such as macro-economic stabilisation, price liberalisation, small-scale privatisation, break-up of state-owned enterprises, etc, which are the condition *sine qua non* for the economic take-off to take place. Type I reforms differ from Type II reforms, such developing banking and legal systems, implementing functioning legal framework and corporate governance, whose efficiency in reducing region differences in prices and incomes per head could be tested as well.

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ANNEX

Table 5 : Convergence and institutions

Real money income per capita growth rates across 11 regions, Feb.1995 – Oct. 1999

Institutional variables	Number of lags k	Unit root coefficient d_0	se(d_0)	Institutional coefficient b	se(b)	Half-life[1] when institutional variables get equal to zero	
						in months	as % of effective
–	6	0.735	0.04	–	–	2.26	100
Price regulation (average)	6	0.456	0.10	0.016	0.005	0.88	39
Price regulation (variance)	6	0.609	0.05	0.013	0.004	1.40	62
Production subsidies (average)	6	0.625	0.10	0.008	0.007	1.48	65
Production subsidies (variance)	6	0.793	0.06	-0.015	0.010	2.99	132
Small privatisation (average)	6	0.945	0.11	-0.003	0.001	12.27	544
Small privatisation (variance)	6	0.752	0.04	-0.001	0.001	2.43	108
Jointly	6	0.622	0.05			1.46	65
Price reg. (variance)				0.014	0.004		
Small privatisation (variance)				-0.002	0.001		

Note: [1]Number of periods needed for the difference to be decreased by two

Consumer prices growth rates across 11 regions, Feb.1995 – Nov. 1999

Institutional variables	Number of lags k	Unit root coefficient d_0	se(d_0)	Institutional coefficient b	se(b)	Half-life[1] when institutional variables get equal to zero	
						in months	as % of effective
–	2	0.912	0.02	–	–	7.50	100
Price regulation (average)	2	0.864	0.03	0.0015	0.0007	4.76	
Price regulation (variance)	2	0.897	0.03	0.0005	0.0005	6.35	
Production subsidies (average)	2	0.878	0.02	0.0019	0.0008	5.31	
Production subsidies (variance)	2	0.909	0.02	0.0015	0.0012	7.23	
Small privatisation (average)	2	0.928	0.02	-0.0004	0.0002	9.23	
Small privatisation (variance)	2	0.909	0.02	-0.0001	0.0001	7.24	
Jointly	2	0.881	0.03			5.46	73
Price reg. (average)				0.0015	0.0007		
Small priv. (average)				-0.0003	0.0002		
Jointly	2	0.892	34.80			6.07	81
Price reg. (average)				-0.0004	0.0002		
Small priv. (average)				0.0022	0.0008		

Note: [1]Number of periods needed for the difference to be decreased by two

Table 6 : Convergence and institutions

Real money income per capita growth rates across 75 regions, Feb.1995 – Oct. 1999

Institutional variables	Number of lags k	Unit root coefficient d_0	se(d_0)	Institutional coefficient b	se(b)	Half-life[1] when institutional variables get equal to zero	
						in months	as % of effective
–	7	0.659	0.023	–	–	1.66	100
Price regulation (average)	7	0.610	0.03	0.003	0.001	1.40	84
Production subsidies (average)	7	0.638	0.04	0.002	0.002	1.54	93
Small privatisation (average)	7	0.577	0.04	0.001	0.000	1.26	76
Jointly	7	0.518	0.05			1.05	63
Price reg. (average)				0.003	0.001		
Small priv.(average)				0.001	0.000		

Note: [1]Number of periods needed for the difference to be decreased by two

Real money income per capita growth rates across 75 regions, Feb.1995 – Aug. 1998

Institutional variables	Number of lags k	Unit root coefficient d_0	se(d_0)	Institutional coefficient b	se(b)	Half-life[1] when institutional variables get equal to zero	
						in months	as % of effective
–	7	0.623	0.030	–	–	1.46	100
Price regulation (average)	7	0.511	0.04	0.005	0.001	1.03	70
Production subsidies (average)	7	0.574	0.06	0.003	0.003	1.25	85
Small privatisation (average)	7	0.511	0.07	0.001	0.001	1.03	70
Jointly	7	0.381	0.07			0.72	49
Price reg. (average)				0.006	0.001		
Small priv.(average)				0.001	0.001		

Note: [1]Number of periods needed for the difference to be decreased by two

Table 7 : Convergence and institutions

Consumer prices growth rates across 75 regions, Feb.1995 – Nov. 1999

Institutional variables	Number of lags k	Unit root coefficient d_0	se(d_0)	Institutional coefficient b	se(b)	Half-life[1] when institutional variables get equal to zero	
						in months	as % of effective
–	7	0.868	0.010	–	–	4.90	100
Price regulation (average)	7	0.860	0.01	0.00024	0.000	4.59	94
Production subsidies (average)	7	0.864	0.01	0.00023	0.000	4.75	97
Small privatisation (average)	7	0.871	0.01	-0.00003	0.000	5.00	102

Note: [1]Number of periods needed for the difference to be decreased by two

Consumer prices growth rates across 75 regions, Feb.1995 – Aug. 1998

Institutional variables	Number of lags k	Unit root coefficient d_0	se(d_0)	Institutional coefficient b	se(b)	Half-life[1] when institutional variables get equal to zero	
						in months	as % of effective
–	7	0.866	0.011	–	–	4.80	100
Price regulation (average)	7	0.824	0.02	0.001	0.000	3.58	75
Production subsidies (average)	7	0.838	0.02	0.001	0.001	3.91	81
Small privatisation (average)	7	0.865	0.01	0.000	0.000	4.79	100

Note: [1]Number of periods needed for the difference to be decreased by two