

Chapter 5

Reforms, Policy Environment, and Agricultural Performance

Efficiency and productivity improvements during transition are the key to measuring and evaluating the success of land reform and farm restructuring policies. That reform matters for efficiency has been demonstrated by Sedik, Trueblood, and Arnade (1999, 2000), who show that higher technical efficiency of crop production across Russia's oblasts is associated with the implementation of certain policy reforms in agriculture, such as reduction of soft budget constraints, elimination of price distortions, and downsizing of the traditional large farm enterprises. Unfortunately, these findings are based on aggregate data for the corporate farm sector at the oblast level, and unavailability of farm-level data precludes direct systematic comparison of farm performance before and after reforms. Even performance comparisons across farms characterized by different degrees of internal reform, specifically individual and corporate farms that emerged during transition, still produce tentative and inconclusive evidence (see Chapter 4). While awaiting the accumulation of sufficient empirical data to test for differences in productivity and efficiency across farms with different degrees of market-oriented restructuring, we are forced to look for less direct techniques of elucidating the impact of reform. In Chapter 4 such an indirect approach included looking at the standard of living of independent private farmers and corporate-farm employees—two rural constituencies differing in their choices during transition. In this chapter, we examine the impact of reform on agricultural performance at the national level.

Growth naturally suggests itself as a possible candidate for measuring the impact of reform at the country level. It can be argued

that the former socialist agriculture actually may have been required to contract rather than grow after the elimination of the massively wasteful government interventions of the pre-reform era. Therefore, looking only at differences in agricultural growth across the region as a measure of performance may be inappropriate in the setting of transition. Attaining higher GDP, on the other hand, is an accepted objective of all countries in a market environment, as it typically leads to a higher level of wealth per capita. Since one of the stylized facts of agricultural development is the positive relationship between the growth in GDP and the growth in agricultural output (World Bank 1982, pp. 44-45; Timmer 1988), we compare the transition countries by both measures of growth, namely the growth in agricultural output versus the growth in GDP. Moreover, we measure growth since 1992, skipping the very first years of transition, when all countries experienced a dramatic downward shock due to changes in the policy environment. The assumption behind this time horizon is that the main forces driving downward adjustment of agricultural production would have worked themselves out between 1989 and 1992, and agriculture could be expected to resume normal growth—albeit from a much lower starting level—in the new market-oriented environment.

Based on growth analysis, we also consider one of the standard partial measures of productivity—the productivity of agricultural labor. For a subset of countries (the 15 former Soviet republics) the available data furthermore enable us to examine an analog of total factor productivity—the changes in the productivity of a basket of all major inputs, and not only labor.

Ultimately, our goal is to identify possible links between the transition behavior of agriculture (or the general economy) and the reform policies of various countries. The analysis of growth and productivity is accordingly followed by a discussion of the impacts of reform and the policy environment on agricultural performance in transition countries.

Whenever no reference to sources of data is given, the analysis is based on the data presented in the annex at the end of the chapter.

Decline and Recovery

The first years of transition (1989-92) were characterized by a marked decline in agricultural production across the region. By 1992, gross agricultural product had dropped on average to about 80% of its level in 1990. The sharp decline in agricultural product was not an isolated phenomenon. It was accompanied by a decline in GDP, which in most countries was even sharper than the decline in agriculture.

The decline in both GDP and agricultural product during the first years of transition was probably an inevitable outcome of the general economic and political disruption. The economic activity in the socialist world was traditionally embedded in a centrally managed command environment, which controlled supply of inputs and sale of outputs. The almost instantaneous elimination of the command system in 1989-90 unavoidably depressed production, as producers had to adjust their operating mode and switch to independent functioning. While previously producers enjoyed an assured flow of inputs, now they had to start looking on their own for sources of input supply. While previously they only had to produce and could rely on state procurement to take care of distribution, now they also had to worry about sales and marketing of their products. These changes in the operating environment hit all the producers in the economy, but perhaps agriculture was hit harder because of the traditionally greater emphasis of command organs on food production and the perishable nature of many farm products, which made them particularly dependent on the availability of marketing channels.

There was also another factor that made the initial decline in agricultural production unavoidable. Under the socialist regime, agriculture was heavily subsidized in the interest of keeping food prices to consumers at a persistently low level (Johnson and Brooks 1983). Farm subsidies included direct budget transfers from the government to farms (e.g., various debt write-offs or investment grants); price controls keeping the prices of farm inputs artificially low, often below manufacturing costs; and price support keeping the prices received by farms above world prices. Table 2.10 in Chapter 2 shows the impact of price subsidies on farm profitability; OECD (1999) estimates the Producer Subsidy Equivalent (PSE) for the Baltic republics and Russia at 70%-80% in the late 1980s, while the

average PSE for all OECD countries at that time was less than 40%. These generous subsidies evaporated, or at least were drastically curtailed, at the very beginning of transition. Agriculture's terms of trade deteriorated, while at the same time food prices to consumers increased, reducing demand. These factors naturally combined to depress farm production.

The chain of collapse thus started with elimination of subsidies, which led to deterioration in terms of trade and reduced use of inputs. Decrease in consumption of fertilizers, herbicides, and other farm inputs adversely affected yields and agricultural output declined. The decrease in input use during the 1990s and its relationship with changes in output for some transition countries are discussed in the section on agricultural efficiency at the end of this chapter.

Politicians and farmers in transition countries, conditioned as they are by decades of production-oriented planning, regard the decline in agricultural output as a major crisis. Western media, taking their cue from local populist sentiments, also describe the drop in farm production in very dark colors. The uninitiated observer is presented with an overall picture of a catastrophe in transition agriculture. And yet, as we discuss above, initial decline of agricultural production is a concomitant of reform. Liefert and Swinnen (2002) actually argue that the absence of a decline in agricultural output more likely reflects failure to reform, rather than failure of reform.

In this interpretation, the decline of agricultural production in 1990-92 is the inevitable result of an initial shock of transition. By their very nature, shocks are transient phenomena and their effects have a tendency to play out over time. Some shocks produce a temporary impact, and eventually the system returns to its initial pre-shock level. Other shocks have a more permanent impact, and the system eventually resumes normal behavior from a new post-shock level. Success of reforms in transition countries should not be measured by the yardstick of the 1990 production level, as is often done by politicians and experts. Instead, we should focus on the behavior that has set in after the initial shock. Resumption of growth after that point is good, regardless of whether a particular country returns to the pre-1990 level or not. Moreover, if the decline in output is associated with an even greater decline in the use of inputs, the net outcome is an increase in productivity or efficiency. Thus, a desirable outcome may be achieved despite the decline in output. As we demonstrate toward the end of the chapter, the efficiency of

agriculture indeed increased in some transition countries despite what looked like a catastrophe with agricultural production.

Consistently with this conception of the initial transition shock, let us focus on growth in transition countries since 1992. To simplify the picture of growth, we abstract from the detailed country-by-country developments and look at the aggregated growth indices for CEE and CIS (Figures 5.1 and 5.2; for detailed country data and graphs see the annex at the end of the chapter). The growth indices for each country present the variation over time of gross agricultural output (GAO) and gross domestic product (GDP) calculated in constant prices and expressed in percent of the 1992 level (in other words, the 1992 index is set at 100). The aggregated indices for CEE and CIS are constructed as arithmetic averages of the GAO index and the GDP index across all countries in each group.

In CEE, agricultural production continued to decline until 1994 and then it recovered, resuming slow but steady growth (Figure 5.1). As a result, by 1997 the GAO index in CEE had returned to the 1992 level (although it was still about 20% below the 1989 pre-transition level). In CIS, on the other hand, the decline in agricultural production did not stop in 1994 and it continued at a fairly steep rate, dropping by 1997 to less than 80% of the 1992 level (or about 60% of the 1990 level). GAO began to recover in CIS around 1998, four years later than in CEE.

GDP growth displays a similar comparative pattern (Figure 5.2). In CEE, GDP decline stopped in 1993 and by 2000 it had risen impressively to more than 120% of the 1992 level. In CIS, GDP decline continued for two more years, until 1995. GDP stabilized in 1996 and registered slow but steady growth since then. However, it still remains far below the 1992 level (85% in 2000). The aggregate growth indices in Figures 5.1 and 5.2 thus indicate earlier and more robust recovery in CEE (since 1993-94) than in CIS (since 1996-98). The situation in agriculture is definitely worse than in the economy as a whole for the entire region: recovery came later and lags far behind the recovery rates in GDP.

Fig. 5.1. Agricultural Output in CEE and CIS: 1992-2001

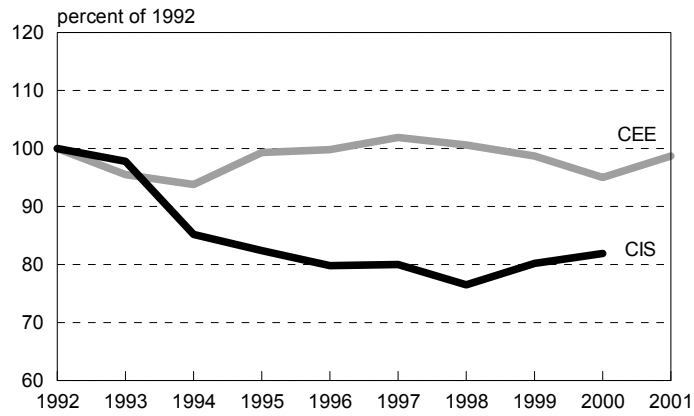
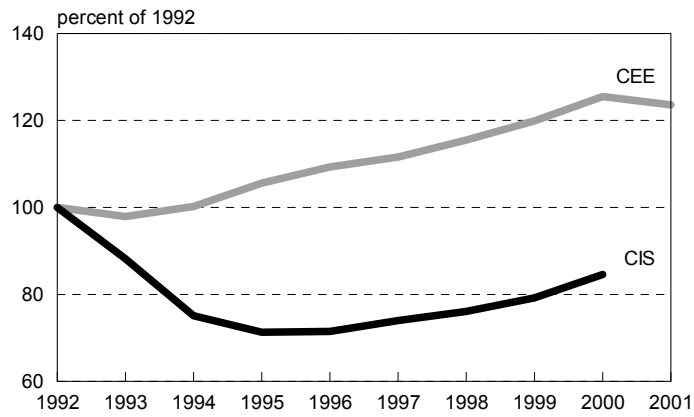


Fig. 5.2. Gross Domestic Product in CEE and CIS: 1992-2001



Agricultural Growth and Economic Recovery: Country Evidence

The graphs in Figures 5.1 and 5.2 suggest a definite relationship between the two aggregate growth indices—the GAO index and the GDP index. We will now extend the analysis of this relationship and examine the growth behavior of the individual countries. To achieve a visually meaningful presentation of the country data, we sacrifice the time dimension by passing from yearly indices to growth rates between 1992 and 1999. In this way, each country is represented by a single point—the 1992-99 change in GAO or GDP (or the equivalent annual mean rate of change), instead of eight points.

Figure 5.3 plots the 23 transition countries in a plane where the vertical axis is the change in agricultural output from 1992 to 1999 and the horizontal axis is the change in GDP. As previously, 1992=100 for both variables, and the values plotted in Figure 5.3 are in fact the GAO and GDP index values for 1999. Instead of looking at the pattern of change over time (as in Figures 5.1 and 5.2), we now look at the cumulative change through 1999. The freely drawn diagonal line separates the “growth” region, where countries show growth between 1992-99 by at least one of the two measures, from the “no growth” region, where both GAO and GDP in 1999 are below the 1992 level. This diagonal line also neatly separates the CEE countries from the CIS: 9 out of 11 CEE countries fall in the “growth” region, and 8 out of 12 CIS countries fall in the “no growth” region with negative changes in the two output measures since 1992. Russia is in the middle of the “no growth” cluster. The average annual growth rates for CEE and CIS are summarized in Table 5.1: the CEE countries achieved better growth performance than the CIS countries by both GDP and agricultural product.

The first conclusion from the diagram in Figure 5.3 is that overall economic growth is conducive to growth in agriculture: there is a significant positive correlation in transition countries between GDP growth and agricultural growth (correlation coefficient 0.7). Positive changes in the overall economic environment lead, among other things, to creation of functioning market services, which were missing in the command economy. The emergence of market services stimulates agricultural production through improved supply of farm inputs, better access to financial facilities, and improvements in sales

and marketing channels. It is hard to imagine agricultural recovery in a country with a stagnating general economy, while a generally positive economic atmosphere reflected in a reasonable GDP growth is likely to induce growth in agriculture. The positive correlation between GDP growth and agricultural growth justifies the general sequencing prescription, “get the economy in order, and agriculture will fix itself.”

Fig. 5.3. Change in Ag Output vs. Change in GDP 1992-99

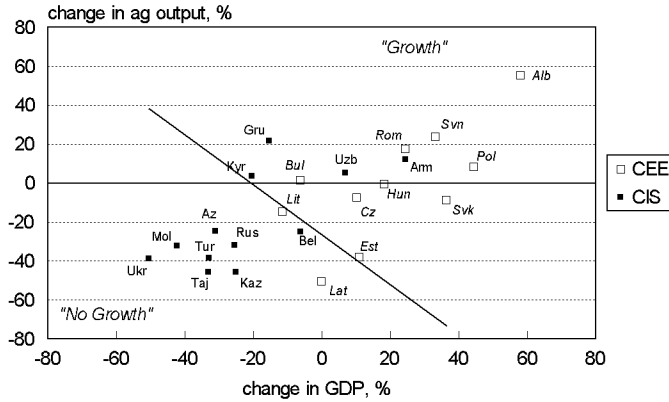


Fig. 5.4. Change in Ag Output vs. Change in GDP 1980-87

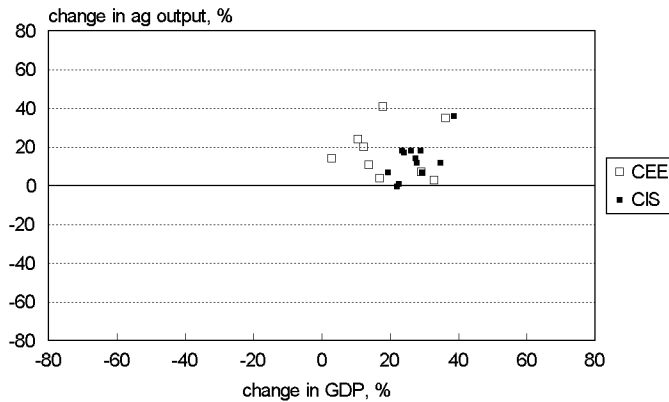


Table 5.1. Average Annual Growth Rates for CEE and CIS: Transition (1992-99) and Pre-Transition (1980-87)

	1992-99		1980-87	
	CEE	CIS	CEE	CIS
Gross Agricultural Product, %	-0.70	-3.57	2.36	1.80
GDP, %	2.62	-3.28	2.53	3.50

Source: For the period 1992-99, see annex. For the period 1980-87: Goskomstat SNG for CIS; Comecon for CEE excluding Albania and the Baltics; national statistical yearbooks for Albania and the Baltics.

The second conclusion is that the CEE countries as a group appear to have outperformed the CIS countries by the two measures of growth between 1992-99. The observed differences in growth have not been inherited from the Soviet period: they are indeed a manifestation of dynamic divergence between CIS and CEE in the process of transition. This can be verified by repeating the growth analysis for the distant pre-reform period 1980-87, which is sufficiently far from the breaking point of 1989-90 and thus provides a reasonable picture of the stable pre-transition situation during the socialist era. In the pre-transition period, all CEE and CIS countries registered positive growth by at least one of the two measures (fell in the “growth” region). Moreover, the variability in growth rates among the countries and between the two subregions was much smaller than in 1992-99: the country points formed a tight cluster in the 1980-87 growth plane (Figure 5.4), which sharply differed from the widely scattered cloud in the 1992-99 plane. The growth rates decreased for both subregions during transition, but the decrease was much more drastic for CIS than for CEE (Table 5.1). The CEE countries continued to maintain on average a non-negative growth rate during transition (positive growth in GDP, zero growth in GAO), while the CIS countries went from a fairly high positive growth in the pre-transition period to a deep negative rate during transition.

Agricultural Employment and Labor Productivity

One of the major goals of transition to market is to achieve improvements in productivity of agriculture. Total factor productivity indices—the ratio of the value of all outputs to the cost of all

inputs—provide the best theoretical tool for assessing productivity changes in a given country over time or productivity differences across countries. The calculation of total factor productivity indices, however, is not an easy task, and researchers are often forced to look at partial productivity measures, which are easier to calculate from the available data. Two popular partial productivity measures include the productivity of land (typically measured by physical yields of various crops per hectare or, in aggregate, by the value of agricultural output per hectare) and the productivity of labor (measured by the value of agricultural output per worker in agriculture). In this section we focus on agricultural labor productivity, and a subsequent section will examine the productivity in relation to a composite basket of all inputs (and not only labor) for a subset of transition countries.

To elucidate the changes in agricultural labor productivity during transition, we need to look at changes in agricultural labor in addition to changes in agricultural output. We have argued that the dramatic decline in agricultural output in CEE and CIS is a natural adjustment forced by the transition from centrally controlled and subsidized agriculture to market-led agriculture. But how has the productivity of agriculture changed? Perhaps the decline in agricultural output has been accompanied by an even greater decline in agricultural employment, as structural changes and adjustments in the economy drove labor into the developing service sector. In this case, the net outcome of the two processes would be an increase in the productivity of labor that reformers have been hoping for. Or perhaps the decline in agricultural output took place against the backdrop of increasing agricultural labor, as people migrated from high-unemployment urban areas to the village, where they could at least grow their own food on a small plot of land. In this case, the productivity of labor in agriculture would only register a further decrease.

In principle, calculation of agricultural labor productivity is a simple undertaking: one needs two time series for each country being studied, a time series of agricultural output (in constant prices) and a time series of agricultural employment (specifically, the number of employed in agriculture). If the output time series is given in absolute money values, the output per worker can be calculated in absolute terms. However, absolute productivity values in different domestic currencies are not suitable for cross-country comparisons. They should be converted to some constant currency (US dollars, for

instance) or transformed to index numbers (in percentage of some common base year). Once the output and labor time series for each country have been transformed from absolute values to index numbers, we calculate the productivity index as the ratio of the agricultural output index to the agricultural labor index (see Box 5.1). The productivity index has its base value of 100 in the same base year as the agricultural output index and the agricultural labor index, and the changes in productivity over time can be compared in a consistent manner with the changes in output and labor.

Box 5.1. How the Ratio of Output and Labor Indices Gives a Productivity Index

Denote by GAO_t the agricultural output in year t (in absolute values) and by Emp_t the number of employed in agriculture in the same year. The agricultural labor productivity (in year t) is calculated as

$$ALP_t = GAO_t / Emp_t$$

The result is expressed in units of output value per agricultural worker: so many Russian rubles per worker or so many Hungarian forints per worker.

In some base year $t=0$ (1992, say) the productivity is given by

$$ALP_0 = GAO_0 / Emp_0$$

If we have a series of index numbers (denoted by $IGAO_t$ and $IEmp_t$), then by definition the agricultural output (in absolute values) and the number of employed in agriculture in year t can be expressed in terms of the absolute values in year 0 and the index number for year t :

$$GAO_t = GAO_0 \times IGAO_t$$

$$Emp_t = Emp_0 \times IEmp_t$$

The productivity in year t is thus given by

$$ALP_t = GAO_t / Emp_t = (GAO_0 / Emp_0) \times (IGAO_t / IEmp_t)$$

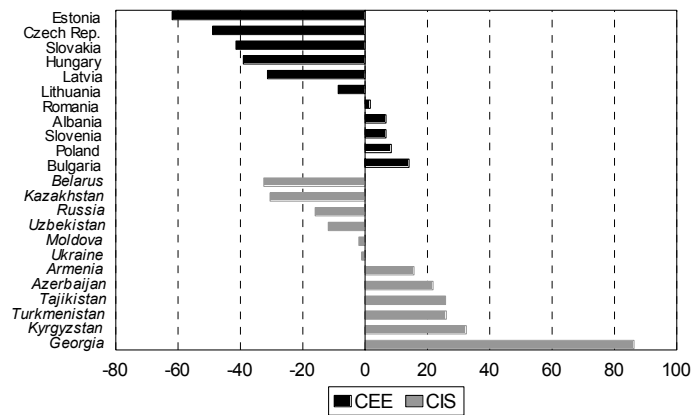
This result is expressed in absolute values, in units of output per worker. To convert these absolute values to productivity index numbers we simply divide the productivity for each year t by the value for base year $t=0$. The ratio of year-0 absolute values GAO_0 / Emp_0 cancels out and we get for the productivity index

$$IALP_t = ALP_t / ALP_0 = IGAO_t / IEmp_t$$

The productivity index thus can be calculated as the ratio of the output index to the labor index. This is very useful when the output is not available in absolute values, or when it is expressed in different national currencies for different countries.

Unfortunately, the standard international sources (such as FAO and OECD) provide highly unsatisfactory and unreliable data for agricultural employment in transition countries. We accordingly constructed an agricultural employment database by laboriously collecting raw information from the latest statistical publications of the various countries. The resulting time series are presented in full in the annex at the end of this chapter (Table A5.5). These agricultural employment data were converted to scale-independent form by transforming the absolute time series into index numbers.

Fig. 5.5. Changes in Agricultural Labor 1992-99 (percent)



The change in agricultural labor between 1992 and 1999 is shown by country in Figure 5.5. Based on this figure, the 22 countries in CEE and CIS can be grouped in four categories by the behavior of agricultural employment during transition:

(a) Countries showing a sharp decline in agricultural labor: Estonia, Czech Republic, Slovakia and Hungary (all in CEE); in these countries agricultural employment dropped 40% and more over the 7-year period 1992-99.

(b) Countries showing a generally moderate, but statistically significant, decline in agricultural labor: Latvia and Lithuania in CEE; Belarus, Kazakhstan, Uzbekistan, and Russia in CIS; in these countries agricultural employment decreased more than 10% (but less than 40%) over the 7-year period.

(c) Countries in which agricultural employment remained steady, i.e., the annual rate of change—whether positive or negative—was not statistically significant; these include Romania in CEE and Moldova and Ukraine in CIS;

(d) Countries with increasing agricultural employment: Bulgaria, Albania, Poland, and Slovenia in CEE; Armenia, Georgia, Azerbaijan, Kyrgyzstan, Tajikistan and Turkmenistan in CIS (all Transcaucasia and most of Central Asia in CIS). In Central Asia and in Georgia agricultural labor increased sharply by more than 20% over the 7-year period 1992-99. In the other countries in this group the increase of agricultural labor was more moderate.

Thus, in both CEE and CIS there are countries where agricultural employment decreased between 1992-99 and countries with increasing agricultural employment. On balance, however, a sharper decline in agricultural employment is observed in CEE, and the aggregated employment curves for the two regions show a distinctly divergent pattern (Figure 5.6), similar to the pattern of the aggregated behavior of GAO and GDP examined in the previous section (compare with Figures 5.1 and 5.2). Combining the agricultural employment trends with agricultural growth discussed previously, we obtain that on average agricultural labor productivity increased markedly since 1992 in the CEE countries and declined in the CIS countries (Figure 5.7, Table 5.2; for detailed country data and graphs see the annex at the end of the chapter). The improvement in agricultural labor productivity has been largely due to sharp reductions of agricultural employment in some CEE countries rather than any significant growth in agricultural output.

What drives the differential changes in agricultural employment across transition countries? We have shown in Chapter 2 that, in the pre-transition period, changes in agricultural employment primarily reflected population growth rates (see Figure 2.5). This was not particularly surprising in the pre-1990 environment, where mobility of labor was highly restricted and all socialist countries had similar growth rates (by both GDP and GAO). In the post-1990 period, on the other hand, the formal restrictions on mobility of labor have been removed, while CEE and CIS countries show considerable divergence in growth rates. It is naturally tempting to hypothesize that labor migrates out of agriculture in countries where higher GDP growth rates support creation of alternative job opportunities and, conversely, agricultural employment increases in countries where

declining GDP deprives the rural population of alternatives. Unfortunately, this attractive hypothesis is not supported directly by the available data: the relationship between the change in agricultural employment and the change in GDP between 1992-99 is not statistically significant, although its sign is negative, as expected (the correlation coefficient is only -0.2).

Fig. 5.6. Agricultural Labor in CEE and CIS: 1992-1999

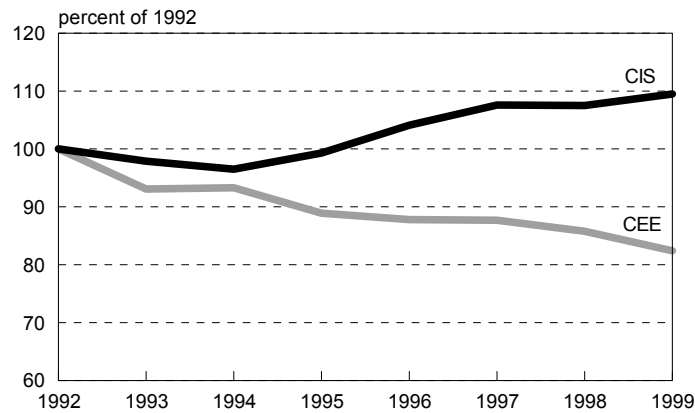


Fig. 5.7. Agricultural Labor Productivity in CEE and CIS: 1992-1999

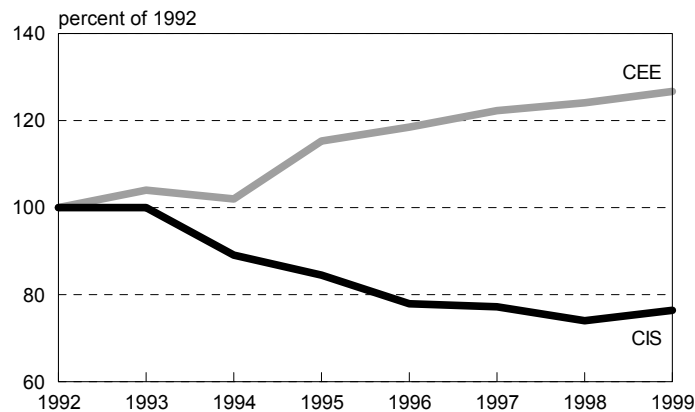


Table 5.2 summarizes the relationship between agricultural employment and GDP. Sharp declines in agricultural employment are generally (but not always) associated with growth in GDP. This is the case in western CEE and Estonia, but not in Albania and Poland, where growth in GDP was associated with a moderate increase in agricultural employment.

Table 5.2. Economic and Policy Indicators of CEE and CIS (percentage change 1992-99)

	GDP	Agricultural labor	Agricultural output	Ag labor productivity	Land in individual tenure 1999
CEE (10 countries)	20	-18	-1	27	66
CIS (12 countries)	-21	10	-20	-24	21
West CEE (4)*	19	-48	-14	66	38
East CEE (4)**	2	-6	-12	-8	75
Poland	44	8	8	0	82
Albania	58	7	55	46	100
European CIS, Kazakhstan (5)	-30	-16	-35	-20	19
Transcaucasia (3)	-7	41	3	-25	35
Central Asia (4)	-20	18	-19	-28	12

* Czech Republic, Slovakia, Hungary, Estonia.

** Bulgaria, Romania, Latvia, Lithuania

Agricultural employment increased sharply in Transcaucasia and Central Asia. In Central Asia the increase in agricultural employment is clearly driven by the high rates of increase of the rural population, which was growing at an annual rate of 1.7% since 1992, while the rural population in all other ECA countries (including Albania) actually declined. In Transcaucasia, on the other hand (as well as in Albania, Poland, and Slovenia), the increase in agricultural employment appears to be associated with land policy. In all these countries agriculture is based primarily on individual farming (see Chapter 4): in Transcaucasia and Albania agricultural land was distributed in the form of physical plots to rural households, whereas in Poland and Slovenia about 80% of agricultural land has always remained in individual farms. The phenomenon of increasing

agricultural employment in transition countries with predominance of individual agriculture can be explained by empirical evidence from a number of farm surveys across the region, which indicate that small-scale individual farming absorbs more labor than the large-scale collectives, despite their contingent of non-productive workers employed in various support services (Lerman 1998). This survey-based finding is reinforced by regional-level cross-section analyses for Russia and Poland, where regions with a higher incidence of individual farming have a higher share of their total labor force in agriculture (Lerman and Schreinemachers, 2002; on Poland see also Dries and Swinnen, 2002). Individual farming thus acts as a labor sink and prevents out-migration of the rural labor force. Particularly telling is the example of Azerbaijan, where agricultural employment began to increase in 1997, after the country had adopted its new individualization strategy (see Table A5.5 in the annex for labor data).

Table 5.3. Factors Affecting the Change in Agricultural Employment (based on 1992-97 data)

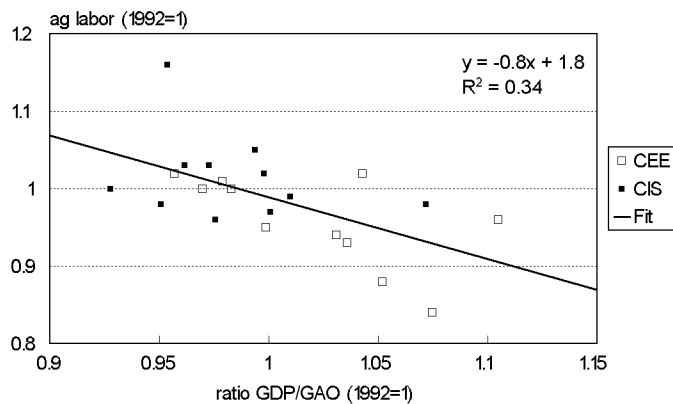
	Coeff.	<i>p</i> -value		Coeff.	<i>p</i> -value
Change in agricultural output	0.74	0.001	Ratio of change in GDP to change in agricultural output	-0.54	0.002
Change in GDP	-0.64	0.022	Change in rural population	1.11	0.067
Change in rural population	1.20	0.047	Share of agricultural land in individual use	0.49	0.021
Share of agricultural land in individual use	0.37	0.076	<i>R</i> ²	0.61	
<i>R</i> ²	0.65				

Note: The regressions were run with a CIS/CEE dummy variable to allow for the systematic technical difference in the reported level of land in individual use in the two subregions (see Chapter 3).

Stronger results are produced by a more general model, which in line with the above discussion additionally includes among the explanatory variables the share of land in individual use and the change in rural population (the expanded model also includes the change in agricultural output, a variable that is obviously related to agricultural employment). The results of this model are summarized in Table 5.3. Agricultural employment indeed decreases when GDP increases, if we control for the change of agricultural output, the increase of the rural population, and the percentage of land in individual use. In this model, a 1% increase in the change of GDP

between 1992-97 reduces by 0.6% the change in agricultural employment (the regression coefficient is statistically significant with $p = 0.02$). The other coefficients are also statistically significant and have positive signs, as expected: agricultural employment increases as the rural population and the share of land in individual use increase; it also increases with the increase of agricultural output, although the direction of causality in this case is probably reversed.

Fig. 5.8. Change in Ag Labor vs Relative Change in GDP
1992-97



Growth in GDP and growth in agriculture have conflicting, oppositely directed effects on agricultural employment. The somewhat technical language of the regression results can be clarified by examining the behavior of the change in agricultural employment as a function of the ratio of the change in GDP to the change in agricultural output (we denote this ratio by GDP/GAO, although more rigorously we should have written $dGDP/dGAO$, where d is the change operator). This ratio measures the change in GDP relative to the change in agricultural output: if the GDP/GAO ratio is greater than 1, the overall economic growth is faster than the growth in agriculture; conversely, if the GDP/GAO ratio is less than 1, agriculture grows faster than the overall economy. Figure 5.8 illustrates the strong negative relationship between the change in agricultural employment and the GDP/GAO ratio: agricultural employment decreases to a greater extent when the growth in GDP is faster than the growth in agriculture.

As the GDP/GAO ratio increases, the creation of alternative job opportunities outside agriculture exceeds the creation of jobs in agriculture, and labor migrates out of agriculture to other sectors. (This analysis and the corresponding insights have been suggested by Pepijn Schreinemachers.) The right-hand part of Table 5.3 repeats the agricultural employment regression with the GDP/GAO ratio replacing the two separate variables for GDP growth and GAO growth. The transformation to a single GDP/GAO ratio representing relative growth does not affect the impact of the other explanatory variables—change in rural population and share of agricultural land in individual use—on agricultural employment. Both variables retain positive (and significant) coefficients in the alternative regression model.

Patterns of Transition: Growth, Employment, and Productivity

A more detailed examination of the patterns of change in performance and agricultural employment based on cluster analysis techniques divides the CEE and CIS countries into several subgroups (as we have previously done in Table 5.2). These subgroups are now shown in separate panels in Figure 5.9, which plots the changes in GDP, gross agricultural output (GAO), agricultural labor (AgEmp), and agricultural labor productivity (ALP) since 1990.

The West CEE cluster, which includes the western CEE countries (Hungary, the Czech Republic, and Slovakia) as well as one of the Baltic countries (Estonia), are uniquely characterized by substantial growth in GDP linked with truly dramatic decline in agricultural employment (Box 5.2 tells the story of what has happened with agricultural labor in the Czech Republic). As a result, agricultural labor productivity in these countries increased despite declines in agricultural output.

Albania is the only other country in the region that shows a substantial increase in agricultural labor productivity since 1992, but in this country agricultural employment actually increased, and the increase in productivity was associated with a strong increase in agricultural output. Poland, like Albania, is also an “outlier” that does not fit with the western CEE countries: in many respects its observed

behavior is similar to that of Albania (with GDP, agricultural output, and agricultural employment all increasing), but the increase in agricultural output is relatively small and as a result the agricultural productivity of labor has remained steady. Albania and Poland (together with Slovenia) form the cluster of countries with “individualized” agriculture in Figure 5.9. In this group, as we have discussed previously, agricultural employment has increased over time due to the labor-sink effect of individual farming, but without detrimental effects to productivity.

Box 5.2. Decline of Agricultural Employment in the Czech Republic

In the Czech Republic, the number of farm workers declined from 533,000 (of which 150,000 in non-agricultural activities) in 1989 to 201,000 (of which 30,000 in non-agricultural activities) in 1997. The total decline in farm workers is 332,000 of which 120,000 (approximately 30%) is due to separation of non-agricultural activities from farms, which could be thought of as mostly a “statistical effect”. The “real” adjustment occurred as follows: about half of the 212,000 farm workers involved in agricultural activities retired, about 45% transferred to other sectors (with 75% of them to urban areas and 25% remaining in rural areas), and only about 5% became unemployed. The remarkably low level of agricultural unemployment is related to the low overall level of unemployment during the early years of transition in the Czech Republic, a level which has grown significantly since 1996 and which is now causing higher unemployment in rural areas as well.

Source: Swinnen, Dries, and Mathijs (2001).

The behavior of the eastern CEE countries (Bulgaria, Romania, Latvia, Lithuania) is on the whole similar to the core CIS countries (Russia, Belarus, Moldova, Ukraine, and Kazakhstan), although the decline in all variables is much more moderate. If we ignore the early shock years and concentrate on the period since 1992, we actually see from Figure 5.9 that there has been practically no decline in the main development variables for the East CEE cluster, while the core CIS countries have continued on a generally downward trajectory.

Among the CIS countries, Transcaucasia and Central Asia show increases in agricultural employment. This is contrary to the trend for core CIS but qualitatively similar to the “individualized” CEE countries. (although in CIS the growth of agricultural labor is much stronger than in CEE). Agricultural productivity of labor declined in all three groups of CIS countries, either due to declines in agricultural output (core CIS) or because of increases in agricultural labor (Transcaucasia and Central Asia). GDP generally declined across CIS.

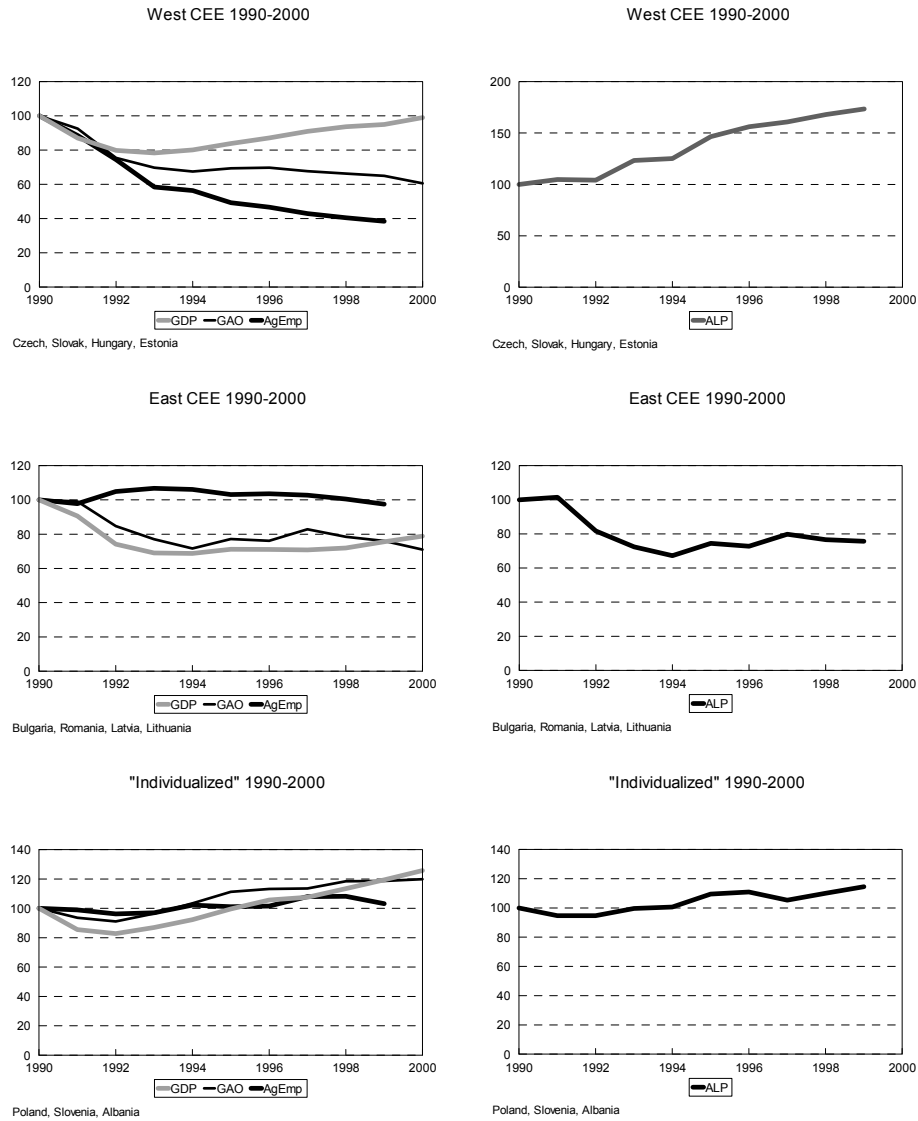


Fig. 5.9. Patterns of Growth and Productivity 1990-2000: CEE countries

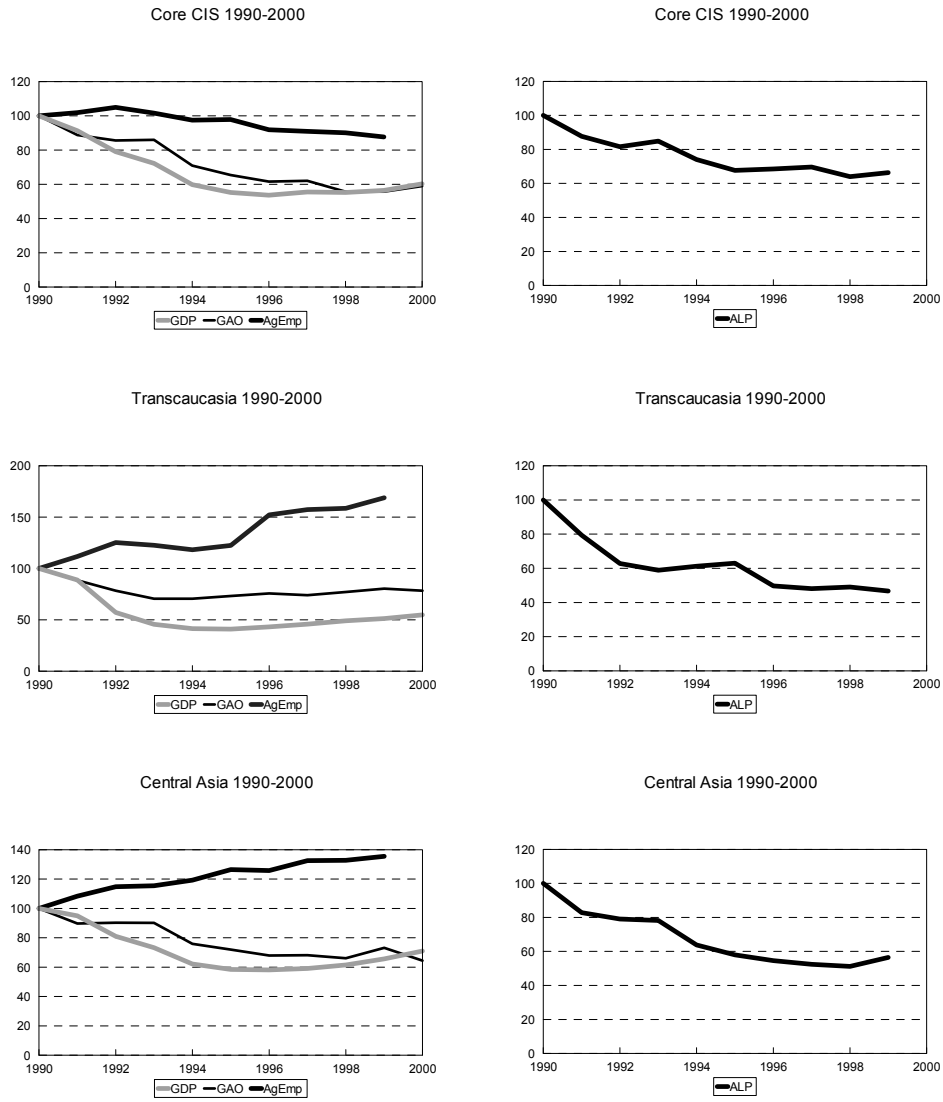


Fig. 5.9 (cont.). Patterns of Growth and Productivity 1990-2000: CIS countries

Table 5.4 summarizes the patterns of transition since 1992 in qualitative terms by characterizing the changes in performance measures for groups of countries as “up”, “down”, or “steady” (see Table 5.2 for the numerical values). Based on the changes in performance measures, we rank the groups of countries from 1 for the best performers (West CEE) to 6 for the worst performers (Central Asia).

Table 5.4. Patterns of Growth and Productivity in CEE and CIS since 1992

	Change in GDP	Change in Ag Output	Change in Ag Labor	Change in Ag Labor Productivity	Performance ranking (1=best, 6=worst)
West CEE (4)*	Up	Down	Sharp down	Up	1
“Individualized” CEE (3)#	Up	Up	Up	Up/Steady	2
East CEE (4) **	Steady	Steady	Steady	Steady	3
Transcaucasia (3)	Steady	Steady	Sharp up	Down	4
European CIS, Kazakhstan (5)	Down	Down	Down	Down	5
Central Asia (4)	Down	Down	Up	Down	6

* Czech Republic, Slovakia, Hungary, Estonia.

** Bulgaria, Romania, Latvia, Lithuania.

Albania, Poland, Slovenia.

Effect of Reforms and the Policy Environment on Agricultural Performance

The results presented in the previous sections on growth and productivity support the view that CEE and CIS as two groups are diverging in time. This divergence of performance measures may be a reflection of the differences in the institutional and policy environment between CIS and CEE that we have discussed in Chapters 3 and 4 (see Table 4.22 for a short summary). In the domain of land policy, these differences are manifested in the attitude toward private land ownership (universal acceptance in CEE, heated debates in most of CIS), the land privatization strategy (restitution in CEE, distribution in CIS), the land allocation strategy (physical plots in CEE, land share certificates in most of CIS), and the legal

framework for land transferability (significantly more permissive in CEE than in CIS). Differences in farm restructuring strategies have led to the emergence of substantially downsized corporate farms with clear profit accountability in CEE (“new companies”), while most corporate farms in CIS retain the traditional characteristics of collective and cooperative organization despite their new market-sounding names. The divergence between CIS and CEE is also manifested in various dimensions of institutional and policy reform outside primary agriculture, which are directly linked to the components of the overall transition agenda. Although these dimensions—privatization and demonopolization of processing, marketing, and supply channels, development of rural finance, emergence of competitive market institutions—are not discussed explicitly in the preceding chapters, various policy and institutional reform indices incorporating an assessment of the corresponding dimensions reflect strong differences between CEE and CIS in the overall progress of reform.

Given the agricultural focus of our discussion, we first ask how the divergence in agricultural performance is related to the divergence of land reform paths discussed in Chapters 3 and 4. We then examine the impact of more general policy differences across the region, which are measured by policy and institutional reform indices that incorporate additional dimensions beyond land reform.

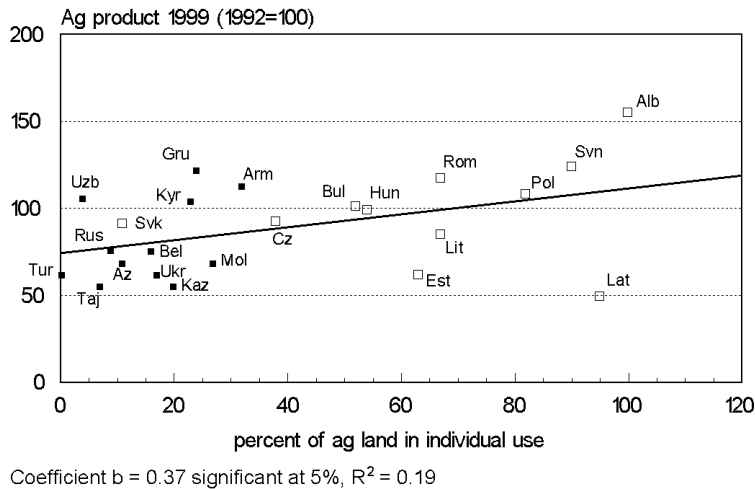
Impact of Individualization

A basic measure of land reform is the percentage of farmland in individual cultivation—as distinct from individual ownership. We have consistently tried to differentiate between the notion of land privatization, which implies transfer of legal ownership rights to private individuals, and the notion of individualization, which implies transition to individual land tenure using own or leased land. In Chapter 4 we have shown that individualization of agriculture is much more advanced in CEE than in CIS: land in individual use represents 66% of agricultural land in CEE and 21% in CIS (see Table 4.2).

This factor in itself has a positive impact on agriculture in CEE. A fairly strong association is observed between the degree of individualization and agricultural performance (Figure 5.10). All

seven countries showing positive growth in agricultural output between 1992-99 are countries with a relatively high share of land in individual cultivation (more than 50% for CEE countries and more than 20% for CIS countries). Among the 16 countries that did not achieve agricultural growth, 10 have a relatively low degree of individualization. A formal view of the correlation is shown by the regression line in Figure 5.10. Countries with a higher share of individual farming register higher agricultural growth (the positive relationship is statistically significant at 5%).

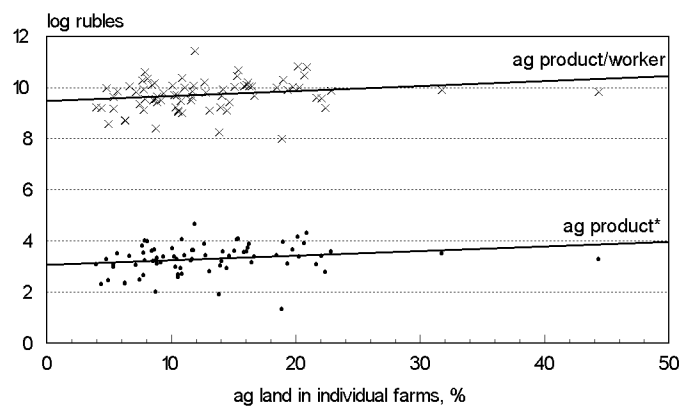
Fig. 5.10. Agricultural growth vs land in individual use in CIS (black squares) and CEE (white squares)



The positive impacts of individualization also emerge from a cross-sectional analysis of agricultural performance in Russia carried out using official regional statistics (1999 data). Across Russia's 80 regions, those with a higher level of individualization achieve higher productivity of agricultural labor, although they employ relatively more workers in agriculture due to the labor-sink effect discussed previously (Lerman and Schreinemachers 2002). Figure 5.11 demonstrates that output per agricultural worker increases with the increase of the share of land used by the individual sector. The results were obtained by two alternative analytical techniques: the top line plots the model with agricultural product per worker (i.e., agricultural

labor productivity) regressed on agricultural land and the share of agricultural land in individual use; the bottom line shows the regression results for agricultural product versus individual land use controlling for agricultural labor (and total agricultural land), which is basically equivalent to looking at agricultural productivity. The positive regression coefficient on the degree of individualization is statistically significant in both cases.

Fig. 5. 11. Productivity vs Individualization: Russia



* Adjusted for the effect of ag land and ag labor

Assessing Impacts through Composite Policy Indices

Land reform is just one dimension of agricultural transition, and individualization is not a sufficient condition of success. Many other factors may have influenced the observed divergence between CEE and CIS. Agricultural performance may have been constrained by agriculture-related difficulties not directly associated with land reform, such as lack of access to functioning market services (competitive processors, marketers, and input suppliers), or by general obstacles to efficient operation, such as difficulties with legal enforcement of contracts, corruption in various levels of government, barriers to mobility in labor markets.

A number of policy indices developed by international organizations attempt to capture the progress of reforms in

additional dimensions. In these indices, various sets of transition-related variables are assessed by a mixture of expert judgments and quantitative techniques to arrive at a measure of progress in economic policy and institutional reforms. The World Bank's ECA Agricultural Reform Index (Csaki and Nash 1998; Csaki and Tuck 2000) is specifically geared to agricultural reforms in transition economies. It assesses the achieved progress with specific policy and institutional reform measures in five dimensions that affect agriculture and rural development: price and market liberalization for agricultural commodities, land reform, privatization and demonopolization of agroprocessing and input supply, rural financial systems, and public institutional framework relevant for the rural sector. In this book we have focused on land reform and farm restructuring policies, and the additional dimensions of reform are not discussed explicitly. These "missing" dimensions are reflected in the so-called ECA Agricultural Reform Index, which assigns scores to specific stages in the process of agricultural reform (Table 5.5). Countries with higher values of the ECA Agricultural Reform Index have achieved higher levels of institutional and policy reform in the process of transition. The average value of the ECA Agricultural Reform Index allowing for the five dimensions of reform in each country is 4.9 out of 10 for CIS and 7.8 out of 10 for CEE (Table 5.6; the detailed country values of the ECA index are given in Table A5.2 in the annex).

While the World Bank's ECA Index is geared specifically to agricultural reforms in transition economies, the Country Policy and Institutional Assessment (CPIA) Index is based on four groups of policy variables that are not directly related to agriculture: macroeconomic management and sustainability reforms; policies for sustainable and equitable growth; policies for reducing inequalities; and public sector management. The 20 variables collected in these four groups are assessed by a mixture of expert judgments and quantitative techniques to arrive at a measure of progress in economic policy and institutional reforms. On a scale of 1 to 10, the CEE countries have index values around 6-7, while the CIS countries have index values around 5 (as for the ECA index, higher values of the CPIA index correspond to greater progress toward a market environment).

Table 5.5. Ranking of Rural-Sector Policies and Institutions in the World Bank's ECA Agricultural Reform Index (scores increase from 1 to 10 as transition from command economy to market economy progresses)

Score	Trade and price liberalization	Land reform	Privatization of agro-processing and input supply	Rural financial systems	Public institutional framework
1-2	Direct state control of prices and markets	System dominated by large-scale farms	Monopolistic state owned industries	Soviet style system with one specialized bank as sole finance channel.	Institutions of command economy
3-4	Deregulation retaining indicative prices and some price controls; significant tariffs on imports or exports	Legal framework for land privatization and farm restructuring in place, but implementation still in early stages	Spontaneous and mass privatization designed, but implementation still in early stages	New banking regulations adopted; commercial banking absent or underdeveloped	Modest restructuring of government and public institutions
5-6	Mainly liberalized markets constrained by lack of competition and some trade controls	Advanced land privatization, but incomplete restructuring of large farms	Implementation of privatization programs in progress	Restructuring of existing banking system, emergence of commercial banks	Partly restructured governmental and local institutions
7-8	Administrative command interventions fully eliminated. WTO-compliant market and trade policies, but domestic markets not fully developed	Most land privatized, but titling not finished and land market not fully functional	Most industries privatized in a framework conducive for foreign direct investment	Emergence of financial institutions serving agriculture and rural population	Government structure has been refocused; research, extensions, and education are being reorganized
9-10	Competitive markets with market-conforming trade and agricultural policies	Farming structure based on private ownership and active land markets	Privatized agro-processors, input suppliers with improved international competitiveness	Efficient financial system for agriculture, agro-processing, and farm services	Efficient public institutions focused on the needs of private agriculture

Source: Csaki and Tuck (2000).

A different set of policy dimensions is reflected by the Freedom House Freedom Index, which includes assessment of democratization and corruption, and by the Euromoney Creditworthiness Index, which assesses the development of financial institutions and the risk level associated with each country's transition policies. We incorporated these special dimensions of transition, which are quite distant from agriculture and land reform, in an aggregate index calculated as the average of five different policy related indices—the ECA and CPIA indices, the Euromoney Creditworthiness Index, the Freedom House Freedom Index, and also the World Bank Liberalization Index. The aggregate index reflecting a wide range of transition policies in and outside of agriculture also gives a substantially higher value for the CEE countries (6.7) than for the CIS countries (3.8).

Table 5.6. Economic and Policy Indicators of CEE and CIS

	Performance ranking from Table 5.4	ECA Ag Reform Index 1999**	Aggregate Policy Index# 1997-98
CEE (11 countries)		7.8	6.7
CIS (12 countries)		4.9	3.8
West CEE (4)*	1	8.3	7.3
“Individualized” CEE (3)*	2	7.5	6.8
East CEE (4)*	3	7.6	6.0
Transcaucasia (3)	4	6.5	4.3
European CIS, Kazakhstan (5)	5	4.9	4.1
Central Asia (4)	6	3.7	3.0

* See Table 5.4 for cluster composition.

** See Table A5.2 in the annex at the end of the chapter.

On a scale of 1 to 10: higher values imply closer to market environment.

Calculated as simple average of five policy-oriented indices: the ECA Agricultural Reform Index (Csaki and Nash 1998), the Freedom Index (Karatnycky et al. 1997), the Liberalization Index (de Melo et al. 1996), the Creditworthiness Index (*Euromoney*, September 1998), and CPIA Index (internal World Bank documents; the methodology of calculation is available from the authors on request).

Table 5.6 associates average values of the aggregate policy index and the ECA agricultural reform index to the various patterns of transition from Figure 5.9, which were ranked in Table 5.4 on the basis of the underlying performance measures (GDP and GAO growth, changes in agricultural employment and agricultural labor

productivity). The highest policy indices are obtained for the four West CEE countries (Czech Republic, Slovakia, Hungary, and Estonia), which also score highest by measures of performance in Table 5.4. The lowest policy indices are observed for Central Asia, which also scores lowest by measures of performance. For the intermediate groups—"Individualized" CEE, East CEE, Transcaucasia, and the core CIS countries—the ranking by the policy index also matches the performance ranking. It is interesting to note that within each subregion the cluster of countries with strongly individualized agriculture ("Individualized" CEE and Transcaucasia in CIS) has a higher aggregate policy index value than the clusters with predominantly corporate agriculture (although the West CEE countries are an exception to this rule).

We see from Table 5.6 that, in general, higher values of policy indices are associated with higher growth (or more moderate decline) in GDP and with improvement in productivity of agricultural labor. In other words, a country's economic performance improves as it achieves greater progress in implementing a broad mix of market-oriented institutional and policy reforms (in the rural sector and throughout the rest of the economy).

It is impossible to disaggregate the effect of the various dimensions of policy and institutional reform that are folded into these international indices. Thus, for instance, we do not know at this stage how much of the superior growth performance of CEE countries is attributable to land policy, how much to demonopolization of agro-processing and development of farm market services, and how much to liberalization of foreign trade and the exchange rate regime. No one particular policy or reform measure is decisive, but the entire portfolio of institutional and policy reforms driving the transition to market has a definite beneficial impact.

On a more rigorously quantitative level, regression analysis shows that the change in agricultural productivity depends on the growth in GDP, which in turn depends on policy indices. The tangible differences in economic performance between the two groups of transition countries are thus clearly related to differences in land reform as well as differences in the policy and institutional environment. It is very likely that the political, social, and macroeconomic factors characterizing the different policy environments in the two groups of countries, as reflected in the policy-oriented indices, have in fact influenced their different land

reform decisions. Land reform alone may have been insufficient to trigger and sustain the divergent trend, but combined with political commitment and resolve it has produced the results that we observe today. Countries that decisively implement market-oriented policies—in agriculture, in the whole economy, and in society in general—are outstripping the reluctant reformers. Market reforms in general, with land reform as part of the overall policy package, are not a failure in terms of agricultural and economic performance.

Efficiency Changes in the Former Soviet Union

We have seen how changes in agricultural output and agricultural labor lead to differential changes in productivity of agricultural labor. But labor is only one of the factors of production: output is also influenced by other inputs, such as land, livestock, fertilizers, machinery, and irrigation. For the 15 countries of the former Soviet Union (CIS and the Baltic states) the data enabled us to compare the changes in output with the changes in the total use of all inputs (including labor). As in the discussion of agricultural labor productivity, if both output and input use decline, but output declines less than input use, the difference reflects an improvement in the total productivity of all factors of production. Conversely, if output declines more than the use of inputs, total factor productivity deteriorates. In general, the residual difference between the growth of output and the growth of inputs is attributable to technical change (which may be positive or negative). This technical change represents efficiency improvements.

Using our data for agricultural labor and FAO data for livestock, machinery, fertilizer consumption, land, and irrigated area in the 15 former Soviet republics, we calculated the change in the use of each input between 1992 and 1997. To calculate the change in the quantity index of a composite basket of all inputs for this period, we weighted the changes in each input by the corresponding coefficients of the production function that had been estimated in a separate study of the former Soviet republics in the pre-transition period (Kriss 1994). The changes in efficiency based on these calculations are presented in Table 5.7. Efficiency increased dramatically in Armenia and Georgia; it increased significantly in the Baltic states (except Latvia) and

slightly to moderately in the core republics (European CIS and Kazakhstan). Central Asia (and Azerbaijan) generally registered decreases in the efficiency of agriculture: the decrease in output exceeded the decrease in the total use of inputs, which was moderated by the significant increases in agricultural labor in these countries. On the whole, despite the observed decreases in both output and total use of inputs, the efficiency of agriculture in the former Soviet republics increased. This shows from a new perspective that traditional Soviet agriculture was highly inefficient in its wasteful use of resources and that the pressures of transition have induced beneficial changes in the use of inputs.

Table 5.7. Changes in FSU Agriculture in the Post-Soviet Period (in percent)

	Change from 1992 to 1997, percent			Pre-transition efficiency level relative to Russia, percent
	Ag output	Use of all inputs	Efficiency	
Baltics				
Estonia	-28.9	-43.1	14.2	28.7
Latvia	-45.3	-39.2	-6.1	11.1
Lithuania	-6.1	-24.4	18.3	20.0
Core				
Russia	-24.7	-32.1	7.4	0.0
Belarus	-17.7	-20.5	2.9	11.2
Moldova	-16.8	-19.3	2.4	-5.0
Ukraine	-26.6	-29.2	2.5	4.6
Kazakhstan	-47.5	-42.3	-5.2	-3.3
Transcaucasia				
Armenia	-1.5	-24.4	22.9	-22.1
Georgia	24.0	-8.8	32.9	-25.8
Azerbaijan	-33.4	-29.6	-3.9	-18.1
Central Asia				
Kyrgyzstan	-6.8	-5.2	-1.7	-15.5
Tajikistan	-28.8	-17.3	-11.5	-14.4
Turkmenistan	-22.2	7.2	-29.4	-16.7
Uzbekistan	-4.5	6.2	-10.7	-18.8

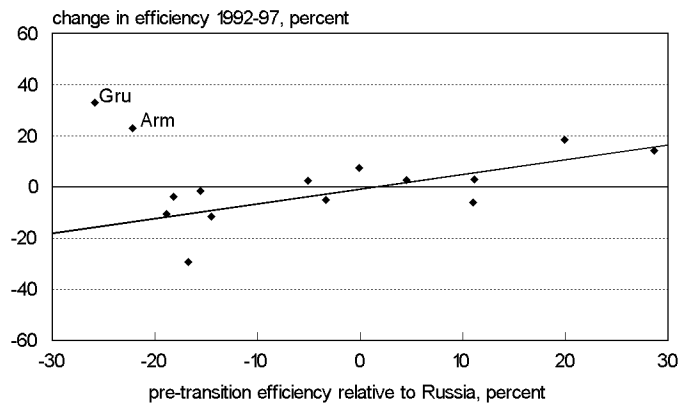
Source: calculated from Kriss (1994); see also Lerman, Kislev, Kriss, Biton (2003).

Note: Efficiency calculated as the difference between the changes in agricultural output and input use from 1992 to 1997.

Comparison with the pre-transition period shows that, in general, countries that were relatively more efficient before 1990 showed

larger improvements in efficiency after 1992. This is probably yet another example of “the rich becoming richer”. The phenomenon is demonstrated in Table 5.7, where the last column shows the pre-1990 efficiency of the former Soviet republics in percent relative to Russia (Kriss (1994); for details see Table 2.9 and Box 2.2 in Chapter 2). Figure 5.12 plots the change in efficiency between 1992-97 versus the pre-1990 efficiency (relative to Russia). In this figure, 13 of the 15 countries closely follow the regression line with $R^2 = 0.72$. Two countries are far outliers. These are Armenia and Georgia, which were relatively inefficient in the Soviet period and yet registered outstanding improvements in agricultural efficiency between 1992-97.

Fig. 5.12. Change in Efficiency vs Pre-Transition Efficiency:
15 Former Soviet Republics



What makes Armenia and Georgia different from the other former Soviet republics? These are the only two CIS countries that resolutely switched from large-scale collective agriculture to small-scale individual farming (see Chapter 4). Their achievements are especially impressive because, in addition to the disruptions of transition experience by all countries, Armenia and Georgia suffered in the early 1990s from the aftereffects of natural disaster and war devastation. The Baltic states, having severed their ties with the former Soviet Union, also adopted a strategy of rapid individualization of agriculture and accordingly achieved significant increases in agricultural efficiency. Yet, contrary to Armenia and Georgia, they were relatively efficient already in the Soviet period,

and the incremental impacts of the transition period were accordingly less remarkable.

So not everything in agriculture is preordained. As we have demonstrated in previous sections, policy changes during transition also have an impact on performance. Combining the past (relative efficiency before 1990) with the present (changes in efficiency between 1992-97, degree of individualization of agriculture, and the progress of agricultural reforms as reflected by the ECA index), we ran a hierarchical cluster analysis on the 15 former Soviet republics. The results are presented in Table 5.8, where the 15 countries are divided into four distinct clusters. In general, the cluster means show that greater improvements in efficiency during transition are associated with larger individual agriculture and with greater overall progress in institutional and policy reforms. In this analysis also, Armenia and Georgia form a single cluster that sharply deviates from all the rest. The degree of individualization of their agriculture and their policy index are significantly higher than for the other CIS countries (excluding the special case of the Baltic states, which are now part of the CEE space, not CIS). This probably enabled them to overcome the disadvantages of low Soviet-era efficiency and the handicaps of war and natural disaster, outstripping all the rest by efficiency improvements.

Table 5.8. Clustering of Former Soviet Republics by Variables Reflecting Pre-Reform and Post-Reform Efficiency and Reform Policies in Agriculture (cluster means based on 1992-97 data)

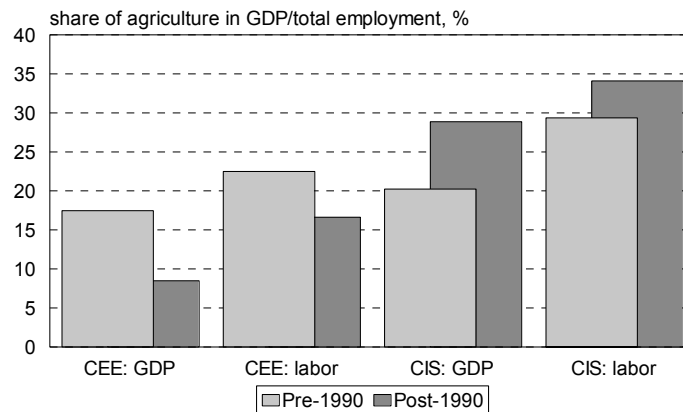
Clusters	Change in efficiency 1992-97	Pre-reform efficiency relative to Russia, 1965-90	Percent of land in individual use, 1997	ECA Policy Reform Index, 1997
Individualized agriculture:				
Armenia, Georgia	27.9%	-24.0%	28%	6.8
Political breakaways:				
Baltic states	8.8%	19.9%	75%	7.5
Moderate reformers: Russia, Ukraine, Moldova, Azerbaijan, Kazakhstan, Kyrgyzstan				
	0.3%	-6.2%	18%	5.6
Slow reformers: Belarus, Tajikistan, Turkmenistan, Uzbekistan				
	-12.2%	-9.7%	7%	2.4

It is also interesting to note that the inclusion of policy measures in the multivariate cluster analysis separated Kyrgyzstan and Azerbaijan from the rest of the Central Asian underperformers and “upgraded” them to one cluster with the core republics (Russia, Ukraine, Moldova, and Kazakhstan). Belarus, on the other hand, was “downgraded” from its natural place in the core cluster to the Central Asian cluster. These shifts between clusters are an understandable consequence of the relatively forward-looking policy environment in Kyrgyzstan and Azerbaijan and the dismal conservatism of Belarus.

Role of Agriculture and Per-Capita Incomes

Agriculture has been at the center of attention of politicians and policy makers since the beginning of transition. This is attributable, at least in part, to the relatively high importance of the agricultural sector in this region as measured both by its share in GDP and, perhaps most significantly, by its share in total employment. Transition has brought significant changes in the role of agriculture in the region, and these changes again show a marked divergence between CEE and CIS.

Fig. 5.13. Importance of Agriculture Before and After 1990



In CEE, agriculture is undergoing a process of “marginalization,” similar to that observed in the EU and the rest of the industrialized world. Alternative sectors—in particular the service industries—are gaining prominence and the share of agriculture in the economy is dropping, especially in GDP, less so in labor (Figure 5.13; Table 5.9). Yet despite these trends, agriculture remains a much more important sector in CEE than in the EU. It continues to be a major source of employment in rural areas, employing over 15% of the total labor force (compared to 5%-6% in the EU). The rural population is particularly dependent on agriculture in Bulgaria, Poland, Romania, Latvia, and Lithuania: in each of these countries the share of agriculturally employed is over 20%. Romania is actually the only CEE country where the importance of agriculture increased (albeit slightly) during transition.

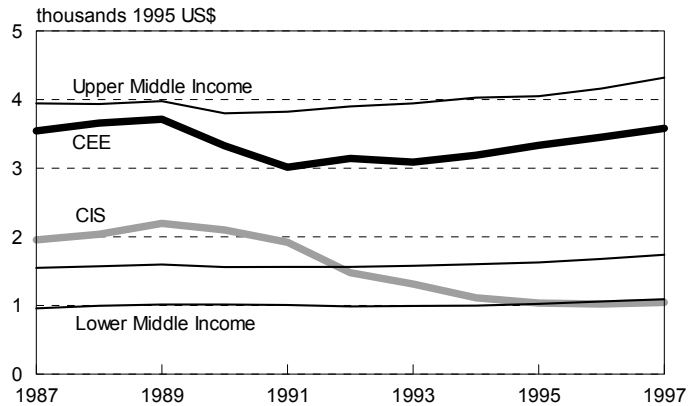
Table 5.9. Importance of Agriculture in CEE and CIS Before and After 1990

	Share in GDP, %		Share in employment, %	
	Pre-1990	Post-1990	Pre-1990	Post-1990
CEE	17	8	22	17
CIS	20	29	29	34
Large	17	14	19	18
Small	18	38	29	37
Central Asia	24	31	35	41

Note: The grouped numbers are simple arithmetic averages, not weighted by country size. Large: Russia, Kazakhstan, Ukraine, Belarus; Small: Armenia, Georgia, Azerbaijan, Moldova; Central Asia: Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

In CIS, on the other hand, the share of agriculture in both GDP and employment has increased significantly since 1990 (Figure 5.13). The country-by-country picture in CIS is mixed: in the large countries—Russia, Kazakhstan, Ukraine, and Belarus—the share of agriculture in GDP is decreasing, but astonishingly the share of agriculture in employment remains unchanged. In the smaller countries, including Central Asia, Transcaucasia, and Moldova, the share of agriculture in both GDP and employment has increased steeply since 1990. These different trends emerge clearly from Table 5.9 that breaks down the CIS subregion into several groups.

Fig. 5.14. Dynamics of GNP Per Capita 1987-97:
CEE, CIS, and Middle Income Countries



The differences in growth and in productivity changes between CIS and CEE are reflected in the level of wealth in these countries, as measured by per-capita income. Figure 5.14 shows the variation of per-capita GNP (in constant 1995 dollars) in CEE and CIS since before the transition, compared with Middle Income countries. Before the beginning of transition (1987-89), both CIS and CEE were firmly in the category of Middle Income countries (per-capita GNP between \$1,000 and \$4,000 in constant 1995 dollars), but the income in CEE was higher than in CIS (\$3,600 per capita in CEE compared with \$2,100 in CIS). All countries in the region registered a decline in per-capita income with the onset of transition, and the per-capita GNP in 1992 averaged 80% of its level in 1989 across the region. The CEE countries stabilized in 1991 and began to show a clear recovery after that. The CIS countries, on the other hand, went through a much longer decline phase, and it is only in the last two or three years (1995-97) that their per-capita GNP stabilized. As a result of the differences in transition trends, the CEE countries remain close to the level of Upper Medium Income countries, as before 1990, with per-capita income averaging \$3,600, while the CIS countries have dropped to the level of Lower Medium Income countries, with average per-capita income as low as \$1,000.

Appendix to Chapter 5

Table A5.1. Sectoral Changes in Transition Countries: CEE

	Percent of ag land in individual cultivation		Change in ag employment 1992-1999, percent	Change in ag output 1992- 1999, percent	Change in GDP 1992- 1999, percent	Change in productivity of labor 1992-1999, percent	ECA Policy Reform Index 1999
	pre- 1990	1999					
Hungary	6	54	-39	-1	18	63	8.8
Czech Rep.	5	38	-49	-8	10	81	8.6
Slovakia	5	9	-41	-9	37	56	7.6
Estonia	6	52	-62	-38	11	63	8.4
Latvia	5	91	-31	-50	0	-28	8.4
Lithuania	9	90	-9	-15	-11	-7	7.6
Romania	12	68	2	18	24	16	6.6
Bulgaria	13	52	14	1	-6	-11	7.6
Poland	77	82	8	8	44	0	7.8
Slovenia	92	94	7	24	33	16	8.0
Albania	4	100	7	55	58	46	6.8
CEE average	21	66	-18	-1	20	27	7.8

Table A5.1 (continued). Sectoral Changes in Transition Countries: CIS

	Percent of ag land in individual cultivation		Change in ag employment 1992-1999, percent	Change in ag output 1992- 1999, percent	Change in GDP 1992- 1999, percent	Change in productivity of labor 1992-1999, percent	ECA Policy Reform Index 1999
	pre- 1990	1999					
Armenia	4	33	16	12	25	-3	7.2
Georgia	7	37	86	22	-15	-35	6.0
Azerbaijan	3	34	22	-24	-31	-38	6.2
Belarus	7	16	-32	-25	-6	11	1.8
Moldova	9	27	-2	-32	-42	-31	6.0
Russia	2	13	-16	-32	-25	-19	5.6
Ukraine	7	18	-1	-39	-50	-38	5.4
Kazakhstan	0.2	21	-30	-45	-25	-22	5.6
Kyrgyzstan	1	23	32	4	-20	-22	6.4
Tajikistan	2	20	26	-45	-33	-57	4.2
Turkmenistan	0.2	0.3	26	-38	-33	-51	2.0
Uzbekistan	2	6	-12	5	7	19	2.0
CIS average	4	21	10	-20	-21	-24	4.9

Table A5.2. The Status of Agricultural Reforms in CEE and CIS: ECA Agricultural Reform Index 1997-1999
1 = Centrally planned economy – 10 = Completed market reforms

Country	Market liberalization		Land reform		Privatization of support services		Rural finance		Institutional framework		Overall score	
	1999	1997	1999	1997	1999	1997	1999	1997	1999	1997	1999	1997
CEE countries												
Hungary	8	9	9	9	10	9	9	8	8	8	8.8	8.6
Czech Republic	9	9	8	8	9	8	9	8	8	8	8.6	8.2
Estonia	9	10	8	6	8	7	8	7	9	9	8.4	7.8
Latvia	9	7	9	9	8	7	8	7	8	8	8.4	7.6
Slovenia	8	8	9	9	8	8	7	8	8	9	8.0	8.4
Poland	7	9	8	8	9	7	7	6	8	8	7.8	7.6
Slovakia	7	7	8	7	8	8	8	8	7	7	7.6	7.4
Lithuania	8	7	8	8	8	7	6	6	8	7	7.6	7.0
Bulgaria	9	6	8	7	8	5	6	4	7	5	7.6	5.4
Albania	8	8	8	8	8	8	5	3	5	5	6.8	6.4
Croatia	6	6	6	5	7	6	6	6	8	6	6.6	5.8
Macedonia	8	7	7	7	7	8	4	4	7	6	6.6	6.4
Romania	7	7	8	7	7	6	6	6	5	4	6.6	6.0
Average CEE	7.92	7.69	8.00	7.54	8.08	7.23	6.85	6.23	7.39	6.92	7.65	7.12
CIS countries												
Armenia	7	7	8	8	7	7	7	7	7	8	7.2	7.4
Kyrgyzstan	7	6	7	6	6	6	6	6	6	5	6.4	5.8
Azerbaijan	7	6	8	6	6	5	5	4	5	4	6.2	5.0
Georgia	8	7	6	7	5	5	6	6	5	6	6.0	6.2
Moldova	7	7	7	6	6	7	5	5	5	4	6.0	5.8
Kazakhstan	6	7	5	5	6	7	6	5	5	5	5.6	5.8
Russia	6	7	5	5	7	7	5	6	5	5	5.6	6.0
Ukraine	6	7	6	5	6	7	5	5	4	3	5.4	5.4
Tajikistan	5	4	5	2	5	5	2	3	4	5	4.2	3.8
Turkmenistan	2	2	3	2	1	1	1	1	3	3	2.0	1.8
Uzbekistan	3	4	2	1	1	1	1	1	3	4	2.0	2.2
Belarus	2	3	2	1	2	2	2	2	1	1	1.8	1.8
Average CIS	5.50	5.58	5.33	4.50	4.83	5.00	4.25	4.25	4.42	4.42	4.87	4.75
Average score	6.76	6.68	6.72	6.08	6.52	6.16	5.60	5.28	5.96	5.72	6.312	5.984

Source: Csaki and Tuck (2000).

Table A5.3. Gross Domestic Product (GDP) Index for CIS and CEE Countries, 1990-2000 (1990=100)

CIS	Arm	Gru	Az	Bel	Mol	Rus	Ukr	Kaz	Kyr	Taj	Tur	Uzb
1990	100	100	100	100	100	100	100	100	100	100	100	100
1991	88.3	78.9	99.3	98.8	82.5	95.0	91.3	89.0	92.1	92.9	95.3	99.5
1992	51.4	43.5	76.9	89.3	58.6	81.2	82.3	84.3	79.3	66.0	90.2	88.5
1993	46.9	30.7	59.1	82.5	57.9	74.2	70.6	76.5	67.0	58.7	81.0	86.4
1994	49.4	27.5	47.5	72.9	40.0	64.7	54.4	66.9	53.5	47.6	65.6	81.9
1995	52.8	28.3	41.9	65.3	39.2	62.1	47.8	61.4	50.6	41.7	60.3	81.2
1996	55.9	31.4	42.4	67.1	36.9	60.0	43.0	61.7	54.2	39.8	55.6	82.6
1997	57.8	34.8	44.9	74.8	37.5	60.5	41.7	62.8	59.6	40.5	49.3	86.9
1998	62.0	35.8	49.4	81.1	35.1	57.5	40.9	61.6	60.9	42.6	51.8	90.7
1999	64.0	36.8	53.0	83.8	33.9	60.7	40.8	63.2	63.1	44.2	60.6	94.7
2000	67.9	37.5	59.0	88.8	34.5	65.7	43.2	69.3	66.3	47.9	71.3	98.5
CEE	Hun	Cz	Svk	Est	Lat	Lit	Rom	Bul	Pol	Svn	Alb	
1990	100.0	100	100.0	100.0	100.0	100	100.0	100.0	100.0	100	100.0	
1991	88.1	88.4	85.4	86.0	89.5	94.3	87.1	91.6	93.0	91.1	72.3	
1992	84.3	88.0	79.9	67.1	58.3	74.3	79.4	84.9	95.4	86.1	67.1	
1993	82.4	88.0	81.4	61.4	49.6	62.2	80.6	83.6	99.1	88.5	73.5	
1994	84.8	90.0	85.4	60.2	49.9	56.1	83.8	85.1	104.2	93.2	79.6	
1995	86.0	95.3	91.1	62.7	49.5	58.0	89.8	87.6	111.5	97.0	90.2	
1996	87.2	99.4	96.8	65.2	51.1	60.7	93.4	79.3	118.2	100.4	98.4	
1997	91.0	98.6	102.8	71.6	55.5	65.1	87.7	74.9	126.3	105.0	91.6	
1998	95.6	97.4	107.0	74.9	57.7	68.5	83.5	77.9	132.3	109.0	98.9	
1999	99.7	97.0	109.0	74.4	58.3	65.8	98.8	79.7	137.8	114.7	106.1	
2000	104.8	99.8	111.4	79.7	62.3	68.3	100.6	84.0	143.2	120.0	114.4	

Source: Goskomstat SNG for CIS; country statistical yearbooks for CEE.

Table A5.4. Gross Agricultural Output (GAO) Index for CIS and CEE Countries, 1990-2000 (1990=100)

CIS	Arm	Gru	Az	Bel	Mol	Rus	Ukr	Kaz	Kyr	Taj	Tur	Uzb
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	101.0	64.0	100.3	95.0	90.0	95.0	87.0	77.0	90.0	73.9	96.0	99.0
1992	103.0	55.7	76.2	86.5	75.6	86.5	80.0	99.3	85.5	95.4	87.4	93.1
1993	97.9	49.0	64.8	89.9	83.2	83.0	81.6	92.4	77.0	88.7	101.3	94.0
1994	100.8	54.4	56.4	77.3	63.2	73.0	68.6	73.0	63.1	70.1	83.1	87.4
1995	105.8	61.5	52.4	73.5	65.1	67.2	65.8	55.5	61.8	53.2	83.9	89.2
1996	108.0	65.1	54.0	74.9	56.6	63.8	59.9	52.7	71.1	50.6	66.3	83.8
1997	101.5	69.7	50.8	71.2	63.4	65.1	58.7	52.3	79.6	50.2	53.5	88.8
1998	114.7	62.7	53.8	70.7	55.8	56.6	52.8	42.3	82.0	40.6	49.3	92.4
1999	115.8	67.8	57.6	65.0	51.4	58.9	49.1	54.2	88.6	52.0	53.8	97.9
2000	112.9	57.6	64.5	70.9			54.1	52.0			64.4	
CEE	Hun	Cz	Svk	Est	Lat	Lit	Bul	Rom	Pol	Svn	Alb	
1990	100	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
1991	93.8	90.8	91.0	94.2	95.6	94.5	105.4	100.8	97.9	100.4	82.6	
1992	75	79.6	71.2	75.8	81.1	72.5	97.8	87.4	85.3	90.3	97.9	
1993	67.7	78.6	65.5	66.8	63.3	68.1	80.6	96.3	91.6	89.6	108.1	
1994	69.8	73.5	68.7	58.2	50.0	53.8	86.0	96.5	83.2	109.9	117.0	
1995	71.6	77.6	70.2	58.3	46.7	61.4	99.8	100.8	91.6	109.8	132.5	
1996	76.1	76.5	71.6	54.6	44.4	69.3	88.5	102.1	92.2	110.9	136.5	
1997	73.6	72.6	70.9	53.8	50.7	75.6	99.5	105.6	92.0	110.9	137.8	
1998	74.1	73.1	66.7	51.1	44.6	71.8	99.7	97.7	97.4	113.3	144.7	
1999	74.5	73.5	65.0	46.9	40.2	61.7	99.1	102.8	92.4	111.8	151.9	
2000	69.2	70.1	57.0	46.1	41.0	64.8	90.1	88.2	87.2	114.5	158.0	

Source: Goskomstat SNG for CIS; country statistical yearbooks for CEE.

Table A5.5. Number of Employed in Agriculture for CIS and CEE Countries, 1990-1999 (thousands)

CIS	Arm	Gru	Az	Bel	Mol	Rus	Ukr	Kaz	Kyr	Taj	Tur	Uzb
1990	283.8	695	1139.5	985.4	673.4	9727.5	4960.5	1712.8	569.1	831	617.1	3115.3
1991	384.6	666.1	1181	936.6	739	9735.9	4762	1861.9	618.5	878.2	646.1	3550.2
1992	484.2	639.8	1286.3	977	745	10112.3	4920.1	1920.3	696.2	888.5	695.7	3651.4
1993	519.7	553.4	1198.5	945.2	726.2	10103.5	4877.6	1745.8	651.2	946.7	711.4	3677.1
1994	502.1	539	1139.5	891.6	764	10278.1	4755.5	1408	684.7	999.3	740.9	3618.7
1995	549.6	530.1	1109.1	843.5	767	9744	5263.5	1434.2	771	1092.3	785.2	3485
1996	586	1023.1	1168.8	760.4	710	9261.3	5025.4	1379.7	773.5	1023.5	811.8	3504.8
1997	564.2	1244.1	1067.1	735.1	683	8592	4988	1545.3	810.8	1145	844.4	3533
1998	565.6	1226.6	1139.6	695.3	749	8724	4965.2	1353.9	832.3	1080	887.5	3467
1999	560.4	1191.9	1566.3	659.5	730	8495.1	4867	1335.4	922.4	1118	877.6	3220
CEE	Hun	Cz	Svk	Est	Lat	Lit	Bul	Rom	Pol	Svn	Alb	
1990	770	553	295	149	218	350	735	3055	4425		721	
1991	660	452	271	141	219	338	679	3116	4265		724	
1992	460	371	257	125	249	362	677	3362	3931	90	720	
1993	360	283	199	102	223	399	698	3537	3848	90	750	
1994	326	287	214	88	209	390	738	3561	3967	98	780	
1995	309	257	202	63	201	390	770	3187	4127	92	778	
1996	284	247	191	60	195	399	769	3249	4293	89	785	
1997	294	232	163	53	204	363	769	3322	4301	108	771	
1998	275	207	158	53	184	355	796	3296	4282	109	769	
1999	280	189	150	48	171	331	772	3419	4261	96	768	

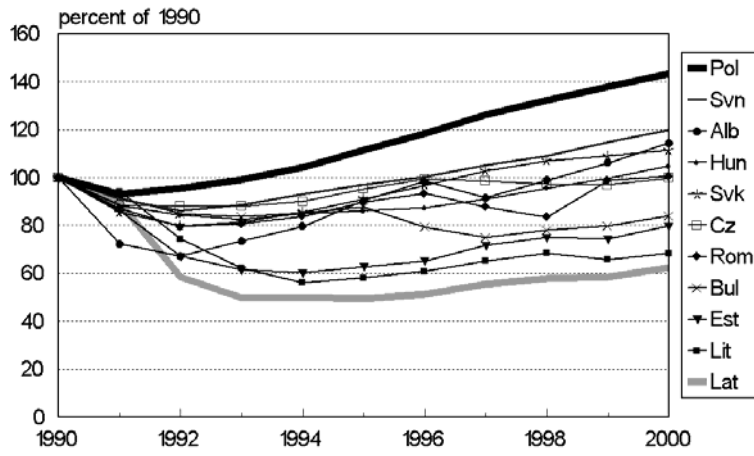
Source: Goskomstat SNG for CIS; country statistical yearbooks for CEE.

Table A5.6. Agricultural Labor Productivity for CIS and CEE Countries, 1990-1999 (1990=100)

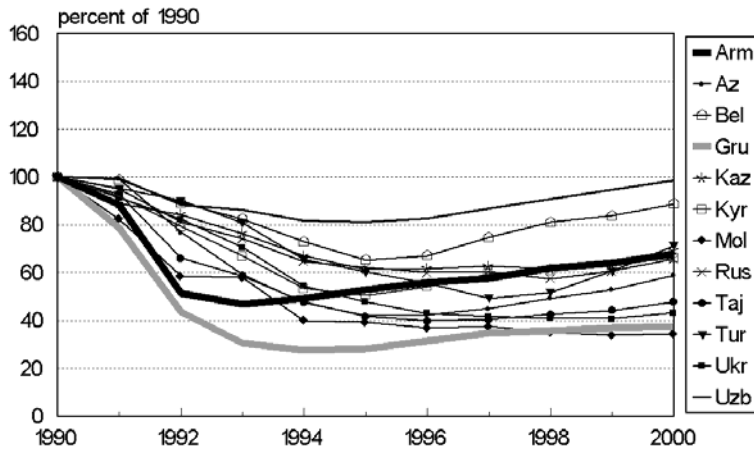
CIS	Arm	Gru	Az	Bel	Mol	Rus	Ukr	Kaz	Kyr	Taj	Tur	Uzb
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1991	74.5	66.8	96.8	99.9	82.0	94.9	90.6	70.8	82.8	69.9	91.7	86.9
1992	60.4	60.5	67.5	87.2	68.3	83.2	80.7	88.6	69.9	89.2	77.5	79.4
1993	53.4	61.5	61.6	93.7	77.1	79.9	83.0	90.6	67.2	77.8	87.9	79.6
1994	57.0	70.1	56.4	85.5	55.7	69.1	71.5	88.8	52.4	58.3	69.2	75.3
1995	54.7	80.6	53.9	85.8	57.2	67.1	62.0	66.2	45.6	40.5	66.0	79.7
1996	52.3	44.3	52.6	97.1	53.7	67.0	59.1	65.4	52.3	41.1	50.4	74.5
1997	51.0	38.9	54.2	95.4	62.5	73.7	58.4	57.9	55.9	36.4	39.1	78.3
1998	57.5	35.5	53.8	100.2	50.2	63.2	52.8	53.6	56.1	31.3	34.3	83.0
1999	58.7	39.5	41.9	97.2	47.4	67.5	50.0	69.5	54.7	38.7	37.8	94.8
CEE	Hun	Cz	Svk	Est	Lat	Lit	Bul	Rom	Pol	Svn	Alb	
1990	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0	
1991	109.4	111.2	99.0	99.6	95.1	98.1	114.1	98.8	101.6		82.3	
1992	125.5	118.8	81.9	90.3	71.0	70.1	106.3	79.4	96.0	100.0	98.0	
1993	144.9	153.6	97.1	97.8	61.9	59.8	84.9	83.2	105.3	99.3	103.9	
1994	164.8	141.9	94.8	98.8	52.2	48.3	85.7	82.8	92.8	111.8	108.2	
1995	178.7	167.0	102.7	137.5	50.6	55.1	95.3	96.6	98.2	119.0	122.8	
1996	206.5	171.7	110.9	135.9	49.7	60.8	84.7	96.0	95.1	124.2	125.4	
1997	192.6	172.7	128.0	150.0	54.0	72.9	95.1	97.1	94.7	102.4	128.9	
1998	207.7	195.3	124.8	144.4	52.9	70.9	92.1	90.6	100.7	103.7	135.8	
1999	204.7	214.7	127.7	146.7	51.2	65.3	94.4	91.9	96.0	116.2	142.6	

Source: Calculated from Tables A5.4 and A5.5.

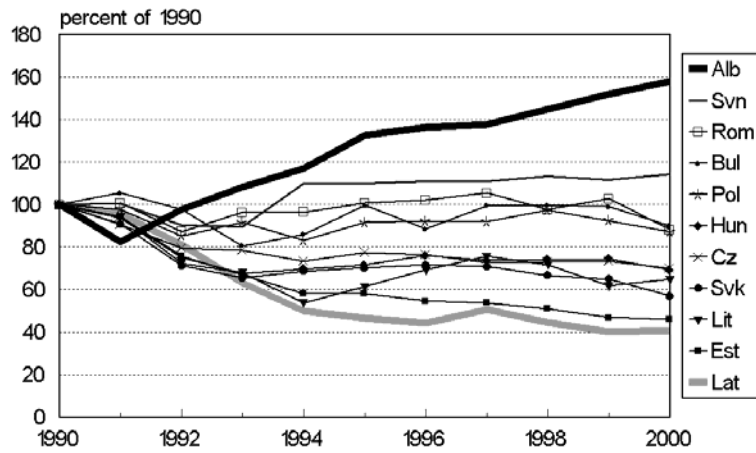
Gross Domestic Product in CEE: 1990-2000



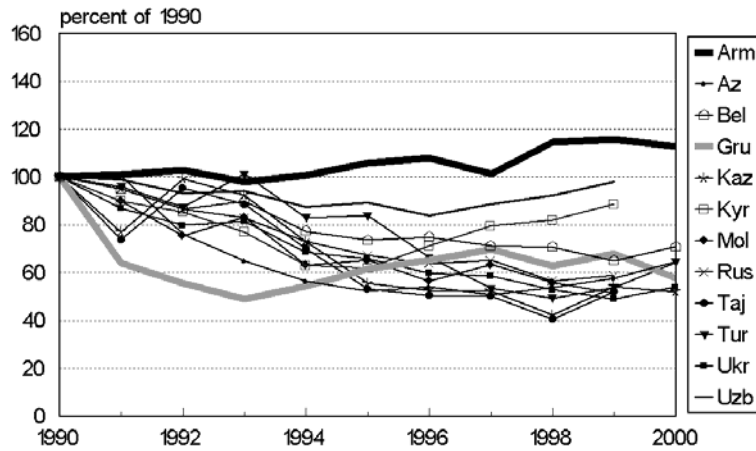
Gross Domestic Product in CIS: 1990-2000



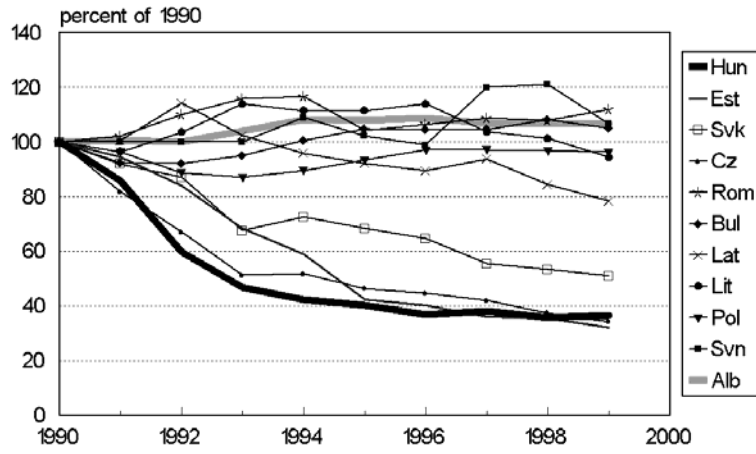
Gross Agricultural Product in CEE: 1990-2000



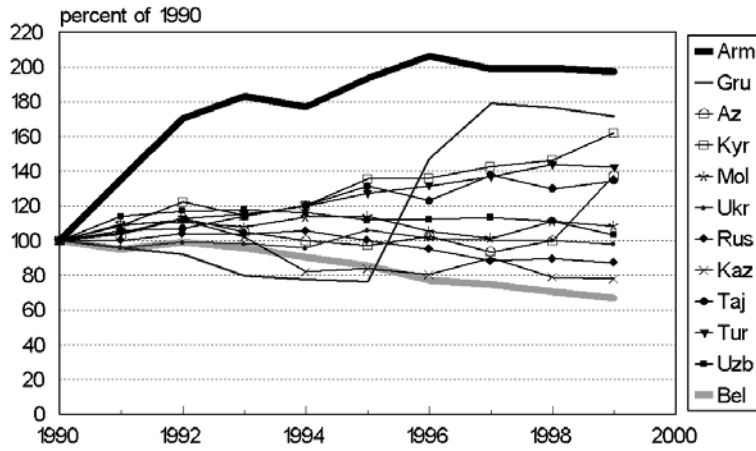
Gross Agricultural Product in CIS: 1990-2000



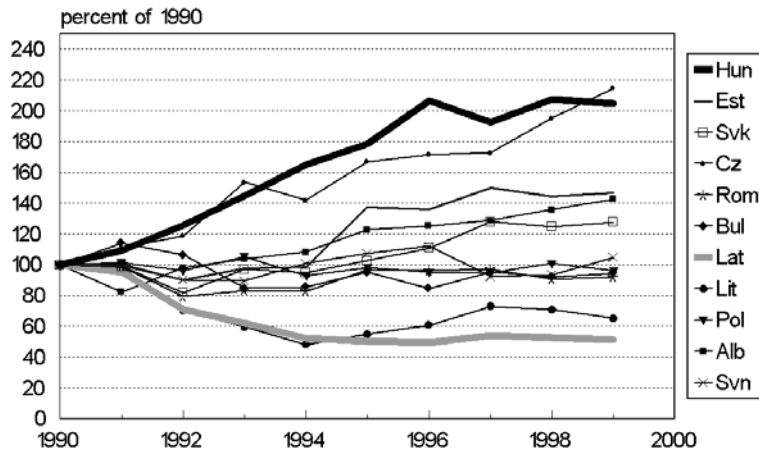
Agricultural Labor in CEE: 1990-1999



Agricultural Labor in CIS: 1990-1999



Agricultural Labor Productivity in CEE: 1990-1999



Agricultural Labor Productivity in CIS: 1990-1999

