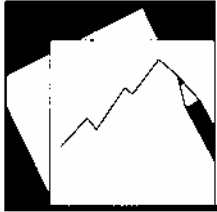


# Working Paper

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INTERNATIONAL MONETARY FUND



WP/04/151

# IMF Working Paper

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## Analysis of Recent Growth in Low-Income CIS Countries

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## IMF Working Paper

Monetary and Financial Systems Department

### Analysis of Recent Growth in Low-Income CIS Countries

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Authorized for distribution by Anne-Marie Gulde

August 2004

#### Abstract

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This paper analyzes factors that determine recent economic growth in the low-income countries of the Commonwealth of Independent States.<sup>2</sup> The main findings are as follows: (1) productivity gains in export-oriented sectors and expansion of exports may have become the main sources of growth in five of the seven CIS-7 countries, while in the early years of transition the output recovery was mainly driven by consumption; (2) economic growth has concentrated in agriculture and the raw material sectors, and, thus, is vulnerable to changes in external conditions; and (3) structural reforms matter for growth, which is consistent with previous research on growth in transition countries.

JEL Classification Numbers: F43, P20, P27, N10, O47, P52

Keywords: Transition economies, growth, recovery, output, CIS-7

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<sup>1</sup>The authors are grateful to Julian Berengaut, Willem Buiter, Mark de Broeck, Erik de Vrijer, Lev Freinkman, Oleh Havrylyshyn, Wojciech Maliszewski, Paul Mathieu, Paulo Neuhaus, Tom Richardson, David Robinson, Ratna Sahay, Clinton Shiells, Jeromino Zettelmeyer, and country economists from the IMF and the World Bank for comments and suggestions. Many thanks to Mark de Broeck for sharing valuable data.

<sup>2</sup>Low-income countries of the Commonwealth of Independent States, referred throughout the paper as the CIS-7 countries, include Armenia, Azerbaijan, Georgia, the Kyrgyz Republic, Moldova, Tajikistan and Uzbekistan.

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## I. INTRODUCTION

It has been six years since the resumption of economic growth in the CIS-7 countries after more than five years of decline following the breakup of the former Soviet Union. As noted previously, low-income countries of the Commonwealth of Independent States (or CIS-7) include Armenia, Azerbaijan, Georgia, the Kyrgyz Republic, Moldova, Tajikistan and Uzbekistan. Despite the recent global economic slowdown, growth in the CIS-7 countries has continued.<sup>3</sup> In 1998–2002, average annual real GDP growth in the CIS-7 countries was 5.4 percent.

This paper focuses on the sources of recent economic growth in the CIS-7 countries and whether this growth can be sustainable. It focuses on demand-side decomposition of GDP, growth accounting, and a sectoral breakdown of GDP. Econometric analysis is used to identify factors driving economic growth.

The breakdown of GDP by expenditure components points to a shift in the sources of growth during the 1990s from consumption to exports and investment. In the early 1990s, the output recovery and growth in the CIS-7 countries was mostly driven by consumption, financed by external borrowing and income from the underground economy. Since the late 1990s, however, economic growth in most CIS-7 countries resulted from the expansion of exports and an increase in investment. High energy endowments in some countries, artificially low energy prices, and low wages may have contributed to the resilience of exports to the recent global economic slowdown.

A growth accounting framework is employed to analyze whether efficiency gains contributed to the recent growth. The results of the growth accounting exercise demonstrate that, starting from 1998, overall total factor productivity (TFP) growth resumed for the first time since the breakup of the Soviet Union and averaged over 5 percent in three of the CIS-7 countries. This points to the possibility that transition efforts have begun to show results on the production side. The results, however, need to be interpreted with caution because of data weaknesses and difficulties in the measurement of changes in the informal sector activity, labor hoarding, capacity utilization, and depreciation rates.

A sectoral analysis reveals that recent GDP growth in the CIS-7 countries was concentrated in agriculture, extraction industries, production of goods with low degree of processing, trade, and services. The analysis also indicates that with the stagnant share of manufacturing and an increasing dependence on exports of raw materials and agricultural products, the CIS-7 countries are becoming increasingly vulnerable to changes in external conditions.

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<sup>3</sup>Despite being one of the poorest countries of CIS, Turkmenistan is not included in this analysis. Large gaps in data and poor quality of the available data preclude the analysis of economic performance in Turkmenistan.

Finally, the paper presents the results of an econometric analysis of the main factors explaining economic growth in the CIS-7 countries. The results, based on data through 2002, are consistent with previous findings (e.g., Fischer, Sahay, and Vegh, 1998 and Havrylyshyn and Van Rooden, 2000) that lower fiscal deficits, exchange rate stability, as well as implementing structural reforms lead to a higher growth.

The rest of the paper is organized as follows. Section II covers growth performance in the CIS-7 countries in comparison with the rest of the CIS and Central and Eastern Europe and the Baltics (CEEB).<sup>4</sup> Section III discusses the sources of growth based on a demand-side decomposition of GDP. Section IV focuses on a growth accounting framework and analysis of TFP growth rates. Section V turns to the sectoral breakdown of GDP and employment. Section VI presents the results of the econometric analysis of the main factors that determine growth in transition. Section VII concludes and discusses policy implications.

## II. RECENT GROWTH DEVELOPMENTS IN THE CIS-7 COUNTRIES

The CIS-7 countries exhibited strong, although uneven, growth in the five-year period 1998–2003 (see Table 1). During this period, growth in the CIS-7 countries was higher than in the CEEB and other developing countries, and was broadly equal to that in the other CIS countries.

Table 1. Real GDP Growth in the CIS-7 Countries, 1998-2003  
(In percent)

	1998	1999	2000	2001	2002	2003 1/	Average 1998–2003
Armenia	7.3	3.3	6.0	9.6	12.9	7.0	7.7
Azerbaijan	10.0	7.4	11.1	9.9	10.6	9.2	9.7
Georgia	2.9	3.0	1.9	4.7	5.5	11.1	4.9
Kyrgyz Republic	2.1	3.7	5.3	5.4	-0.5	5.6	3.6
Moldova	-6.5	-3.4	2.1	6.1	7.8	6.3	2.1
Tajikistan	5.3	3.7	8.3	10.2	9.1	6.0	7.1
Uzbekistan	2.1	3.4	3.3	4.1	3.2	0.3	2.7
CIS-7 country average	3.3	3.0	5.4	7.1	6.9	6.5	5.4
Other CIS 2/ countries	-0.2	3.1	7.9	8.1	5.8	6.1	5.1
CEEB	3.9	2.2	4.6	3.8	4.1	5.4	4.0
Memorandum items:							
Developing countries	3.5	3.9	5.7	4.1	4.6	5.0	4.5
Industrial countries	2.7	3.4	3.9	1.0	1.8	1.8	2.4

Source: World Economic Outlook (IMF, 2003)

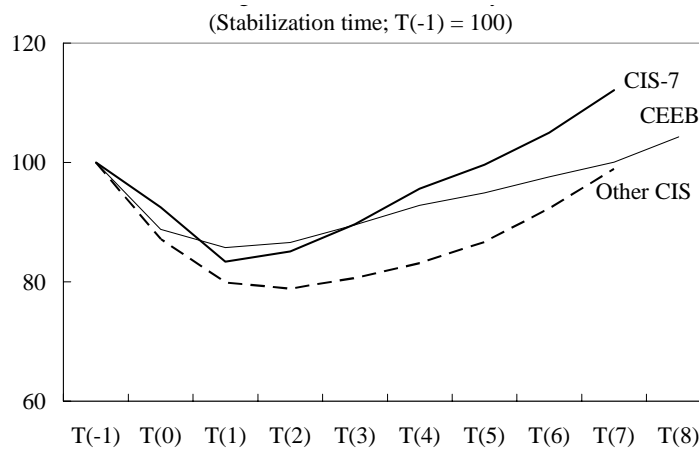
1/ Preliminary.

2/ Hereafter “Other CIS” group excludes Turkmenistan

<sup>4</sup>The CEEB countries include Albania, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Poland, Romania, the Slovak Republic, Slovenia, Estonia, Latvia, and Lithuania. Because of lack of data, Bosnia and Herzegovina, as well as Serbia and Montenegro have not been included in the sample.

Using the concept of stabilization time, the comparison among the three groups of countries shows that the relative magnitude of the recovery in the CIS-7 countries surpassed that in the other CIS and the CEEB.<sup>5</sup> In stabilization time, time is measured from a base year, T(0), which is the year of the start of a stabilization program. Stabilization programs in the CIS-7 and the other CIS countries started between September 1993 and February 1995, while stabilization programs in the CEEB countries began during the period January 1990–October 1993.

Figure 1. Real GDP Recovery



Sources: Authors' calculations; Fisher and Sahay, 1996, IMF, World Economic Outlook.

Although the CIS-7 countries demonstrated strong performance compared to the other CIS countries and even the CEEB countries, as Figure 1 shows, it is unclear to what extent this growth was merely a stronger rebound from a deep fall in real GDP (see Table 2), a result of reforms, or a response to external developments.<sup>6</sup> However, transition indicators of the

<sup>5</sup>Fischer, Sahay and Vegh (1998) introduced the stabilization time concept to compare transition countries taking into account their reform efforts from the beginning of stabilization programs.

<sup>6</sup>The sharp economic decline in the early years of the transition reflected initial shocks, sizable movements of capital and labor, the disruption of intraregional trade, termination of direct transfers from the Soviet Union (about 13 percent of GDP in the case of the Kyrgyz Republic), a marked change in ownership rights, civil conflicts, and trade embargoes. See among others, Campos and Coricelli (2002), Fischer, Sahay, and Vegh (1996a, 1996b, and 1998), Havrylyshyn and Wolf (1998), Havrylyshyn and others (1999), Havrylyshyn (2001), Zettelmeyer (1998), and Havrylyshyn and van Rooden (2000).



European Bank for Reconstruction and Development (EBRD) demonstrate that reforms in the CIS-7 countries did not progress as much as in the other transition countries.

Table 2. Contraction Depth of Real GDP  
(1989=100)

	Year of the First Positive Real GDP Growth	Cumulative Drop from 1989 (In percent)
Armenia	1994	53.3
Azerbaijan	1996	42.6
Georgia	1996	78.8
Kyrgyz Republic	1996	48.7
Moldova	1997	63.2
Tajikistan	1997	68.6
Uzbekistan 1/	1996	13.9
Kazakhstan	1997	39.4
Russia	1997	41.3

Source: World Economic Outlook, IMF, 2003.

1/ According to official data, the initial output decline in Uzbekistan was much lower than in other CIS countries. It is possible that Uzbekistan's GDP data are less accurate than those in the rest of the CIS-7 countries. Alternatively, according to Zettelmeyer (1998), Uzbekistan's output drop was cushioned by low initial industrialization, its cotton production that could readily be sold on international market, and its self-sufficiency in energy.

The Russian crisis in 1998 and the recent global economic slowdown could have had an impact on growth in the CIS-7 countries. While initially the crisis led to a slowdown in most of the CIS-7 countries, as Russia recovered, stronger import-demand from Russia provided an impetus for recovery.<sup>7</sup> The real depreciation of CIS-7 currencies against the ruble and other currencies could have supported an increase of the market share of the CIS-7 countries.<sup>8</sup>

All in all, the recent growth spurt in the CIS-7 countries could be partially explained by their low initial real GDP levels, but also by increased demand from Russia and other countries, and by improved productivity. In the following sections we turn to an analysis of the forces

<sup>7</sup>The impact of the Russian crisis in 1998 was more visible for countries with close relations with Russia (e.g., the Kyrgyz Republic and Moldova); at the time of the crisis, a close relationship with Russia was considered an impediment for medium-term growth in both countries. For a more detailed analysis on the impact of the Russian crisis on the CIS-7 countries, see IMF and the World Bank (2002).

<sup>8</sup>During 1998–2002, real depreciation of the CIS-7 currencies was on average 20 percent against Russian ruble and 14 percent against all currencies combined.

driving growth in the CIS-7 countries and address the question of the sustainability of growth.

### **III. DEMAND DECOMPOSITION: HAS GROWTH BEEN DRIVEN BY CONSUMPTION?**

In this section we turn to the analysis of decomposition of GDP by expenditure components to examine what were the main sources of growth in the CIS-7 countries on the demand side. Unfortunately, insufficient data for Tajikistan and Uzbekistan do not allow us to calculate contributions of expenditure components to GDP growth.<sup>9</sup>

The analysis of the expenditure components of the GDP shows that after 1998 the recovery of the output and growth in five CIS-7 countries started to be driven by net export and investment, rather than by consumption as it was in earlier years (see Table 3).<sup>10</sup> High consumption prior to 1998 had most likely driven the recovery by stimulating an increase in capacity utilization and possibly investment.<sup>11</sup>

While consumption continued to be the main driving force for growth in Moldova, in Armenia, Azerbaijan, and Georgia growth in 1998–2002 appeared to be driven by the expansion of exports and investment in export-oriented sectors. In the Kyrgyz Republic, real GDP growth appears to have been export-driven after 1998. However, the data do not fully reflect this because of the supply shock (landslide in the gold mine Kumtor) in 2002.

The most recent observations demonstrate that the pace of investment started to pick up in some CIS-7 countries, mostly because of foreign direct investment coming to export-oriented industries (with the exception of Uzbekistan).<sup>12</sup> The share of investment in the GDP,

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<sup>9</sup>The breakdown of GDP by expenditure components demonstrates that final consumption continued to be a dominant component of GDP in Tajikistan and Uzbekistan until 2002 (see Table A4 in the Appendix).

<sup>10</sup>Private consumption was financed by the retail trade sector, foreign remittances, and possibly income from the underground economy. Government consumption was fueled by accumulated foreign borrowing, grants and inflation financing (seignorage). See IMF and the World Bank (2002).

<sup>11</sup>The breakdown of GDP by expenditure components demonstrates that final consumption continued to be a dominant component of GDP in Tajikistan and Uzbekistan until 2002 (see Table A4 in the Appendix).

<sup>12</sup>See also Table A5 in the Appendix.

however, still remains low in the CIS-7 countries compared to that in the other country groups (see Table 4).<sup>13</sup>

Table 3. Contribution of Expenditure Components to Real GDP Growth, 1998–2002

	Avg. 96–97	Avg. 98–00	Avg. 01–02	Avg. 96–97	Avg. 98–00	Avg. 01–02
	(In percent)			(In percent of total)		
<b>Armenia</b>						
GDP growth	4.6	5.5	11.3	100.0	100.0	100.0
Final consumption	5.4	5.3	5.5	117.4	96.2	48.9
Investment	1.3	0.9	1.7	28.3	15.9	15.2
Net export	-2.1	-0.7	4.0	-45.7	-12.1	35.9
<b>Azerbaijan</b>						
GDP growth	3.5	9.5	10.3	100.0	100.0	100.0
Final consumption	4.7	10.3	4.9	134.3	108.4	47.4
Investment	2.9	4.1	3.2	82.9	43.3	31.2
Net export	-4.1	-4.9	2.2	-117.1	-51.7	21.4
<b>Georgia</b>						
GDP growth	6.9	5.5	3.8	100.0	100.0	100.0
Final consumption	7.7	-3.2	-0.8	111.6	-57.9	-22.7
Investment	1.9	3.7	0.3	27.5	66.4	7.3
Net export	1.7	5.0	4.3	24.6	91.5	115.4
<b>Kyrgyz Republic</b>						
GDP growth	8.5	3.7	2.5	100.0	100.0	100.0
Final consumption	4.9	2.5	2.8	57.6	68.6	116.3
Investment	-1.0	1.9	-0.5	-11.8	52.4	-18.4
Net export	4.6	-0.8	0.1	54.1	-21.0	2.1
<b>Moldova</b>						
GDP growth	-2.2	-2.6	7.0	100.0	100.0	100.0
Final consumption	10.9	0.6	7.9	495.5	21.6	119.4
Investment	-1.7	-1.0	0.5	-77.3	-39.5	7.4
Net export	-11.3	-2.1	-1.4	-513.6	-82.0	-26.8

Sources: National committees on statistics; IMF and authors' estimates.

1/ For explanations of methodology used in deriving data see Box 1 in the Appendix.

<sup>13</sup>The only exception is Azerbaijan, where investment mostly in the oil-producing industry accounted for 27.4 percent of GDP in 1999–2002.

Table 4. Investment Ratios, 1999–2002  
(Average; in percent of GDP)

	1999–2002
CIS-7 countries	17.1
CIS-7 w/o Azerbaijan	15.4
Other CIS countries	20.7
CEEB	22.7
OECD	21.9

Sources: IMF, OECD.

The increased contribution of net exports to growth in the CIS-7 countries reflects the greater importance of exports for the CIS-7 economies, as the share of exports in GDP remained high or increased (see Table 5). As is noted in Section I, the growth of exports may be partially attributed to the effects of the Russian crisis in 1998 and the recent global economic slowdown.<sup>14</sup> The latter also could have had a positive impact on CIS-7 exports, as other countries searched for cheaper suppliers. Indeed, the competitiveness of the CIS-7 countries remained high throughout the period 1997–2002, as average monthly wages stayed below 40 dollars.

Table 5. Export of Goods and Services, 1997–2002  
(In percent of GDP)

	1997	1998	1999	2000	2001	2002
Armenia	20	21	23	25	25	30
Azerbaijan	29	23	28	39	41	44
Georgia	19	20	26	34	32	29
Kyrgyz Republic	38	36	42	42	37	37
Moldova	48	41	47	45	46	46
Tajikistan	72	49	64	86	69	64
Uzbekistan	27	23	18	25	28	31

Source: World Economic Outlook (IMF, 2003)

#### IV. GROWTH ACCOUNTING

This section explores to what extent improvements in total factor productivity (TFP) contributed to real GDP growth in 1998–2002. A commonly used approach to link output to inputs and to measure economic performance over time is to set up a growth accounting framework. The growth accounting exercise in this paper follows the methodology of

<sup>14</sup>See IMF and the World Bank (2002).

De Broeck and Koen (2000) and makes use of their dataset, extended until 2002.<sup>15</sup> The period of extension differs from country to country due to the availability of data on employment. However, we recognize that because of data uncertainties any point estimate is likely to be misleading.

The exercise is based on the assumption that output is produced according to a neoclassical Cobb-Douglas production function in the form,

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}, \quad (1)$$

where  $Y_t$  is total output at time  $t$ ;  $A_t$  is the total factor productivity index at time  $t$ ;  $K_t$  is the capital stock;  $L_t$  is the labor stock; and  $0 < \alpha < 1$  is the elasticity of the output with respect to capital. Output growth can be decomposed into capital growth, labor growth, and the residual, which is referred as total factor productivity growth. In the absence of information on factor prices that would allow approximating the elasticities of output with respect to capital and labor, we assume that these elasticities are constant over time and across countries and sum up to 1. The elasticities of output with respect to capital and labor are set equal to 0.3 and 0.7, respectively, which is consistent with previous studies on growth accounting (e.g. De Broeck and Koen, 2000). From equation (1), the change in TFP in logarithmic terms is calculated as

$$g_A = g_Y - \alpha g_K - (1 - \alpha) g_L, \quad (2)$$

where  $g_i$  is the growth rate of variable  $i$ .

The standard formula for the capital stock accumulation is

$$K_t = K_{t-1}(1 - \delta) + I_t, \quad (3)$$

where  $I_t$  is investment at time  $t$ , and  $\delta$  is the rate of depreciation.<sup>16</sup> We make a crude assumption on the depreciation rate for the total capital stock in the economy, taking it as a constant, at the 3 percent level.<sup>17</sup> It seems to be reasonable overall, however, the depreciation rate of 3 percent could be perceived as too low for some sectors which require investment in plant and equipment.

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<sup>15</sup>For a detailed description of the dataset and the sources see De Broeck and Koen (2000). The latest data are taken from the WEO (IMF, 2003), official CIS statistics, and IMF country desks.

<sup>16</sup>We do not take into account so called “economic deterioration” or obsolescence of the capital (see Gittleman, ten Raa, and Wolff, 2003). In many models depreciation rate consists of two components—physical deterioration (depreciation) and economic deterioration (obsolescence). The effect of obsolescence of capital is impossible to capture for the CIS countries, therefore, both components are assumed to be captured by the depreciation rate.

<sup>17</sup>This assumption is consistent with the assumptions of De Broeck and Koen (2000).

The model deserves some further explanation and justification. In particular, some problems may arise from interpretation of TFP growth, abstracting from changes in capacity utilization, the use of a constant depreciation rate, as well as from general data issues. Because measurements of TFP growth have certain biases, they should not be interpreted as simply an estimate of the rate of exogenous technological progress. Changes in TFP in this basic growth accounting framework should be interpreted as residuals that reflect any factor affecting the efficiency with which inputs were used, including changes in working hours, hidden employment, labor hoarding, capacity utilization, changes in resource allocation, and the accuracy with which output and inputs are measured. More generally, this implies that, except for changes in reported employment and investment, the impact of the transition is reflected entirely in changes in estimated TFP.

The basic growth accounting framework could in theory be extended to account explicitly for factor utilization.<sup>18</sup> We are not aware, however, of any estimation of capacity utilization rates for labor and capital for the CIS-7 countries. Therefore, this extension for the CIS-7 countries is virtually impossible without making arbitrary assumptions.

To test the robustness of the assumption about the choice of the depreciation rate, alternative calculations were conducted, including a scenario with a very high (up to 70 percent) depreciation rates (obsolescence) in 1992 and a low depreciation rate (1 percent) afterwards. All the findings show very similar qualitative patterns of the changes of TFP and capital stock to the scenario using the constant 3 percent depreciation rate.

We recognize that lack of data is somewhat of a problem, and 13 years is a very short period to uncover patterns in total factor productivity, especially considering the fact that the 13-year time span includes a catastrophic systemic collapse (combined negative supply and demand shocks), only one or two business cycles at most and, perhaps, the resumption of economic activities conducive to TFP growth. However, general TFP trends still provide useful insights.

Average annual growth rates of real GDP, capital, labor, and TFP for different periods are summarized in Table 6. TFP changes were largely negative in the early 1990s, but as stabilization policies took hold, TFP changes turned positive in the CIS-7 countries after 1993. As growth of factor inputs cannot account for the growth performance in the CIS-7 countries during the five-year time span 1993–2002, total factor productivity seems to be important.

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<sup>18</sup>See Dolinskaya (2001) for an application of the extended growth accounting framework exercise for Russia. The extended framework would capture explicitly the under utilization of labor and capital resulting from the massive reallocation of resources from the state sector to the private sector during the transition.

Table 6. Output and Total Factor Productivity Growth 1971–2002  
(In percent; period average)

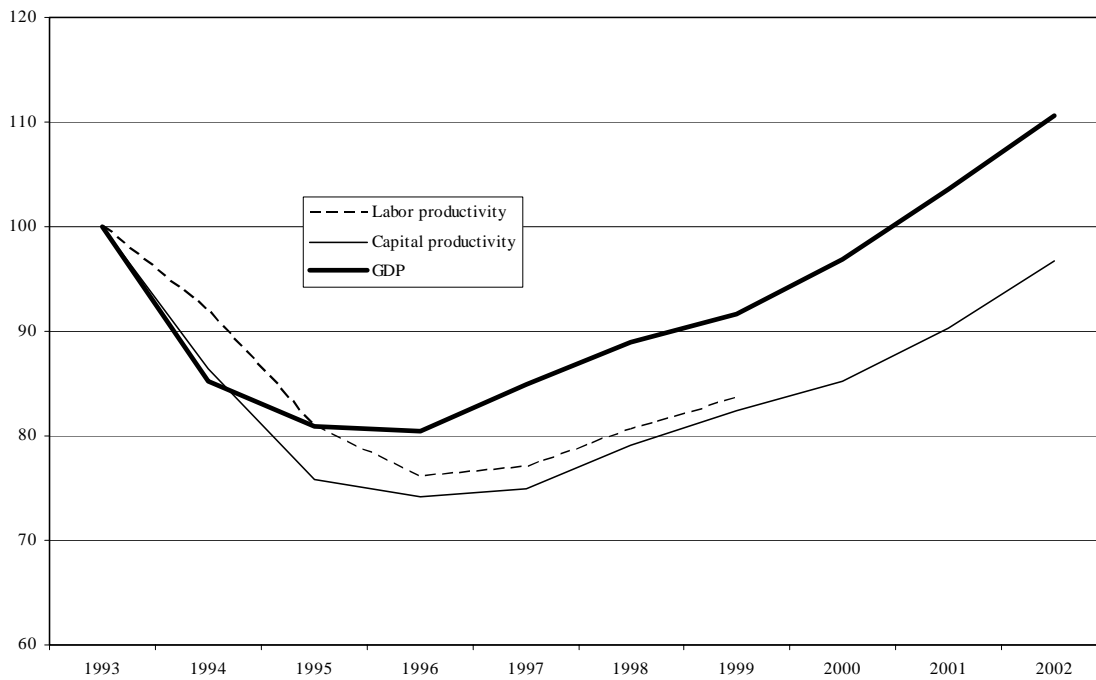
		Output Growth Rate	Capital Growth Rate 1/	Labor Growth Rate	TFP Growth Rate	Labor Productivity Growth Rate
<i>Countries</i>						
Armenia	Avg. 1971-97	0.6	3.3	1.1	-1.1	-0.2
	Avg. 1991-97	-8.8	-1.7	-2.5	-6.5	-3.6
	Avg. 1971-2000	1.7	2.4	0.7	-0.2	0.6
	Avg. 1991-2000	-2.7	-2.0	-2.4	-0.4	-0.1
	Avg. 1993-2000	3.4	-2.7	-2.6	6.0	6.4
	Avg. 1998-2000	5.5	-2.6	-2.3	8.0	8.1
Azerbaijan	Avg. 1971-97	-0.5	3.6	1.7	-2.8	-2.6
	Avg. 1991-97	-10.7	1.3	0.0	-11.1	-10.3
	Avg. 1971-2000	1.0	3.9	2.3	-2.3	-2.1
	Avg. 1991-2000	-4.0	2.1	2.8	-6.5	-6.7
	Avg. 1993-2000	-1.8	2.3	3.4	-4.9	-5.3
	Avg. 1998-2000	9.5	4.0	9.2	1.9	1.6
Georgia	Avg. 1971-97	-1.4	2.3	0.2	-2.3	-2.2
	Avg. 1991-97	-13.1	-2.5	-3.0	-10.2	-10.3
	Avg. 1971-2002	-0.7	1.7	-0.4	-0.9	-0.6
	Avg. 1991-2002	-4.5	-2.2	-2.6	-2.0	-2.8
	Avg. 1993-2002	1.1	-2.3	-0.1	1.9	0.2
	Avg. 1998-2002	3.5	-1.9	-3.1	6.3	7.8
Kyrgyz Republic	Avg. 1971-97	-0.1	3.9	1.6	-2.4	-1.4
	Avg. 1991-97	-9.5	0.8	-0.5	-9.4	-6.1
	Avg. 1971-2002	0.4	3.6	1.6	-1.8	-1.0
	Avg. 1991-2002	-3.5	1.3	0.5	-4.3	-3.0
	Avg. 1993-2002	-1.7	1.1	0.1	-2.2	-1.3
	Avg. 1998-2002	3.2	2.0	1.8	1.3	1.4
Moldova	Avg. 1971-97	-2.0	3.9	-0.3	-3.0	-1.2
	Avg. 1991-97	-15.9	-0.5	-3.3	-13.5	-9.0
	Avg. 1971-2002	-1.6	3.1	-0.6	-2.3	-1.0
	Avg. 1991-2002	-10.5	-1.1	-2.9	-5.0	-6.2
	Avg. 1993-2002	-7.2	-1.8	-3.5	-2.0	-2.0
	Avg. 1998-2002	-2.6	-2.0	-2.6	4.1	0.2
Tajikistan	Avg. 1971-97	-1.7	3.8	1.9	-4.2	-4.1
	Avg. 1991-97	-13.8	-0.3	-1.1	-12.9	-12.8
	Avg. 1971-2001	-0.3	2.9	1.8	-2.8	-2.7
	Avg. 1991-2001	-5.5	-0.8	-0.5	-4.9	-5.9
	Avg. 1993-2001	-3.4	-1.2	-0.4	-2.7	-4.0
	Avg. 1998-2001	6.9	-1.5	0.6	6.9	6.3
Uzbekistan	Avg. 1971-97	2.3	5.0	2.7	-1.1	-1.1
	Avg. 1991-97	-1.5	2.2	1.3	-3.1	-3.2
	Avg. 1971-2000	2.6	4.3	2.6	-0.8	-0.8
	Avg. 1991-2000	0.2	1.6	1.2	-1.5	-1.7
	Avg. 1993-2000	1.3	0.9	0.9	0.0	0.0
	Avg. 1998-00	4.2	-0.05	0.9	3.8	3.5
CIS-7 countries	Avg. 1971-97	-0.4	3.7	1.3	-2.4	-1.8
	Avg. 1991-97	-10.5	-0.1	-1.3	-9.5	-7.9
	Avg. 1971-2000	0.5	3.1	1.2	-1.6	-1.1
	Avg. 1991-2000	-4.3	-0.1	-0.6	-3.5	-3.8
	Avg. 1993-2000	-1.2	-0.5	-0.3	-0.6	-0.9
	Avg. 1998-2000	4.3	-0.3	0.6	4.6	4.1

Sources: De Broeck and Koen (2000); and authors' estimates.

1/ Based on assumption of a 3 percent depreciation rate.

The evolution of real GDP, capital, and labor productivities<sup>19</sup> suggests a sharp fall in input productivities associated with the drop in output in the early years of the transition (see Figure 2). By 2002, average capital productivity in the CIS-7 countries almost surpassed its 1993 level. Average labor productivity as of 1999, however, was far below the level in 1993, possibly reflecting labor mobility across different sectors and labor hoarding.

Figure 2. GDP, Labor Productivity, and Capital Productivity, 1993–2002  
(Average Index; 1993=100)



After 1998, for the first time since the start of the transition period, the overall total factor productivity appears to be increasing in all CIS-7 countries pointing to a possibility that reform efforts have begun showing results on the production side. The latter conclusion, however, must be interpreted with caution because the increase in total factor productivity captures not only the technological progress, but also changes in capacity utilization, the rebound after the Russian crisis, the increase in GDP due to the legalization of the informal sector, and changes in hidden employment.<sup>20</sup>

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<sup>19</sup>Average capital and labor productivities are defined as  $GDP/K$  and  $GDP/L$ , respectively.

<sup>20</sup>It should be noted that an increase in capacity utilization could be due to progress in reforms.



The same conclusion can be supported by a regression analysis with the changes in TFP as the dependent variable. The set of independent variables include unemployment rate, initial output per capita, and various transition indicators from the EBRD. The dataset includes the CIS-7 countries and covers the period 1991–2002. The results of the regression analysis are presented in Table 7.

Table 7. Regression Results: Dependent Variable: Changes in Total Factor Productivity (TFP)  
(Fixed-effect estimation)

	(1)	(2)	(3)
Initial output (Per capita)	-0.003 (-1.006)	...	...
Unemployment rate	-0.627 (-1.342)	-0.81 (-1.330)	-0.944 (-1.545)
Average EBRD transition index	...	12.427 (3.405)	...
Large-scale privatization	3.439 (1.797)	...	3.874 (1.422)
Infrastructure reform	13.549 (3.283)	...	12.636 (2.121)
Country FE coefficients			
Armenia	...	-16.95	-20.16
Azerbaijan	...	-27.79	-26.59
Georgia	...	-19.52	-24.36
Kyrgyz Republic	...	-28.98	-23.78
Moldova	...	-26.18	-25.21
Tajikistan	...	-22.77	-21.61
Uzbekistan	...	-23.24	-22.35
R-squared	0.29	0.29	0.33
Adjusted R-squared	0.24	0.19	0.21
Likelihood ratio	5.91	...	...
Probability value	0	...	...
Number of observations	62	62	62

Source: authors' estimates.

The regression results show a positive correlation between changes in TFP and infrastructural reform and large-scale privatization, and a negative correlation with unemployment rate. Country fixed-effect coefficients, which reflect initial conditions, are negative and highly significant.

## V. GDP SECTORAL DECOMPOSITION

In this section we turn to the analysis of the sectoral breakdown of GDP from 1995 to 2001 and examine to what extent growth was concentrated in individual sectors, in particular, the raw material sector and the production of goods with a low degree of processing.

Different sectors of GDP are characterized by their share in total GDP, sector share of employment in total employment, and sector share of investment in total investment (see Tables 8 to 10). In addition, we use a growth accounting framework in each sector separately to illustrate recent developments in total factor productivity in key sectors of the economy: industry, agriculture, construction, transport, and trade.<sup>21</sup> While we acknowledge data limitations, the results of this section shed light on the evolution of sectoral composition of GDP and update the previous findings of Easterley and Fischer (1994) and De Broeck and Koen (2000). These sectors do not capture the total economy, because the services sector (which is generally viewed as the fastest growing in transition economies) is left aside.

As is commonly accepted, the growth of services during this timeframe was remarkable, especially in the early years of transition because many services were created for the first time. Unfortunately, data are insufficient to analyze growth and TFP in services. The reasons are twofold. First, most countries still use an outdated statistical classification for the sectoral breakdown of GDP, which partially includes services in other sectors (mainly industry and agriculture). Therefore, for this sector it is difficult to identify value added of the output and total employment. Second, it is virtually impossible to calculate capital growth in this sector because of lack of data on investment.

Agriculture has significant potential as a source of economic growth, export diversification, and gainful employment. However, it is likely that increased agricultural efficiency could be accompanied by labor shedding. Agriculture provides direct employment to more than 40 percent of the labor force and accounts for more than 25 percent of GDP in the CIS-7 countries.

On average, TFP growth in agriculture was positive but unstable in part because of varying weather conditions and declining investment (Table 8). Among the CIS-7 countries, Moldova has shown the highest TFP growth in agriculture between 1998 and 2002, which partly reflects the recent breakup of collective farms.

Agriculture may be becoming more labor intensive. It has the highest and increasing share of employment among most of the CIS-7 countries (Table 9), the second highest (but slightly declining) share of GDP (Table 8), a diminishing share in total investment, and unstable declining TFP growth after 1998 (Table 11). This could be an indication that these economies are turning more to subsistence farming. The results of the latest EBRD study (Raiser, Schaffer, and Schuchhardt, 2003) also support the conclusion that in the poorest CIS countries, where a social safety net was not available, many people have been forced back into subsistence farming. However, this could be just a transitory phenomenon because of

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<sup>21</sup>For sectoral growth accounting we used the same assumptions as described in the previous section.

employment declines in industry and a saturated services sector, pushing people to opt out of more productive sectors to self-employment opportunities in agriculture.<sup>22</sup>

In industry, real output growth, on average, was higher than TFP growth, which demonstrates increasing capacity utilization in this sector. Industry accounts for the second largest share of GDP in the CIS-7 countries, a segment that has been growing since 1998.<sup>23</sup> The share of employment in industry in percent of total employment in the CIS-7 countries either stabilized or declined insignificantly in 1998–2000. TFP growth in industry turned positive for all CIS-7 countries after 1998 (with the exception of Moldova). Although investment in industry as a share of total investment remained high, it has been declining in Georgia and Tajikistan since 1998. The highest share of investment in industry was in Azerbaijan, where more than 70 percent of total investment went to the petroleum sector.

Industrial growth in the CIS-7 countries still depends on production of raw materials and manufacturing of goods with a low degree of processing, such as oil in Azerbaijan, precious stones and metals in Armenia, nonferrous metallurgy in the Kyrgyz Republic, aluminum and cotton in Tajikistan, and gold and cotton in Uzbekistan. New investment is mainly directed into industries associated with production and manufacturing of raw materials and goods with a low degree of processing mainly for exports.

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<sup>22</sup>This does not necessarily imply physical reallocation of people to rural areas. As many examples demonstrate, a closure or a disruption of production in some industrial enterprises, which used to be a main source of employment in small towns, has made employees seek alternative self-employment, including the use of small plots of land to grow vegetables for personal consumption.

<sup>23</sup>The share of manufacturing has also been growing as a share of GDP in all the CIS-7 countries except for Azerbaijan, where the oil-extracting industry clearly has dominated development of manufacturing.

Table 8. The CIS-7 Countries: Structure of GDP by Sector, 1995–2001  
(In percent)

	1995	1996	1997	1998	1999	2000	2001
Armenia—total	100	100	100	100	100	100	100
Industry	24	23	22	20	21	22	...
Agriculture	41	35	29	31	27	23	...
Construction	7	7	8	8	8	10	...
Transport	3	4	6	4	5	5	...
Other	25	30	34	37	39	40	...
Azerbaijan—total	100	100	100	100	100	100	100
Industry	27	26	25	22	28	36	36
Agriculture	25	25	20	18	18	16	16
Construction	4	9	12	13	11	7	6
Transport	16	9	8	9	11	12	12
Other	28	31	35	38	32	30	31
Georgia—total	100	100	100	100	100	100	100
Industry	10	20	18	17	18	17	17
Agriculture	42	33	29	27	25	20	19
Construction	2	3	4	5	4	4	4
Transport	8	6	8	11	12	14	14
Other	39	38	42	41	42	44	45
Kyrgyz Republic—total	100	100	100	100	100	100	100
Industry	12	11	17	16	22	23	...
Agriculture	41	46	41	36	35	34	...
Construction	6	6	5	4	3	4	...
Transport	3	4	3	3	3	2	...
Other	38	33	35	40	37	36	...
Moldova—total	100	100	100	100	100	100	100
Industry	25	23	20	17	17	16	...
Agriculture	29	27	26	26	25	25	...
Construction	4	4	5	3	3	3	...
Transport	5	6	6	7	8	10	...
Other	37	40	43	47	47	46	...
Tajikistan—total	100	100	100	100	100	100	100
Industry	34	26	22	20	22	24	23
Agriculture	37	36	32	25	25	27	27
Construction	3	3	3	4	5	3	4
Transport	3	4	2	3	6	4	4
Other	23	32	41	48	41	41	41
Uzbekistan—total	100	100	100	100	100	100	100
Industry	17	18	16	...	...	51	51
Agriculture	28	22	28	...	...	...	...
Construction	7	8	7	...	...	...	...
Transport	6	6	6	...	...	...	...
Other	42	46	43	...	...	...	...

Source: CIS Goskomstat.

Table 9. Investment by Sector, 1995–2002  
(In percent)

	1995	1996	1997	1998	1999	2000	2001	2002
Armenia—total	100	100	100	100	100	100	100	...
Industry	29.6	23.4	17.3	11.8	8.6	10.4	15.4	...
Agriculture	8.7	4.6	4.1	8.3	13.4	6.5	4.9	...
Construction	0.3	0.0	0.0	0.0	0.1	0.0		...
Transport and communications	5.0	37.6	40.3	16.8	21.0	36.2	20.9	...
Trade and procurement	0.0	0.0	2.1	3.7	3.3	3.0	6.8	...
Others	56.4	34.4	36.2	59.4	53.6	43.9	52.0	...
Azerbaijan—total	100	100	100	100	100	100	100	100
Industry	46.4	72	70.7	74.9	61.7	68.1	70.5	77
Agriculture	1.9	1.5	0.5	0.6	1.2	0.7	0.7	...
Construction	0.3	0.2	0.5	0.6	1.1	0.3	1.1	1.9
Transport and communications	5.3	3.3	4.3	6.6	7.8	9.2	17.2	6.2
Trade and procurement	0.3	0.5	0.9	0.9	9.3	3.3	4.4	1.8
Others	45.8	22.5	23.1	16.4	18.9	18.4	6.1	13.1
Georgia—total	100	100	100	100	100	100	...	...
Industry	46.1	32.3	30.5	26.4	20.1	15.7	...	...
Agriculture				0.1	1.7	0.4	...	...
Construction	6.3	4.7	2.6	4.2	22.1	26.4	...	...
Transport and communications	8.7	25.3	42.9	58.3	41.4	39.9	...	...
Trade and procurement	0	2	2.4	1.4	0.2		...	...
Others	38.9	35.7	21.6	9.6	14.5	17.6	...	...
Kyrgyz Republic—total	100	100	100	100	100	100	100	100
Industry	76.9	80	69.3	33.52	34.7	40.5	32.34	18.35
Agriculture	1.5	1	1.4	2.8	3.6	3.7	3.98	4.04
Construction	0.2	0.9	0.5	1.3	1.9	0.7	3.93	10.1
Transport and communications	7.2	5	12	22.8	32.1	32.2	34.2	21.67
Trade and procurement	0.6	2	2.3	7.52	5	3	9.09	10.1
Others	13.6	11.1	14.5	32.1	22.7	19.9	16.5	35.7
Moldova—total	100	100	100	100	100	100	100	100
Industry	20.2	29.6	42.4	36.2	38.3	27.5	44.6	36.4
Agriculture	10.8	9.9	9.8	5.7	3.6	3.4	4.9	5.7
Construction	2.8	2.0	2.6	2.5	2.1	1.8	1.4	1.2
Transport and communications	9.9	12.4	10.9	15.4	25.6	43.8	24.3	31.1
Trade and procurement	5.0	5.0	5.7	13.3	12.4	9.0	7.9	6.5
Others	51.3	41.1	28.6	26.9	18.0	14.5	16.9	19.1
Tajikistan—total	...	...	100	100	100	100	100	...
Industry	...	...	62.5	50.5	63.7	31.7	38.4	...
Agriculture	...	...	6.2	1.0	11.8	5.1	3.9	...
Construction	...	...	0.0	3.9	0.5	1.5	0.6	...
Transport and communications	...	...	13.4	8.7	12.0	32.9	18.9	...
Trade and procurement	...	...	0.1	2.3	0.2	0.3	0.8	...
Others	...	...	17.8	33.6	11.8	28.5	37.4	...
Uzbekistan—total	100	100	100	100	100	100	100	100
Industry	49.3	33.8	32	29	33	30	39	32
Agriculture	6.5	6.9	7	6	8	6	6	6
Construction	0.4	0.7	0.6	0.3	0.3	...	...	...
Transport and communications	7.6	17.7	21.1	18.7	13.1	...	...	...
Trade and procurement	4.8	4.1	2.9	2.8	2.2	...	...	...
Others	31.4	36.8	36.4	43.2	43.4	64.0	55.0	62.0

Source: CIS Goskomstat.

Table 10. CIS-7: Employment by Sector, 1995–2000  
(In percent)

	1995	1996	1997	1998	1999	2000
Armenia—total	100	100	100	100	100	100
Industry	21	18	17	16	15	14
Agriculture	37	41	41	42	43	44
Transport and communication	4	3	4	4	4	4
Construction	5	5	4	4	4	4
Other	33	33	34	34	34	34
Azerbaijan—total	100	100	100	100	100	100
Industry	10	8	7	7	7	7
Agriculture	31	32	29	31	42	41
Transport and communication	4	5	5	4	5	5
Construction	5	4	4	4	4	4
Other	50	52	56	54	42	44
Georgia—total	100	100	100	...	...	...
Industry	15	9	6	...	...	...
Agriculture	31	50	59	...	...	...
Transport and communication	7	7	5	...	...	...
Construction	4	1	2	...	...	...
Other	43	33	29	...	...	...
Kyrgyz Republic—total	100	100	100	100	100	100
Industry	12	11	10	10	9	8
Agriculture	47	47	48	49	52	53
Transport and communication	5	5	5	4	4	4
Construction	4	4	3	3	3	3
Other	32	34	34	34	32	33
Moldova—total	100	100	100	100	100	100
Industry	12	12	12	11	11	11
Agriculture	46	43	41	46	49	51
Transport and communication	4	4	4	5	5	4
Construction	4	3	3	4	3	3
Other	34	38	39	35	33	31
Tajikistan—total	100	100	100	100	100	100
Industry	10	10	9	9	8	7
Agriculture	59	59	64	61	64	65
Transport and communication	3	3	2	3	3	2
Construction	4	4	3	3	2	2
Other	24	23	22	25	23	24
Uzbekistan—total	100	100	100	100	100	...
Industry	13	13	13	13	13	...
Agriculture	41	41	41	39	36	...
Transport and communication	4	4	4	4	4	...
Construction	6	6	6	7	7	...
Other	35	36	36	37	40	...

Source: CIS Goskomstat.

Table 11. CIS-7: TFP by Sector, 1995–2002  
(Percentage change)

	1995	1996	1997	1998	1999	2000	2001	2002
Armenia								
Industry	12.9	13.5	5.9	11.9	11.7	10.1	...	...
Agriculture	-2.8	-8.6	16.3	2.9	0.1	12.2	...	...
Construction	41.0	27.8	20.5	12.3	30.2	24.8	...	...
Transport and communications	8.0	20.8	0.0	-46.3	3.5	17.1	...	...
Trade and procurement	-19.9	-1.1	3.7	70.3	11.0	16.6	...	...
Azerbaijan								
Industry	-3.2	13.0	9.2	-2.8	1.8	4.7	...	...
Agriculture	6.7	-9.2	13.8	-12.8	-9.5	14.4	...	...
Construction	77.9	48.9	5.7	...	...	...	...	...
Transport and communications	-18.9	9.2	0.6	...	...	...	...	...
Trade and procurement	4.1	4.2	-9.9	-0.2	15.7	...	...	...
Georgia								
Industry	14.2	31.5	-5.6	36.5	16.3	-0.3	...	...
Agriculture	-28.7	-6.8	-10.4	32.0	-19.7	7.1	...	...
Construction	19.7	83.3	-11.0	...	...	...	...	...
Transport and communications	14.2	22.5	0.0	...	...	...	...	...
Trade and procurement	21.8	19.7	11.3	18.2	13.8	...	...	...
Kyrgyz Republic								
Industry	13.2	39.1	7.9	-3.2	9.5	8.4	-14.0	...
Agriculture	7.6	13.0	1.3	7.7	-2.9	7.2	4.2	...
Construction	12.5	-8.7	-30.2	6.9	30.5	9.1	-2.0	...
Transport and communications	3.5	-6.9	-0.9	-35.2	12.6	45.4	20.0	...
Trade and procurement	9.0	-12.3	-2.5	0.2	13.1	4.7	3.0	...
Moldova								
Industry	7.6	-0.7	-14.6	-28.1	6.5	12.2	3.9	0.6
Agriculture	-13.1	16.0	-8.4	0.4	18.5	17.6	12.7	4.1
Construction	21.3	10.1	252.0	-16.5	13.7	-2.7	15.0	6.2
Transport and communications	10.4	3.3	129.0	-46.3	18.2	5.7	6.2	-1.6
Trade and procurement	-39.6	-36.6	-14.2	69.8	8.5	9.4	8.4	1.2
Tajikistan								
Industry	-19.1	-1.5	17.4	9.4	16.2	20.8	2.3	...
Agriculture	-24.6	9.9	-0.2	8.2	11.5	11.1	-4.1	...
Construction	-56.4	27.3	13.6	...	...	...	...	...
Transport and communications	-26.6	0.4	19.2	...	...	...	...	...
Trade and procurement	5.4	19.4	23.4	-54.0	3.5	8.8	-22.1	...
Uzbekistan								
Industry	-1.4	0.1	2.3	5.0	4.6	...	...	...
Agriculture	-3.4	6.7	4.9	8.3	12.3	...	...	...
Construction	-0.8	3.4	5.1	2.2	3.4	...	...	...
Transport and communications	-0.7	-2.3	2.5	-32.7	0.3	...	...	...
Trade and procurement	-6.5	4.2	12.4	9.1	7.7	...	...	...

Sources: De Broeck and Koen (2000); and authors' estimates.

The share of exports of goods with a low degree of processing in total exports has recently increased in all the CIS-7 countries except Armenia (Table 13).

Table 12. Share of Commodities with a Low Degree of Processing in Total Exports of the CIS-7 Countries, 1995 and the Latest Available Year

Country	Main Commodities Exported	Percentage of Total Export	
		1995 1/	Latest Available Year
Armenia	Precious stones, minerals, metals, and chemicals	61.0	59.0
Azerbaijan	Oil, metals, and cotton	64.5	90.7
Georgia	Metals, fuels, tea, and beverages	30.1	44.3
Kyrgyz Republic	Gold, metals, electricity, and cotton	36.2	73.5
Moldova	Metals, minerals, and wood	62.8	76.6
Tajikistan	Aluminum, electricity, and cotton	59.0	84.0
Uzbekistan	Cotton, gold, and gas	64.0	64.5

Source: IMF, Recent Economic Development Reports.

1/ For Azerbaijan, Moldova, Tajikistan, and Uzbekistan, data refer to 1994.

Average TFP growth turned out to be positive in almost all key sectors in the CIS-7 countries in 1998–2002, indicating possibly the first positive results of transition efforts on the production side (Table 8).<sup>24</sup> Sectoral capital and labor reallocation significantly affected overall productivity during the early years of the transition. Although in recent years national statistical agencies have begun to improve their estimates of private sector employment and investment, the productivity effect from changes in sectoral output over the recent period merits further examination.

Recent TFP growth varies for different sectors. In agriculture, average TFP growth was positive in all CIS-7 countries, except Azerbaijan in 1995–2002. Industrial TFP growth resumed in the CIS-7 countries (with the exception of Moldova) in 1998–2002. The highest recent TFP growth was observed in the trade sector, where it varied from 5 percent in the Kyrgyz Republic to 33 percent in Armenia. The only exception is Tajikistan, where TFP in the trade sector declined by 16 percent in 1998–2001. In the transport sector TFP continued to decline on average in all countries but the Kyrgyz Republic in 1998–2002. In construction, average TFP growth resumed over the same period of time.

<sup>24</sup>Tables 10 and 11 present the structure of GDP and employment by sectors, which include industry, agriculture, construction, and transportation and communications. Table 12 shows annual sectoral TFP growth rates for 1995–2002.



Table 13. CIS-7: Average TFP Growth by Sector, 1971–2002  
(In percent)

	Agriculture	Construction	Industry	Transport /1	Trade /2
<b>Armenia</b>					
1971–1997	-2.48	-5.13	-0.33	-3.70	-1.17
1971–1980	2.49	-0.67	1.38	4.11	0.32
1981–1990	-5.56	-4.25	-0.90	-0.30	-1.31
1991–1997	-5.21	-12.75	-1.97	-19.70	-3.09
1998–2000	5.06	22.47	11.22	-8.56	32.62
<b>Azerbaijan</b>					
1971–1997	-0.49	-3.01	-2.00	-7.87	-8.05
1971–1980	6.90	-0.46	2.40	-0.95	0.89
1981–1990	-3.12	-11.44	-1.41	-3.88	-3.10
1991–1997	-7.28	5.36	-9.14	-23.48	-27.90
1998–2000	-2.63		1.23		7.74
<b>Georgia</b>					
1971–1997	-0.78	-1.08	-1.66	-6.54	0.44
1971–1980	5.42	-1.34	3.02	3.11	0.65
1981–1990	-2.29	-11.41	-4.37	-11.28	-2.67
1991–1997	-7.49	14.05	-4.48	-13.56	4.57
1998–2000	6.47		17.51		16.00
<b>Kyrgyz Republic</b>					
1971–1997	-0.97	-4.89	-1.83	-4.79	-5.26
1971–1980	-0.44	-1.24	-0.76	3.21	-1.22
1981–1990	-1.01	-7.52	0.85	2.74	-1.82
1991–1997	-1.67	-6.35	-7.20	-26.98	-15.94
1998–2001	4.05	11.12	0.18	10.74	5.28
<b>Moldova</b>					
1971–1997	-3.68	3.81	-1.95	1.43	-6.98
1971–1980	-2.09	-3.03	-0.60	1.29	-1.21
1981–1990	-1.54	-0.05	-0.50	1.53	0.49
1991–1997	-9.02	19.09	-5.93	1.50	-25.89
1998–2002	10.66	3.14	-0.98	-3.55	19.48
<b>Tajikistan</b>					
1971–1997	-7.09	-7.88	-3.18	-5.01	2.62
1971–1980	1.34	-2.20	-2.13	0.69	-0.04
1981–1990	-5.58	-4.54	-1.12	2.17	-1.53
1991–1997	-21.28	-20.75	-7.61	-23.43	12.36
1998–2001	6.69		12.18		-15.96
<b>Uzbekistan</b>					
1971–1997	0.00	0.00	0.00	0.00	0.00
1971–1997	-0.76	-5.75	-0.77	-0.47	-1.28
1971–1980	0.66	-1.14	0.14	1.85	-0.02
1981–1990	-1.57	-6.11	0.38	0.60	-0.42
1991–1997	-1.64	-11.81	-3.73	-5.32	-4.30
1998–1999	10.32	2.81	4.76	-16.21	8.44

Sources: De Broeck and Koen (2000); and authors' estimates.

1/ Transport includes communications.

2/ Trade includes procurement.

The sectoral reallocation has not necessarily formed a base from which recovery could proceed into sustainable economic growth. Until recently, overall GDP growth in the CIS-7 countries was concentrated in agriculture and industries related to production of raw materials and goods with a low degree of processing. Thus, growth in the CIS-7 countries remains dependent on changes in world prices of raw materials and vulnerable to changes in external conditions. Altogether, this may indicate that for growth to become sustainable, the CIS-7 countries would require further diversification of commodities and export markets. This, in turn, would necessitate new investment, for which continuation of structural reforms is a necessary condition.

Growth prospects could be enhanced by better realizing the trade potential. According to the latest studies,<sup>25</sup> a number of factors have had a negative impact on trade—such as restrictive trade policies in Central Asia, weaknesses in the physical infrastructure, and corruption and governance problems in customs and transport services. The poor trade environment has also been affected by insufficient foreign investment, which is critical to overcome deficiencies in the diversification of production.

## **VI. ECONOMETRIC ANALYSIS OF MAJOR GROWTH FACTORS**

In this section we turn to the analysis of effects of policy and structural reforms on growth in the CIS-7 countries. We ran regressions, similar to those used in previous studies on growth in transition, but on extended datasets which include the latest observations through the year 2002.<sup>26</sup> We examine two datasets: the first one consists of 24 transition countries;<sup>27</sup> the second one includes the CIS-7 countries only to test for specific features of growth performance in those countries.

We use the average annual GDP growth rate as the dependent variable. As explanatory variables, we include macroeconomic policy variables to account for the effects of the

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<sup>25</sup>See for instance, Elborgh-Woytek (2003).

<sup>26</sup>See among others Fischer, Sahay, and Vegh (1996a, 1998), Falcetti, Raiser, and Sanfey (2000), Havrylyshyn, Izvorski, van Rooden (1998), Berg and others (1999). The difference in our analysis from the above-mentioned studies lies in our consideration of an extended unbalanced panel dataset covering the period from the beginning of transition (year when most consumer prices were liberalized) until 2002.

<sup>27</sup>These countries are Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, the Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, the Slovak Republic, Slovenia, Tajikistan, Ukraine, and Uzbekistan.

exchange rate regime and the government budget deficit on growth.<sup>28</sup> To measure the progress of reforms, we use the EBRD transition indicators.<sup>29</sup>

The beginning of transition for a country is defined as a year when most prices were liberalized or when a new national currency was introduced, whichever was earlier. This is a logical way to define the start of the transition period, since prices determined by the market are the most important feature of the market economy. Also, in most countries prices were liberalized before the start of the stabilization programs.

The regression specification for a country  $i$  is as follows.

$$GDPgrowth_i = \alpha_i + \beta_{1,i}ER_i + \beta_{2,i}Fiscal + \beta_{3,i}InitialShock + \beta_{4,i}WarCIS7 + \sum_j \beta_{j,i}TranInd_j,$$

where  $\alpha_i$  is a country specific intercept,<sup>30</sup>  $GDPgrowth$  is real GDP growth,  $ER$  is a dummy for the exchange rate regime,  $Fiscal$  is a variable to control for fiscal policy (general government budget deficit in percent of GDP),  $InitialShock$  is a variable determining the impact of initial conditions,  $warCIS7$  is a dummy to control for an impact of civil conflicts in the CIS-7, and  $TranInd$  is a set of EBRD transition indicators.

The dummy  $ER$  for the exchange rate regime has a value of one in case of a fixed de facto exchange rate or a 2 to 5 percent band for the exchange rate, and a value of zero otherwise.<sup>31</sup> The exchange rate regimes are defined using the classification of Reinhart and Rogoff (2000), which distinguishes between *de facto* pegs or bands and announced pegs or bands.

To control for the impact of initial conditions prior to the transition period we introduced an additional variable, a one-year decline in real GDP (in percent) relative to the pre-transition year ( $IS$ ).<sup>32</sup> It allows us to construct a homogeneous variable for impacts of the initial shocks

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<sup>28</sup>See Fischer, Sahay, and Vegh (1998) on the discussion of using a dummy for exchange rate regime as indicator of the choice of an anchor in reducing inflation in transition countries.

<sup>29</sup>Detailed description of the time series is provided in Appendix I.

<sup>30</sup>We employ a fixed-effect estimation method to control for effects of country-specific features on growth.

<sup>31</sup>We assign the value of one, if the exchange rate was fixed for more than six months of a year.

<sup>32</sup>Two studies (Falcetti, Raiser, and Sanfey (2000) and Havrylyshyn, Izvorski, and van Rooden (1998)) demonstrate that initial conditions mattered at the beginning of the transition period, but their impact over time was overtaken by that of structural and economic reforms.

and to make it comparable across all transition countries. This variable is calculated as follows:

$$IS = 100 - 100 * \left( 1 + \frac{Y(t) - Y(t-1)}{Y(t-1)} \right), \quad (4)$$

where  $t$  is the year when most consumer prices were liberalized.

For a test of the effect of civil conflicts on growth, we use a war dummy for the CIS-7 countries (*WarCIS7*), which take the value of one in period  $t$ , if a CIS-7 country had a military conflict in year  $t$ , and zero otherwise.

The EBRD indices (*TranInd*) cover small-scale privatization, large-scale privatization, governance and enterprise reforms, price liberalization, trade liberalization, competition policy, banking reform and interest rate liberalization, securities markets and nonbank financial institutional reform, and reform of infrastructure. Each of the transition indices takes values from 1 to 4, where 1 represents little or no reform and 4 stands for full achievement of reform in a particular area, according to the EBRD classification system.<sup>33</sup>

The results of the regressions for all transition countries are summarized in Table 14.<sup>34</sup> We used a general-to-specific approach in the regression analysis: the first regression contains all explanatory variables, including insignificant variables. In the other regressions all insignificant explanatory variables were subsequently eliminated.<sup>35</sup>

On the basis of the analysis for 24 transition countries, the main results can be summarized as follows:

- The initial shock variable appears to be insignificant in all specifications. One of the explanations is that because we run fixed-effects regressions, country-specific coefficients control for initial conditions.
- De facto stability of the exchange rate regime and prudent fiscal policy exert a large positive effect on real GDP growth. The estimated coefficients for the fixed exchange rate are lower, but the estimated coefficients for government deficit are higher than those reported in Fischer, Sahay, and Vegh (1998). The impact of a stable exchange

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<sup>33</sup> See EBRD Transition Report, 2003, page 17.

<sup>34</sup> We report fixed effect country coefficients for the first regression only because of the great similarity to the other regressions.

<sup>35</sup> For details on econometric methodology for growth regression in transition countries, see Berg and others (1999), Fischer, Sahay and Vegh (1996a, 1996b, 1998), Havrylyshyn, Izvorski and van Rooden (1998), and Havrylyshyn and van Rooden (2000).

rate regime loses substance when variables capturing the progress of reforms are included in the regression.

- The dummy for war conflicts in the CIS-7 countries is negative but insignificant.
- Net effect of privatization on growth is positive (although, surprisingly, large-scale privatization seems to have a negative, statistically insignificant or weakly significant effect on growth in transition, which may be due to major capital and labor reallocations). The effect of small-scale privatization is positive and significant.
- The negative sign for the price liberalization variable may reflect the fact, that in most cases, price liberalization was completed in the early transition years when output declined. Thus, there is a negative correlation between the price liberalization index and growth.
- The effect of the reform of nonbank financial institutions was positive and significant at the 10 percent level, supporting the results of earlier studies that strong institutions matter for the progress of transition.

The sample for the CIS-7 countries allows for less degree of freedom than the sample which includes 24 transition economies. Nevertheless, regressions on the sample for the CIS-7 countries confirm the findings derived on the broader sample of transition countries, in particular as concerns the impact of initial shocks, fiscal policy, civil conflicts, and privatization. However, it was impossible to determine the impact of a stable exchange rate regime since it appears to be insignificant in all specifications of the sample including just the CIS-7 countries. This may be due to a small sample size.

Table 14. Regression Results: Dependent Variable: Real GDP Growth  
(Fixed Effect Estimation)

	Sample of 24 transition countries				CIS-7				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Exchange rate dummy	0.05 (3.98)	0.046 (4.05)	0.045 (4.10)	0.048 (4.14)	-0.0037 (-0.148)	0.0035 (0.154)	0.012 (0.5198)	0.007 (0.324)	0.011 (0.442)
Fiscal	0.47 (3.67)	0.533 (5.03)	0.511 (4.92)	0.493 (4.86)	0.653 (4.269)	0.639 (4.348)	0.569 (4.4899)	0.674 (4.614)	0.473 (3.372)
Initial shock	0.003 (2.67E-15)	...	...	...	0.002 (1.37E-15)	...	...	...	...
Banking sector reform	0.01 (0.68)	0.013 (1.04)	...	...	0.055 (1.160)	0.048 (1.294)	0.046 (1.376)	0.046 (1.362)	...
Reform of nonbanking sector	0.02 (1.79)	0.018 (1.67)	0.017 (1.85)	...	-0.007 (-0.190)	...	...	...	...
Competition policy	0.004 (0.30)	...	...	...	0.031 (0.861)	...	...	...	...
Enterprise reform	0.002 (0.16)	...	...	...	-0.035 (-0.616)	...	...	...	...
Infrastructure reform	-0.0002 (-0.02)	...	...	...	-0.048 (-1.227)	-0.045 (-1.395)	-0.058 (-1.815)	...	...
Price liberalization	-0.03 (-1.68)	-0.027 (-1.91)	-0.026 (-1.90)	-0.027 (-2.01)	0.024 (0.726)	...	...	...	...
Trade liberalization	0.003 (0.31)	...	...	...	0.0139 (0.511)	...	...	...	...
Large-scale privatization	-0.01 (-1.25)	...	...	...	-0.054 (-1.585)	-0.047 (-1.527)	...	-0.054 (-1.757)	...
Small-scale privatization	0.03 (2.58)	0.038 (2.96)	0.037 (3.58)	0.046 (5.47)	0.073 (2.609)	0.083 (3.807)	0.071 (3.800)	0.082 (3.812)	...
War dummy for CIS-7	-0.04 (-1.23)	...	...	...	-0.05 (-1.181)	-0.045 (-1.281)	...	...	-0.062 (1.757)
Average transition index	...	...	...	...	...	...	...	...	0.095 (2.963)
Country FE coefficients									
Albania	0.002	...	...	...	...	...	...	...	...
Armenia	0.011	...	...	...	-0.097	-0.0039	-0.119	-0.112	-0.139
Azerbaijan	-0.135	...	...	...	-0.238	-0.13	-0.173	-0.193	-0.169
Belarus	-0.079	...	...	...	...	...	...	...	...
Bulgaria	-0.112	...	...	...	...	...	...	...	...
Estonia	-0.215	...	...	...	...	...	...	...	...
Georgia	-0.165	...	...	...	-0.252	-0.107	-0.186	-0.167	-0.172
Kazakhstan	-0.115	...	...	...	...	...	...	...	...
Kyrgyz Republic	-0.111	...	...	...	-0.238	-0.157	-0.237	-0.192	-0.201
Latvia	-0.241	...	...	...	...	...	...	...	...
Lithuania	-0.208	...	...	...	...	...	...	...	...
Moldova	-0.156	...	...	...	-0.22	-0.095	-0.174	-0.156	-0.215
Macedonia	-0.149	...	...	...	...	...	...	...	...
Poland	-0.124	...	...	...	...	...	...	...	...
Romania	-0.076	...	...	...	...	...	...	...	...
Russia	-0.14	...	...	...	...	...	...	...	...
The Slovak Republic	-0.152	...	...	...	...	...	...	...	...
Slovenia	-0.159	...	...	...	...	...	...	...	...
Tajikistan	-0.125	...	...	...	-0.228	-0.105	-0.170	-0.149	-0.144
Ukraine	-0.142	...	...	...	...	...	...	...	...
Uzbekistan	-0.051	...	...	...	-0.137	-0.096	-0.161	-0.131	0.156
R-squared	0.58	0.58	0.58	0.57	0.74	0.73	0.71	0.71	0.68
Adjusted R-squared	0.53	0.53	0.53	0.53	0.65	0.67	0.66	0.66	0.64
Likelihood ratio	9.82	11.67	12.43	12.69	8.57	12.95	14.54	14.47	14.44
Probability value	0	0	0	0	0	0	0	0	0
Number of observations	284	284	284	284	77	77	771	77	77

Source: Authors' estimates.

## VII. CONCLUSIONS

This paper has focused on the recent growth performance and the prospects of sustainable growth in the CIS-7 countries. The major findings of the paper are the following:

- Although in the early years of transition, the recovery in the CIS-7 countries was driven by consumption, after 1998 the growth was driven by export expansion and investments in export-oriented sectors in Armenia, Azerbaijan, Georgia, and the Kyrgyz Republic. Consumption continued to be the main driving force of the growth in Moldova, and possibly Tajikistan and Uzbekistan.
- The resilience of exports to a global slowdown in recent years indicates that comparative advantages in the form of high energy endowments in selected countries, artificially low energy prices, and a low level of real wages remain strong for the CIS-7 countries. They are likely to continue to stimulate exports, provided no new barriers to trade are put in place.
- Because exports consist mainly of agricultural products, raw materials, and products with a low degree of processing, the CIS-7 countries are becoming increasingly vulnerable to changes in exogenous factors, such as changes in world commodity prices and/or the weather.
- Since 1998, for the first time since the start of the transition, overall total factor productivity (TFP) appears to be increasing in all CIS-7 countries, indicating the possibility that reform efforts began showing results on the production side. Because changes in TFP capture not only the increase in productivity, and increases in capacity utilization,<sup>36</sup> but also better coverage of the private sector by official statistics and changes in hidden employment, the latter conclusion must be interpreted with caution.
- The sectoral breakdown of GDP demonstrates that agriculture, industry, and trade represent the leading sectors driving overall growth in the CIS-7.<sup>37</sup> Industrial growth, in turn, is mostly concentrated in export-oriented industries, i.e. those related to the production of raw materials and goods with a low degree of processing. TFPs in the leading sectors exhibit positive, albeit uneven, growth after 1998.

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<sup>36</sup> An increase in capacity utilization may be considered as one of the positive effects of structural reforms.

<sup>37</sup> Empirical observations also show rapid growth in services from the beginning of transition. The analysis of services is, however, complicated because of an unconventional statistical classification of GDP by sectors in the CIS-7 countries, and is beyond the scope of this paper.

- Output recovery in agriculture may be transitory. While remaining one of the key sectors driving growth in many CIS-7 countries, agriculture has exhibited increasing labor intensity. The share of agricultural investment in the total investment declined. These deteriorations may mainly reflect that other sectors shed employment and prompted an inflow of workers to agriculture, and points to a transitory nature of output recovery in agriculture.
- Although the share of investment in GDP appears to be increasing (because of the expansion in export-oriented sectors), it still remains very low compared to the rest of the CIS and CEEB countries, with the exception of the petroleum sector in Azerbaijan. It is insufficient to overcome vulnerabilities and to achieve a long-term sustainable growth.

Based on the analysis of factors determining growth in the CIS-7, the policy recommendations for the CIS-7 should include measures aimed at further trade liberalization and improvement of general investment climate. Given significant comparative advantages and the potential gains from trade that could be realized, as evidenced by growth of exports in the CIS-7 countries during the recent global contraction, exports are likely to continue to be the leading source of growth in the CIS-7 countries. Therefore, the CIS-7 countries should continue trade liberalization. In particular, emphasis should be given to reducing corruption and improving governance in customs and transport services, as well as removing man-made barriers to trade.<sup>38</sup> Moreover, measures should be pursued to facilitate the development of physical infrastructure conducive to trade. For instance, access to world markets could be facilitated through the development of regional transportation networks.

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<sup>38</sup> See Elborgh-Woytek (2003).



### Data Description and Data Issues

Variable	Definition	Source
GDP growth	Percentage change of GDP in constant prices	WEO (2003), data from IMF economists working on the countries.
Exchange rate dummy	Dummy for “stable” exchange rate regime, 1 = stable rate, 0 = floating rate. The dummy for the “stable” exchange rate arrangement is defined as for fixed exchange rate in classification of Reinhart and Rogoff (2004). That is, the exchange rate is defined as “stable,” if there is <i>de facto</i> peg or bands (2–5 percent), which can be different from the officially announced arrangement.	Authors’ estimates
Fiscal	General government budget balance in percent of GDP	WEO, data from IMF economists, working on the countries.
Avg Index	Average of all EBRD liberalization indices	Authors’ estimates
Bank Reform	Banking reform and interest rate liberalization	EBRD, 2002
Comp Policy	Competition policy	EBRD, 2002
Ent Reform	Governance and enterprise reform	EBRD, 2002
Infr Reform	Infrastructure: the rating is calculated using the average reform process ratings in telecommunications, electric power, water and waste water, roads and railways.	EBRD, 2002
Price Liberalization		EBRD, 2002
Trade Liberalization	Trade and foreign exchange system	EBRD, 2002
Large Privatization	Large-scale privatization	EBRD, 2002
Small Privatization	Small-scale privatization	EBRD, 2002

Table A1. GDP by Expenditure, 1993–2002  
(In percent)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Azerbaijan										
GDP	100	100	100	100	100	100	100	100	100	100
Final consumption	95.7	100.0	94.2	98.0	88.7	98.5	87.4	78.7	75.7	74.4
private	65.6	76.4	82.3	87.2	76.4	83.0	72.4	65.2	64.3	60.1
public	30.1	23.5	11.9	10.8	12.3	15.4	15.0	13.5	11.4	14.5
Gross fixed capital formation	20.9	26.3	14.9	25.8	36.0	35.6	28.5	23.1	22.9	34.8
Changes in inventories	1.8	-15.6	8.1	2.2	-0.7	-2.1	-2.0	-2.5	-2.2	-2.0
Net exports	-14.5	-16.4	-17.2	-26.0	-23.7	-31.9	-13.9	0.7	3.6	-7.5
Armenia										
GDP	100	100	100	100	100	100	100	100	100	100
Final consumption	176.8	105.8	117.5	111.7	114.7	111.6	106.4	108.9	104.9	96.7
private	156.3	94.3	106.1	100.3	103.3	100.1	95.4	96.7	93.8	82.6
public	20.5	11.5	11.3	11.3	11.5	11.5	11.0	12.2	11.1	14.0
Gross fixed capital formation	7.7	20.2	16.2	17.9	16.2	17.2	16.5	18.4	17.0	19.5
Changes in inventories	0.0	3.2	-0.4	3.0	7.0	2.7	1.5	1.3	2.2	0.0
Net exports	-43.1	-40.0	-29.6	-33.1	-36.5	-33.3	-28.8	-26.7	-19.7	-15.1
Georgia										
GDP	...	...	...	100	100	100	100	100	100	100
Final consumption	...	...	...	112.4	108.4	98.2	95.5	99.2	93.7	97.4
private	...	...	...	102.8	97.9	86.5	84.0	89.4	83.0	86.7
public	...	...	...	9.6	10.6	11.7	11.5	9.7	10.7	10.8
Gross fixed capital formation	...	...	...	9.7	10.2	11.2	19.2	17.8	17.9	16.7
Changes in inventories	...	...	...	1.2	1.1	1.1	1.2	1.3	1.3	1.3
Net exports	...	...	...	-19.2	-26.2	-20.7	-19.2	-16.9	-16.0	-11.6
Kyrgyz Republic										
GDP	100	100	100	100	100	100	100	100	100	100
Final consumption	96.0	97.0	94.5	100.6	86.2	106.1	96.8	85.7	82.3	85.6
private	75.7	78.1	75.0	82.1	68.9	88.2	77.6	65.7	64.8	67.6
public	20.3	18.8	19.5	18.5	17.3	17.9	19.1	20.0	17.5	18.0
Gross fixed capital formation	13.3	12.4	20.4	22.4	12.4	12.9	15.7	18.0	16.8	17.2
Changes in inventories	-1.7	-3.0	-2.0	2.8	9.3	2.6	2.3	2.0	1.2	1.3
Net exports	-7.6	-6.3	-12.9	-25.8	-7.9	-21.5	-14.8	-5.7	-0.3	-3.4
Moldova										
GDP	...	100	100	100	100	100	100	100	100	100
Final consumption	...	75.4	82.9	94.3	97.3	100.9	90.0	103.0	101.1	102.7
private	...	52.5	55.8	67.2	67.5	75.4	74.2	87.6	86.0	84.6
public	...	22.9	27.1	27.1	29.9	25.5	15.9	15.4	15.1	18.1
Gross fixed capital formation	...	19.3	16.0	19.7	19.9	22.1	18.4	15.4	16.7	16.6
Changes in inventories	...	9.5	8.9	4.5	3.9	3.8	4.4	8.5	6.5	6.1
Net exports	...	-4.2	-7.8	-18.6	-21.2	-26.8	-12.9	-27.0	-24.4	-25.4
Tajikistan										
GDP	...	...	...	...	...	100	100	100	100	...
Final consumption	...	...	...	...	...	76.7	80.6	81.7	81.5	...
private	...	...	...	...	...	67.4	70.3	72.3	74.0	...
public	...	...	...	...	...	9.3	10.4	9.4	7.5	...
Gross fixed capital formation	...	...	...	...	...	13.4	16.6	9.4	9.2	...
Changes in inventories	...	...	...	...	...	2.0	0.7	2.2	7.4	...
Net exports	...	...	...	...	...	-7.8	1.5	10.2	2.0	...
Statistical discrepancy	...	...	...	...	...	15.6	0.6	-3.4	-0.1	...
Uzbekistan										
GDP	100	100	100	100	100	100	100	100	100	100
Final consumption	105.2	92.8	76.0	84.0	85.1	90.3	90.7	88.2	90.6	86.2
private	54.0	62.4	44.0	53.2	60.2	63.8	66.1	63.7	69.7	65.0
public	51.2	30.4	32.0	30.8	24.9	26.5	24.6	24.5	20.9	21.2
Gross fixed capital formation	2.9	5.7	24.2	23.0	18.9	10.6	10.8	11.0	11.0	11.0
Changes in inventories	...	...	...	...	...	...	...	...	...	...
Net exports	-7.7	2.0	-0.2	-9.4	-3.0	-0.3	-0.3	3.1	0.4	2.7

Sources: IMF staff and national authorities estimations.

Table A2. Annual TFP Growth Rates, 1991–2002  
(In percent)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
	-											
Armenia	10.2	-59.0	-7.4	12.9	5.7	5.1	7.2	9.6	6.1	7.7	n.a.	n.a.
Azerbaijan	-7.9	-21.0	-18.3	-17.5	-12.2	-1.5	0.6	-9.1	5.9	9.7	n.a.	n.a.
	-											
Georgia	18.3	-37.0	-18.2	-9.4	-5.6	10.8	6.4	18.4	5.4	-0.8	3.6	6.3
Kyrgyz Republic	-6.9	-24.8	-10.7	-26.3	-9.6	3.0	9.6	1.2	0.7	4.3	3.7	-3.6
	-											
Moldova	21.4	-34.4	8.9	-36.7	-6.6	-5.4	1.3	-6.0	3.8	4.7	8.3	0.3
Tajikistan	-7.6	-25.5	-18.9	-12.5	-11.0	-13.2	-1.2	5.4	6.3	8.2	7.0	n.a.
Uzbekistan	-4.2	-9.5	-2.2	-5.3	-2.4	-1.1	3.1	3.4	4.1	n.a.	n.a.	n.a.

Sources: De Broeck and Koen (2000); and authors' estimates.

Table A3. Annual Labor Productivity Growth, 1991–2002  
(In percent)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Armenia	-13.9	-38.4	-6.7	9.3	7.7	8.9	7.9	10.1	6.4	7.7	n.a.	n.a.
Azerbaijan	-5.2	-19.3	-23.0	-17.9	-11.4	-0.7	5.5	-13.8	7.4	11.0	n.a.	n.a.
Georgia	-13.4	-30.1	-21.8	-8.2	-15.8	10.8	6.5	27.2	5.9	-2.7	2.4	6.1
Kyrgyz Republic	-6.9	-18.8	-7.7	-18.4	-5.2	6.5	7.9	1.2	0.2	5.2	4.2	-3.9
Moldova	-17.4	-28.3	20.0	-30.6	-1.4	-7.1	2.2	-6.3	6.1	0.8	7.2	6.8
Tajikistan	-9.9	-27.7	-14.9	-11.8	-12.8	-10.9	-1.7	5.0	7.2	7.8	5.1	n.a.
Uzbekistan	-5.1	-10.5	-2.2	-6.6	-2.1	0.4	3.7	3.0	4.0	n.a.	n.a.	n.a.

Sources: Authors' estimates.

Table A4. Components of GDP by Expenditures, 1994–2002

Average	Consumption				Fixed investment		Net Exports	
	94–98		99–02		94–98	99–02	94–98	99–02
	Private	Public	Private	Public				
Armenia	100.8	11.4	86.0	10.3	15.9	17.9	-35.9	-22.6
Azerbaijan	84.1	13.4	65.5	13.6	23.0	27.3	-21.6	-4.3
Georgia 2/	95.7	10.6	85.8	10.7	10.4	17.9	-22.1	-15.9
Kyrgyz Republic	78.5	18.4	68.9	18.7	16.1	16.9	-14.9	-6.1
Moldova	63.7	26.5	83.1	16.1	19.4	16.8	-15.7	-22.4
Tajikistan 3/	67.4	9.3	72.3	9.1	13.4	11.8	-12.2	-8.0
Uzbekistan	56.7	29.0	66.1	22.8	16.5	11.0	-2.2	1.5

Sources: National authorities; and IMF staff and authors' estimates.

1/ See Table A1 in Appendix I for annual data on decomposition of GDP by expenditure components.

2/ Data series for Georgia starts at 1996. Therefore, the first average is for 1996–98.

3/ Data series for Tajikistan is for 1998–2001. Therefore, the first average covers 1998 only, and the second average covers 1999–2001.

Table A5. Foreign Direct Investment in CIS-7, 1996–2002  
(In percent of GDP)

	1996	1997	1998	1999	2000	2001	2002
Armenia	1.1	3.2	11.6	6.6	5.5	3.3	4.6
Azerbaijan	20.8	27.4	23.0	11.1	2.8	5.2	17.1
Georgia	1.8	6.6	6.1	2.2	5.0	2.5	3.8
Kyrgyz Republic	2.6	4.7	5.3	3.1	-0.5	-0.1	1.0
Moldova	1.4	4.1	4.4	3.3	11.1	10.5	6.6
Tajikistan	1.7	1.6	1.9	1.9	2.4	0.9	3.0
Uzbekistan	0.7	1.1	0.9	0.7	0.5	0.7	0.7
CIS-7, average	4.3	6.9	7.6	4.1	3.8	3.3	5.3
CIS-7, excluding Azerbaijan	1.5	3.6	5.0	3.0	4.0	3.0	3.3
Other CIS, average	2.4	2.8	2.4	3.7	2.4	4.1	3.4

Source: IMF: FSU database.

### Box 1. Statistical Issues in Analysis of GDP by Expenditure Components

The decomposition of the GDP by expenditure components is based on official data, which are subject to both conceptual and measurement problems (see Fischer, Sahay, and Vegh, 1996a and 1998 for details). Statistical discrepancies in the breakdown of GDP by expenditure components were large for some countries, especially for early transition years. For a number of countries, statistical discrepancies are captured in different expenditure items. For example, in the National Accounts Statistics in Uzbekistan the item “Investments” contains a large sub-item “Inventory,” which is used by the government for balancing all statistical discrepancies in GDP accounting.

For Tajikistan, the data on GDP by expenditure are available only from 1998 onwards. The country’s statistical services provide data on the decomposition of nominal GDP by expenditure, although work has only recently begun on estimates for expenditure components of real GDP.

Further, in the absence of reliable official data on expenditures, staff country teams typically derive expenditure components with consumption as a residual.

The breakdown of GDP by expenditure components raises questions as to whether the data are reliable. With this in mind, it is difficult to determine just where the biases lie in the data provided. The data on government expenditures are known and the external components are known (apart from the treatment of errors and omissions). Therefore, the main question remaining is the data for the overall GDP and the split between consumption and investment. The inaccurate measurements of the shadow economy in the CIS-7 countries are more likely to affect the final consumption component, rather than investment, because investment can be easily seen by tax authorities. Also, there are few incentives for enterprises to understate investment, because overstating investment leads to higher depreciation allowances and lower tax bills. Hence, incentives are to overstate investment; thus, the bias may well be to understate the consumption component.

The contributions of expenditure components to the real GDP growth, presented in Table 3, are computed as follows. The contributions of the final consumption and gross capital formation are calculated based on the data of these components in constant prices from the WEO. The contribution of net exports to the real GDP growth is calculated as a residual difference between the real GDP growth and contributions from final consumption and investments, because the data on net exports in constant prices are not available. Although there are data on exports and imports of goods and nonfactor services in current prices, calculations of real growth rates using those data and deflators produce inconsistent results.

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